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Renewables information



International
Energy Agency
Secure
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2017

Renewables information

with 2016 data **2017**

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- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
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INTRODUCTION

Renewables Information 2017 is the 16th edition of an annual publication which provides sound market information on renewable and waste energies to policy and market analysts, and those employed in all sectors of the renewables industry.

Monitoring and reporting of historical trends, as well as the current energy market situation, provides a strong foundation for policy and market analysis to better inform the policy decision process towards policy instruments that are best suited to meet domestic and international objectives.

Renewables Information 2017 brings together in one volume the basic statistics compiled by the IEA on renewables and waste. It covers production, trade, transformation to electricity and heat, final consumption and installed generating capacity from renewables and waste. This introduction is followed by important information that will assist the reader in correctly using the data in this publication.

The information is structured as follows:

Key trend provides an overview of developments in the markets for renewables and waste in the world. The focus is given to OECD Member countries but it also provides selected renewables indicators for non-OECD countries.

Part I of the publication provides Explanatory notes:

1. Definitions
2. Sources and notes
3. Geographical coverage¹
4. Energy conventions and units

1. This document is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area. In this publication, “country” refers to a country or a territory, as the case may be.

Part II provides, in tabular form, a statistical overview corresponding to key trends.

Part III provides, in tabular form, a more detailed and comprehensive picture of developments in renewables and waste for each OECD Member country, including the country notes, which information can help understanding the data.

The OECD data shown in this publication are primarily based on the *Annual Renewables and Waste Questionnaire* submissions from OECD Member countries to the secretariat. The Energy Data Centre of the IEA secretariat works closely with national administrations to ensure consistency in time series and with IEA product definitions and reporting conventions. The finalised data provide the basis for *World Energy Balances*.

The non-OECD data are based upon information collected by the IEA secretariat, including via national submissions to the United Nations and via national energy publications. The resulting synthesis is published in *World Energy Balances*. Users of this publication are directed to the methodology sections of those publications for more detail on individual non-member countries covered in the publication.

A data service is available on the internet. It includes unlimited access through an annual subscription as well as the possibility of obtaining data on a pay-per-view basis. Details are available at <http://data.iea.org>.

In addition, all tables are available in our online data service and on CD-ROM. Information on ordering the data services and other energy statistics publications is available at the end of this book, and on the IEA website at www.iea.org/statistics/.

Further information on reporting methodologies is also available on the IEA website.

Data were collected by the team in the Energy Data Centre (EDC) of the IEA secretariat, headed by Duncan Millard. The IEA would like to thank and acknowledge the dedication and professionalism of the statisticians working on energy data in the countries. Within the IEA, for OECD members: electricity, coal and renewable data were prepared, respectively, by Mark Mateo, Beatriz Martínez and DaeYong Kwon, under the responsibility of Vladimir Kubecek; oil and natural gas data were prepared, respectively, by Laura Thomson and Aitor Soler Garcia, under the responsibility of Erica Robin; balances data were prepared by Rémi Gigoux, under the responsibility of Roberta Quadrelli. Non-OECD countries statistics were prepared by Emmanouil Christinakis, Laila El-Ashmawy, Musa Erdogan, Markus Fager-Pintilä, Nikolaos Kordevas, Agnieszka Koscielniak, Claire Morel, Klaus Pedersen

and Arnaud Pincet under the responsibility of Céline Rouquette.

Vladimir Kubecek has the overall responsibility for this report. The publication and its statistics were produced by DaeYong Kwon. Desktop publishing was carried out by Sharon Burghraeve.

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What's new?

Latvia joining OECD

As Latvia became an OECD member in July 2016, Latvia appears in the list of OECD members and is included in the zone aggregates, starting with the 2017 edition. Consequently, you can find data for Latvia in Part II and Part III.

New data

In this edition, you can find new data showing hydro capacity broken down by size and type in Table 2 of Part II.

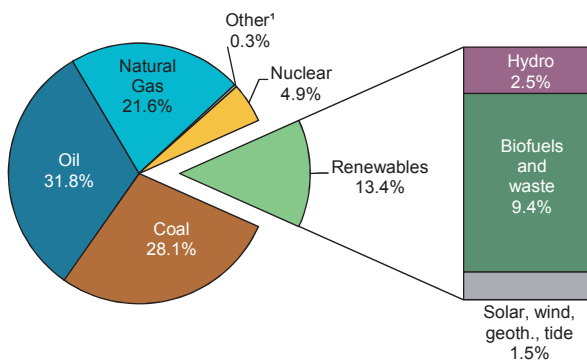
In Table 3 of Part II, 5 year average of capacity factor has been added.

In the case you would like us to add some more or other information, please contact us at RenewAQ@iea.org.

OVERVIEW OF RENEWABLES AND WASTE IN THE WORLD

In 2015, world Total Primary Energy Supply (TPES) was 13,647 Mtoe, of which 13.4%, or 1,823 Mtoe (up from 1,784 Mtoe in 2014), was from renewable energy sources (Figure 1).

Figure 1: 2015 fuel shares in world total primary energy supply



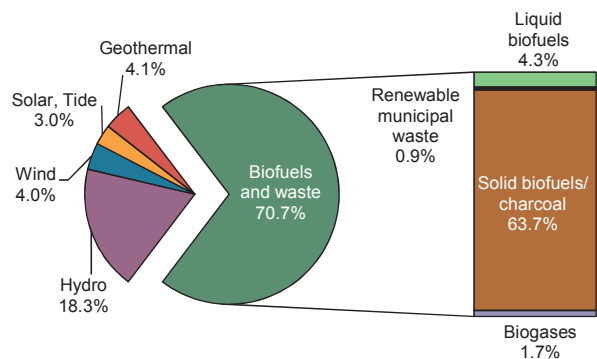
1. Other includes non-renewable wastes and other sources not included elsewhere such as fuel cells.

Note: Totals in graphs might not add up due to rounding.

Due to its widespread non-commercial use in developing countries (i.e. residential heating and cooking), solid biofuels/charcoal remains the largest renewable energy source, representing 63.7% of global renewables supply (Figure 2). The second largest source is hydro power, which provides 2.5% of world TPES or 18.3% of renewable energy supply. Geothermal, liquid biofuels, biogases, solar, wind, and tide each hold a smaller share making up the rest of the renewables energy supply.

Since 1990, renewable energy sources have grown at an average annual rate of 2.0%, which is slightly higher than the growth rate of world TPES, 1.8% (Figure 3).

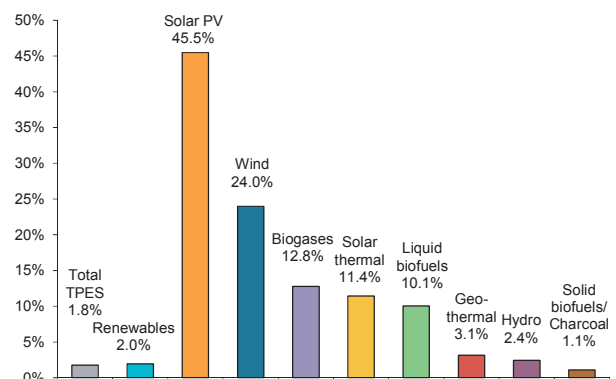
Figure 2: 2015 product shares in world renewable energy supply



Note: Totals in graphs might not add up due to rounding.

Growth has been especially high for solar photovoltaic and wind power, which grew at average annual rates of 45.5% and 24.0% respectively, both from very low bases in 1990. Biogases had the third highest growth rate at 12.8%, followed by solar thermal (11.4%) and liquid biofuels (10.1%).

Figure 3: Average annual growth rates of world renewables supply from 1990 to 2015

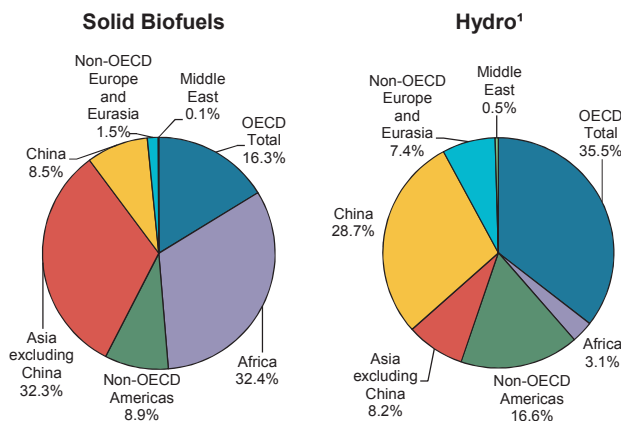


The average annual growth rate of hydroelectric power in non-OECD countries between 1990 and 2015, was 3.9%, much larger than the 0.6% growth in OECD countries. Growth in non-OECD was mainly driven by China accounting for 63.8% of hydro power increase in non-OECD countries. China showed 9.1% of growth rate between 1990 and 2015. Viet Nam and Mozambique are the other main contributors to the high growth rate, with average annual growth rates of 9.8% and 17.8% respectively.

In 2015, non-OECD countries accounted for 64.5% of total hydro power and any further increase is likely to be from these countries, as most of the remaining hydro potential resides in these countries.

Non-OECD countries also account for most of the production of solid biofuels. In 2015, 83.7% was produced and consumed in non-OECD countries, where developing countries, situated mainly in Asia and Africa, use non-commercial biomass for residential cooking and heating (Figure 4). Africa, which accounted for only 5.8% of the world's total TPES in 2015, accounted for 32.4% of the world's solid biofuels supply.

Figure 4: 2015 regional shares in renewables supply



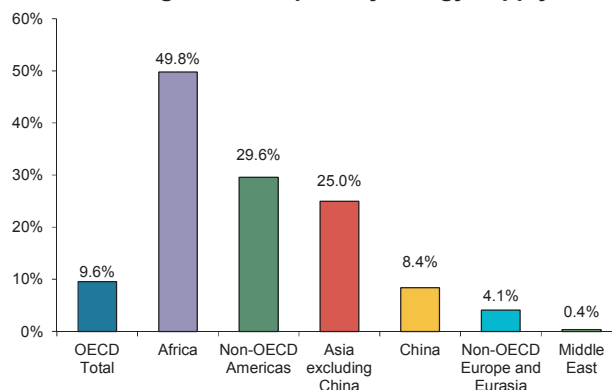
1. Excludes pump storage generation.

Note: Totals in graphs might not add up due to rounding.

Largely because of their use of non-commercial solid biofuels, non-OECD countries are the principal renewable energy users, accounting for 72.3% of world total renewables supply. On the other hand, while OECD countries supply 27.7% of world renewables, they constitute 38.5% of the world TPES. In OECD countries the share of renewables in total energy supply is 9.6% compared to 49.8% in Africa, 29.6% in Non-OECD Americas, 25.0% in Asia excluding China (Figure 5). However, the OECD countries play a

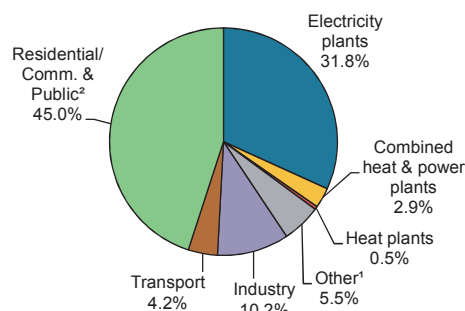
major role when looking at “new” renewables, a loosely defined term used to delineate between traditional and more recent technologies used to produce renewable energy. In 2015, the OECD countries accounted for 64.0% of world energy from solar, wind, tide, renewable municipal waste, biogases and liquid biofuels, whilst Africa represented 0.4%, 9.4% for Non-OECD Americas, 5.0% for Asia excluding China, and 20.1% for China.

Figure 5: 2015 shares of renewables of regional total primary energy supply



About half of the renewable primary energy supply in OECD countries is used in the transformation sector to generate electricity and sold heat. However, on a global level a majority of renewables is consumed in the residential, commercial and public services sectors. Again, this is a consequence of widespread solid biofuels use in the residential sector of developing countries. In fact, globally 35.1% of renewables are used for electricity production and heat production worldwide, while 45.0% are used in the residential, commercial and public sectors (Figure 6).

Figure 6: 2015 world sectoral consumption of renewables



1. Other transformation, energy industry own use, losses.

2. Includes the Agriculture/ forestry, fishing and non-specified industries.

Note: Totals in graphs might not add up due to rounding.

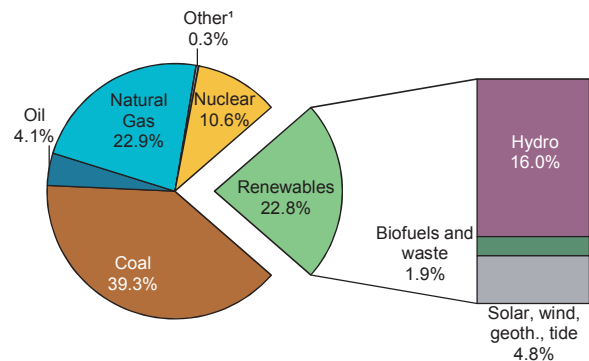
Renewables were the third largest contributor to global electricity production in 2015. They accounted for 22.8% of world electricity generation, after coal (39.3%) and gas (22.9%) and ahead of nuclear (10.6%) and oil (4.1%). However, the relative position of renewables and gas can be influenced by various factors among which the weather conditions play prime role.

Hydroelectricity supplies the vast majority of renewable electricity, generating 16.0% of world electricity, which is 70.3% of total renewable electricity, whilst biofuels and waste, including solid biofuels, play a minor role in electricity generation, supplying 1.9% of world electricity. Although growing rapidly, geothermal, solar, wind and tide energies accounted for only 4.8% of world electricity production, 21.2% of total renewable electricity in 2015.

Since 1990, renewable electricity generation worldwide grew on average by 3.6% per annum, which is slightly faster than the total electricity generation growth rate (2.9%). So whilst 19.4% of global electricity in 1990 was produced from renewable sources, this share has increased to 22.8% in 2015.

Over this period, hydroelectric power saw its share of total world electricity production fall from 18.1% in 1990 to 16.0% in 2015. Taking out hydroelectricity from renewables, the share of the remaining renewable sources used to produce electricity grew from 1.3% in 1990 to 6.8% in 2015.

Figure 7: Fuel shares in world electricity production in 2015



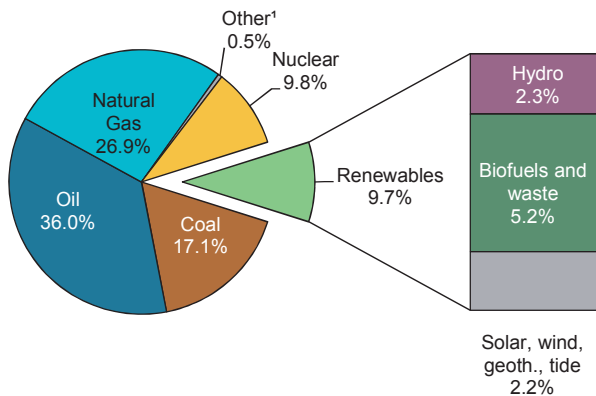
1. Other includes electricity from non-renewable wastes and other sources not included elsewhere such as fuel cells and chemical heat, etc.

Note: Totals in graphs might not add up due to rounding.

OVERVIEW OF RENEWABLES AND WASTE IN OECD COUNTRIES

In 2016, the share of renewables in total OECD primary energy supply reached 9.7%, the highest share since the IEA time series began in 1990 (Figure 8). This represents a slowdown in the growth of the share of renewables in TPES with the share increasing from 9.6% in 2015 and 9.4% in 2014, but well above the 6% level of 1990. OECD Europe experienced an increase in renewable TPES from 14.0% in 2015 to 14.2% in 2016. OECD Americas showed an increase in renewable TPES from 8.2% to 8.5% in the same period. On the other hand, OECD Asia experienced a decrease in renewables share in TPES from 5.0% to 4.8%.

Figure 8: 2016 fuel shares in OECD total primary energy supply



1. Other includes non-renewable wastes and other sources not included elsewhere such as fuel cells.

Note: Totals in graphs might not add up due to rounding.

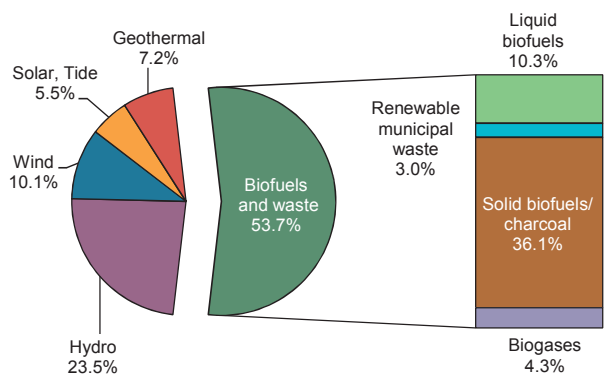
Primary energy supply

In OECD countries, total primary energy supply (TPES) from renewable sources increased from 272 Mtoe to 512 Mtoe between 1990 and 2016, an average annual growth rate of 2.5%. By comparison, the growth of

TPES for non-renewable energy sources (including coal, oil, gas and nuclear) was 0.4%.

The largest portion of renewable primary energy supply in the OECD comes from biofuels and waste, which accounted for 53.7% of the renewable supply (Figure 9). Of the biofuels, solid biofuels, including wood, wood wastes, other solid wastes and charcoal, constitutes the largest share, 36.1% of the renewable supply. The second largest renewable energy source is hydroelectric power, providing 23.5% of renewable primary energy. Solid biofuels and hydro accounted for 59.6% of the total OECD primary renewable energy in 2016.

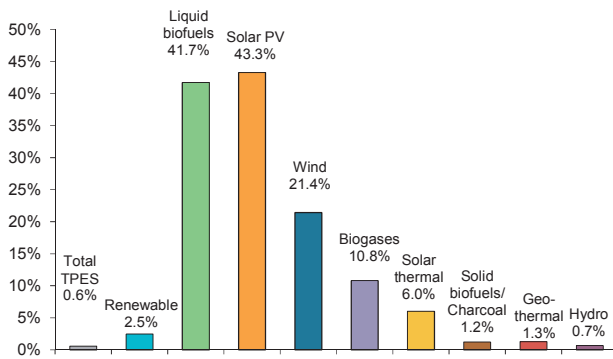
Figure 9: 2016 product shares in OECD renewable energy supply



Note: Totals in graphs might not add up due to rounding.

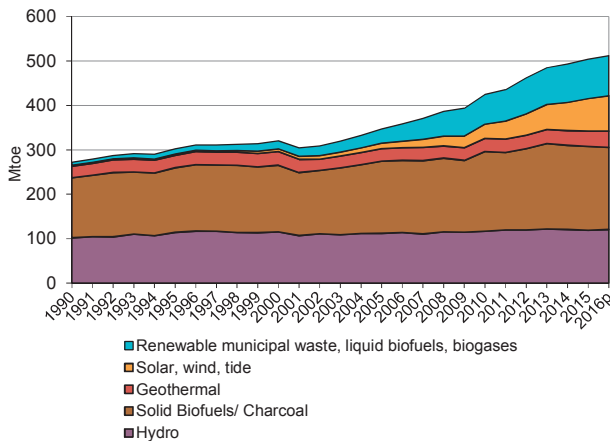
The average annual growth rate of solid biofuels between 1990 and 2016 was 1.2% and 0.7% for hydro (Figure 10), lower than the average annual growth rate of all renewable energies, 2.5%. This is mainly because hydroelectric capacity is mature in most OECD member states, and increasingly difficult to locate suitable sites to expand this energy form.

Figure 10: Annual growth rates of renewable supply from 1990 to 2016 in OECD total



Solid biofuels and hydro influenced much of the growth of total renewables between 1990 and 2001 (Figure 11). However, since 2001, the majority of renewables growth can be attributed to “new” renewables which have all seen growth rate above the average for all renewables. For example, solar photovoltaic experienced the highest growth among the renewables, averaging 43.3% between 1990 and 2016. Also experiencing high growth rates are liquid biofuels, 41.7%, and wind, 21.4% per annum since 1990. Biogases have grown much more rapidly than solid biofuels, with an average annual growth rate of 10.8%.

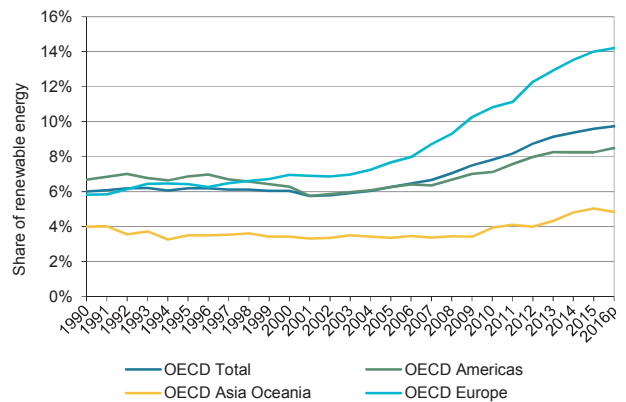
Figure 11: OECD renewable primary energy supply by product



However, despite these significant growth rates, the contribution of such “new” renewables to the total energy supply is still relatively small. Renewable municipal waste, biogases, liquid biofuels, wind, solar, and tide combined still represent only 3.2% of total primary energy supply. Nevertheless, their growing contribution to the renewable energy supply should be noted as their share of total renewables in OECD countries increased from 3.1% in 1990 to 33.2% in 2016.

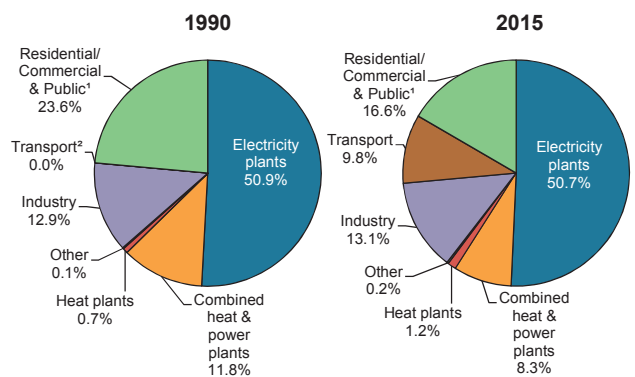
Among the different OECD regions, OECD Europe has the highest share of primary energy supply from renewable sources, with 14.2% in 2016 (Figure 12) and the largest increase in its renewable share since 1990 (up from 5.8%). The increase of the renewable share in OECD Europe is the result of the implementation of strong policies supporting renewable energy in the late 1990s and early 2000s, in particular the European Union’s directive to increase the share of renewable energy in TFC to 20% by 2020, which includes targets for individual countries. The renewable share of TPES in OECD Americas reached 8.5% in 2016, the highest level since the IEA time series began. In OECD Asia Oceania the share of renewable primary energy supply remained more constant between 1990 and 2016 (from 4.0% to 4.8%).

Figure 12: OECD regional shares in renewable energy supply



As a result of diversification in the use of renewables, sectoral renewables consumption has changed compared to 1990 (Figure 13). The most significant trend is the steep growth of biofuels used for transport. In 2015, liquid biofuels and biogases used for transport constituted 9.8% of the consumption of renewables.

Figure 13: OECD sectoral consumption of renewables



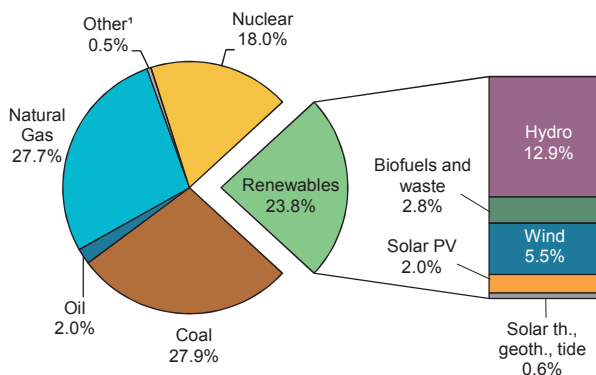
1. Includes the Agriculture/ forestry, fishing and non-specified industries.
 2. Represents less than 0.05%.
 Note: Totals in graphs might not add up due to rounding.

Electricity production

OECD gross electricity production from renewable products (excluding generation from pumped storage plants) reached 2 588.3 TWh in 2016, a 3.8% increase from the 2015 level of 2 494.1 TWh. This represents 23.8% of total OECD electricity production in 2016 (Figure 14), which is the largest share of renewables in gross electricity production for any year in the renewables time series beginning from 1990.

The increase in electricity production from renewables was mainly caused by wind and solar PV. For wind, electricity production increased by 43.1 TWh which is mostly coming from the US (36.3 TWh), followed by Turkey (3.8 TWh) and Italy (2.8 TWh). Solar PV increased by 35.0 TWh, again mainly driven by the US, which had increased electricity production from solar PV by 18.0 TWh, followed by Japan (8.0 TWh), UK (2.7 TWh) and Chile (1.3 TWh).

Figure 14: Renewable shares in OECD electricity production in 2016



1. Other includes electricity from non-renewable wastes and other sources not included elsewhere such as fuel cells and chemical heat, etc. Note: Totals in graphs might not add up due to rounding.

Since 1990, electricity generation from renewable energy sources in OECD has been growing at an average rate of 2.6% per year, almost double the rate for total electricity generation (1.4%), mainly through the strong growth in “new” renewable products, such as solar PV, wind, renewable municipal waste and biogases.

Among renewables sources, hydroelectric power production has experienced the lowest average growth rate of any renewables electricity source from 1990 to 2016, 0.7% (Figure 15). This is because hydroelectric power has reached its capacity limit in most OECD

countries. Hydroelectricity generated 15.4% of total OECD electricity in 1990 but this share has decreased to 12.9% in 2016. With growth in other types of renewables, the hydroelectricity share of electricity from renewable energy sources declined from 89.4% in 1990 to 54.2% in 2016.

The share of non-hydro renewable electricity in total OECD electricity production increased from 1.8% in 1990 to 10.9% in 2016. In 1990, the majority of non-hydroelectricity was generated by solid biofuels and geothermal energy accounting for 7.2% and 2.2% of renewable electricity respectively, whilst solar photovoltaic, wind, biogases and liquid biofuels combined represented less than 0.6%. However, between 1990 and 2016, these technologies grew much faster than any other power source (Figure 15). Most notable is wind, which grew from 0.3% in 1990 to 23.2% of renewable electricity in 2016, a 21.4% average annual growth rate, making it now the second largest renewable source for electricity. The share of solar PV in OECD renewable electricity production increased from 0.0% to 8.4% in the same time period, and biogases increased from 0.3% to 3.1%, average growth from 1990 of 43.3% and 12.7% respectively. All of these sources experienced higher average growth rates than older technologies such as hydro power (0.7%), solid biofuels (2.6%) and geothermal (2.3%). As a result, non-hydro renewable electricity production experienced an 8.5% of average annual growth rate between 1990 and 2016 (Figure 15).

Figure 15: Annual growth rates of electricity production between 1990 and 2016 in OECD countries

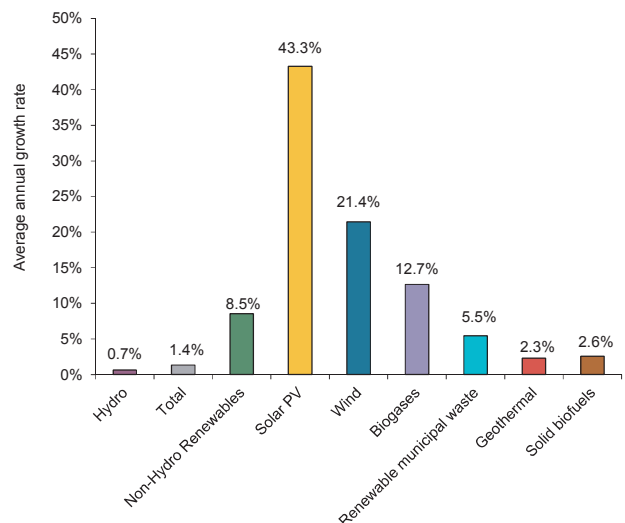
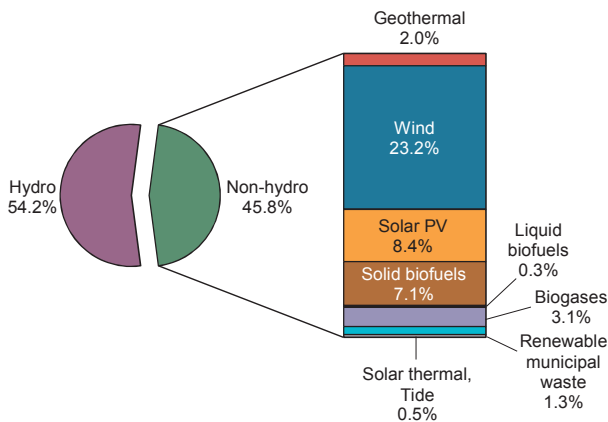


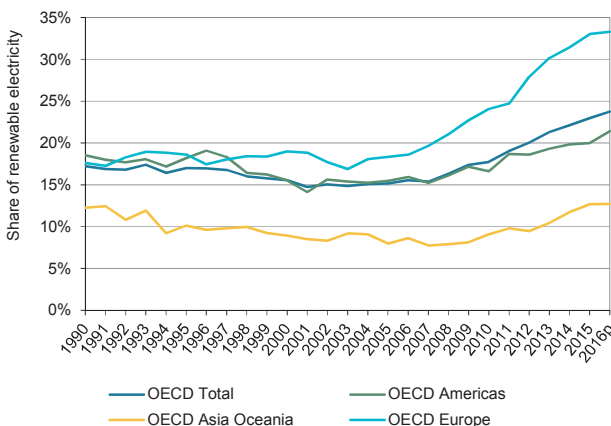
Figure 16: Shares in OECD renewable electricity production in 2016



Note: Totals in graphs might not add up due to rounding.

Renewable electricity production in OECD Europe grew 3.6% per annum since 1990. This growth rate is higher than other OECD regions, 1.9% for OECD Americas and 2.1% for OECD Asia Oceania. OECD Europe supplied 46.0% of total OECD renewable electricity production in 2016, up from 35.5% in 1990, slightly higher than the level of OECD Americas of 44.3%. The shares of electricity from renewables increased from 18.5% in 1990 to 21.4% in 2016 in OECD Americas, from 17.6% to 33.3% in OECD Europe, and from 12.3% in 1990 to 12.7% in OECD Asia Oceania (Figure 17). As a result of these increases, the OECD region as a whole saw its share of electricity from renewable sources grow to 23.8% in 2016 from 17.3% in 1990.

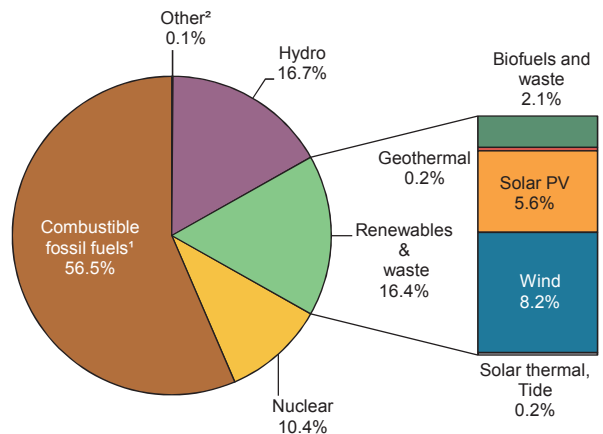
Figure 17: OECD regional shares in renewable electricity production from 1990 to 2016



Installed generating capacity

In 2015, 957.3 GW, 33.1% of total OECD generating capacity, was renewable energy and waste sources (Figure 18). Compared to 2014, total electricity generation capacity increased by 31.5 GW with the biggest growth seen in solar PV (28.6 GW) and wind (24.6 GW), offsetting the decreases experienced in nuclear (-2.5 GW) and combustible fuels (-27.6 GW). The largest increase in solar PV occurred in Japan which added 10.8 GW, followed by the US (6.8 GW) and the UK (3.8 GW). The sum of these three countries account for 74.6% of total increase. Regarding wind capacity, the largest growth was in the US, 8.3 GW, followed by Germany with 5.5 GW increment.

Figure 18: OECD generating capacity 2015



1. The capacities of plants which co-fire biofuels and waste with fossil fuels (e.g. solid biofuels that are co-fired with coal) are included under the dominant fuel.

2. Other: fuel cells, waste/chemical heat.

Note: Totals in graphs might not add up due to rounding.

The largest share (16.7%) of total generating capacity is hydroelectric plants, 483.4 GW, followed by 238.5 GW from wind (8.2%), 161.7 GW from solar photovoltaic (5.6%), and 62.1 GW from biofuels and waste (2.1%).

Of the biofuels and waste, 31.6 GW was solid biofuel capacity, 12.6 GW was municipal waste, 13.2 GW was biogases and 2.4 GW was liquid biofuels. The remaining generating capacity is accounted for by geothermal (0.2%), solar thermal, tide, wave and ocean power capacity, with less than 0.2%. Hydro pumped storage capacity represented 70.7 GW.

Detailed electricity production by source

This section provides more detailed analyses of individual renewable and waste energy sources in the electricity production. The energy sources are listed in the order of decreasing share in the renewable electricity production of OECD countries.

Hydroelectricity

As mentioned above, hydroelectric power is nearing its potential capacity limit in most OECD countries. Between 1990 and 2016, electricity generated from hydroelectric plants (excluding generation from pumped storage plants) increased from 1,183.8 TWh to 1 401.9 TWh in the OECD, yielding an average annual increase of 0.7%. While 89.4% of electricity produced from renewable sources came from hydroelectric plants in 1990, this share decreased to 54.2% in 2016 due to the rapid growth of electricity generation from other renewable sources. Despite this decrease, hydroelectric power is still the largest electricity producer among renewable technologies. In 2016, the largest hydroelectric power generating countries were Canada, the United States and Norway which represented 27.7%, 19.1% and 10.2%, respectively, of OECD hydroelectric production. Whilst the highest share in total electricity generated was seen in Norway (96.3%) followed by Iceland (72.6%) and Austria (61.2%).

Wind

In 2016, wind turbines produced 23.2% of renewable electricity in the OECD. Between 1990 and 2016, wind power increased from 3.8 TWh to 599.4 TWh, achieving an average annual growth rate of 21.4%. This is the second fastest growth rate of renewable electricity after solar photovoltaic. Among OECD regions, wind electricity production is the highest in OECD Europe, with 51.4% of the total OECD production in 2016. Most of the growth also occurred in OECD Europe, where wind grew by 25.9% per annum. In absolute terms, the United States, Germany and Spain are the largest producers of electricity from wind within the OECD, producing 229.3 TWh, 77.4 TWh and 48.9 TWh respectively.

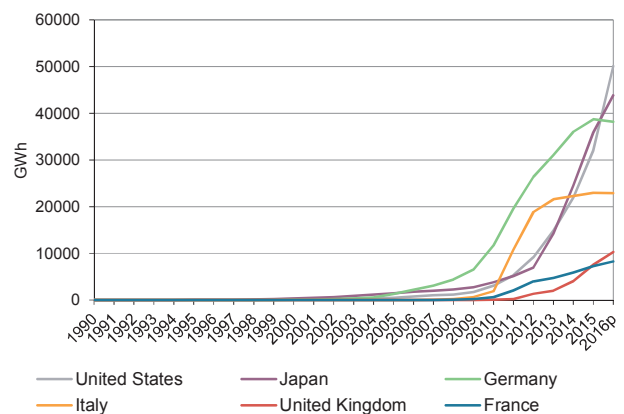
Solar photovoltaic

The OECD as a whole produced 218.3 TWh of PV electricity in 2016, 8.4% of its total renewable electricity production. The five largest producers of solar

photovoltaic (PV) electricity in the OECD were the United States with 50.1 TWh, Japan with 43.8 TWh, Germany with 38.2 TWh, Italy with 22.9 TWh, and the UK with 10.3 TWh. These five countries combined produced 75.7% of the PV electricity in the OECD.

While being small in absolute terms, electricity from solar PV increased from 19 GWh in 1990 to 218 283 GWh in 2016, achieving a 43.3% annual growth rate, the fastest of all renewable electricity technologies. US, the largest producer among OECD countries, increased production from 183 GWh in 2000 to 50 103 GWh in 2016, achieving a 42.0% growth rate over that time (Figure 19). Japan, the second largest producer, increased production from 347 GWh in 2000 to 43 846 GWh in 2016, with a growth rate over those years of 35.3%.

Figure 19: Solar photovoltaic electricity in six major OECD producing countries from 1990 to 2016



Solid biofuels

Electricity generation from solid biofuels grew from 95.2 TWh to 184.3 TWh between 1990 and 2016, a 2.6% average annual growth. As the fourth largest renewable electricity source, solid biofuels accounted for 7.1% of renewable electricity generation in 2016. The United States (45.3 TWh) accounted for 24.6% of electricity generated from solid biofuels within the OECD, where it makes up 7.1% of the country's renewable electricity production. The second largest producer of electricity from solid biofuels is Japan (29.3 TWh), where it represents 18.1% of the country's renewable electricity supply. Other large producers of electricity from solid biofuels in the OECD in 2016 are the UK, Germany, and Finland, producing 19.6 TWh, 11.0 TWh and 10.8 TWh respectively.

Biogases

Electricity in the OECD from biogases grew from 3.7 TWh in 1990 to 81.3 TWh in 2016. With an average annual growth rate of 12.7% since 1990, biogases are the third fastest growing source of renewable electricity in the OECD.

The driver of this growth is OECD Europe, which accounted for 79.5% of OECD production in 2016. Much of the growth is due to Germany, where production grew by 20.9% per annum since 1990, making it the largest producer in the OECD (42.0%). The third and fourth largest OECD producers were also located in Europe. Italy produced 9.0 TWh or 11.0% of OECD production, and the United Kingdom produced 7.4 TWh (9.2%).

The second largest OECD producer in 2016 is the United States which produced 13.3 TWh, or 16.3% of electricity from biogases in the OECD. However, despite its large share in OECD production, the United States growth rate (6.6% per year since 1990) has been lower than many of the European Union countries that use biogases, e.g. 38.2% in Italy and 20.9% in Germany.

Geothermal

Similar to hydroelectric power, geothermal electricity production has not experienced significant growth between 1990 and 2016. It grew at an average annual rate of 2.3%, from 28.6 TWh to 51.8 TWh.

Geothermal electricity generation remained almost static in OECD Americas over the period 1990 to 2016, although the region remains the largest geothermal electricity producer, with a 48.8% share of OECD production in 2016. The United States is the largest producer with 37.2% of the OECD total in 2016, with a production of 19.2 TWh, slightly above the 16.0 TWh level in 1990. The second largest producer is New Zealand, with 7.9 TWh in 2016, representing 15.2% of total OECD production. Other major producers are Italy (12.0%), Mexico (11.7%), and Iceland (9.8%).

Renewable municipal waste

Renewable municipal waste represented 1.3% of renewable electricity generation in 2016 in OECD countries. Renewable municipal waste has one of the smallest portions of renewable electricity portfolio. The highest share it represented in any one country is the Netherlands at 13.8%, Luxembourg at 9.3% and Hungary at 7.6%.

It should be noted that sometimes data are estimates rather than observations because the energy classification systems of some countries do not separate renewable and non-renewable municipal waste.

In 2016, 32.8 TWh of electricity was produced from renewable waste in the OECD. By far the largest producer of electricity from renewable municipal waste is the United States, generating 8.4 TWh, or 25.6% of OECD production. The second largest producer is Germany, with a production of 6.0 TWh (18.2%). With 2.6 TWh (7.8%), the UK is the third largest producer. Italy experienced the highest growth rate, increasing production from 37.0 GWh to 2,538 GWh (a growth rate of 17.7% per annum).

Liquid biofuels

Liquid biofuels for electricity production is a relatively new technology. The first country to report electricity production of this type was Germany in 2001 with 15 GWh. Since then, an increasing number of countries have produced substantial amounts of electricity from liquid biofuels. In 2016, ten countries reported a total of 6 499 GWh of production. The largest producer currently is Italy with 4,818 GWh.

Solar thermal

Solar thermal power production experienced rapid growth in the 1980's and 90's reaching 887 GWh in 1998, but stagnated in the following years. During the period of 1999 to 2006, average annual growth rates for solar thermal were essentially zero. Due to the recent renewed interest in solar thermal, the US has increased its production from 527 GWh in 1999 to 5 533 GWh in 2016. Prior to 2007, OECD solar thermal production took place mostly in the United States with small demonstration plants in Australia. With the opening of a new solar thermal power plant in 2007, Spain became the third OECD country to report electricity production from solar thermal with 5 506 GWh in 2016. These three countries combined produced all 11 045 GWh of OECD electricity from solar thermal in 2016.

Tide, wave, ocean

In 2016, 1 008 GWh of electricity were generated from tide, wave and ocean motion in three OECD countries. In 2016, France and Korea produced 500 GWh and 495 GWh respectively. The other contributor was Canada producing 13 GWh in 2016.

PART I

EXPLANATORY NOTES

1. DEFINITIONS OF PRODUCTS AND FLOWS

Products

Renewable(s)

Energy products included under the title “renewable” include: hydroelectricity, geothermal, solar photovoltaic, solar thermal, tide, wave, ocean, wind, solid bio-fuels, biogases, liquid biofuels and renewable municipal waste.

Total renewables does not include industrial waste, non-renewable municipal waste, waste heat, net heat generated by heat pumps, and electricity generated with hydro pumped storage.

Further discussion on the definition of “renewables” with regard to energy statistics is listed in Section 2, *Sources and notes*.

Electricity and heat

Electricity

Gross electricity production is measured at the terminals of all alternator sets in a station. It therefore includes the energy taken by station auxiliaries and losses in transformers that are considered integral parts of the station.

Although output from hydro pumped storage plants is included in total hydroelectricity production, it is excluded from primary hydroelectricity generation. Therefore, it also is excluded from the contribution of renewables.

Heat

Heat production includes all heat produced by main activity producer CHP and heat plants, as well as heat sold by autoproducer CHP and heat plants to third parties.

Fuels used to produce quantities of heat for sale are included in transformation processes under the rows *CHP plants* and *heat plants*. The use of fuels for heat which is not sold is included under the sectors in which the fuel use occurs. Data on heat have become available in different years for different countries and thus any aggregated data should be used with caution.

Hydro energy

Hydro energy refers to potential and kinetic energy of water converted into electricity in hydroelectric plants.

Geothermal energy

Geothermal energy is the energy available as heat emitted from within the earth’s crust, usually in the form of hot water or steam. It is exploited at suitable sites:

- for electricity generation using dry stream or high enthalpy brine after flashing
- directly as heat for district heating, agriculture, etc.

Solar energy

Solar radiation exploited for electricity generation and hot water production. Passive solar energy for direct heating, cooling or lighting of dwellings or other buildings is not included.

- **Solar photovoltaic:** This is solar radiation exploited for electricity generation by photovoltaic cells.
- **Solar thermal:** This is solar radiation exploited for:
 - hot water production by flat plate collectors (mainly of the thermosyphon type) for domestic hot water or seasonal heating of swimming pools
 - electricity generation by solar thermal-electric plants.

Tide / wave / ocean energy

Tide, wave and ocean represents the mechanical energy derived from tidal movement, wave motion or ocean current and exploited for electricity generation.

Wind energy

Wind energy represents kinetic energy of wind exploited for electricity generation in wind turbines.

Biofuels and Renewable Waste

This section includes solid biofuels, biogases, liquid biofuels, and the renewable portion of municipal waste. The fuels in this section are expressed in terajoules on a **net calorific value** basis, with the exception of liquid biofuels and charcoal, which are in thousand tonnes.

Note that for biomass commodities, only the amounts specifically used for energy purposes (a small part of the total) are included in the energy statistics. Therefore, the non-energy use of biomass is not taken into consideration and the quantities are null by definition.

Solid biofuels

- Solid biofuels covers organic, non-fossil material of biological origin which may be used as fuel for heat and electricity production. Note that for biofuels commodities, only the amounts specifically used for energy purposes (a small part of the total) are included in the energy statistics. Therefore, the non-energy use of biofuels is not taken into consideration and the quantities are null by definition.
- **Primary solid biofuels** is defined as any plant matter used directly as fuel or converted into other forms before combustion. This covers a multitude of woody materials generated by industrial process or provided directly by forestry and agriculture (firewood, wood chips, bark, sawdust, shavings, chips, sulphite lyes also known as black liquor, animal materials/wastes and other solid biofuels). This category excludes charcoal.
- **Fuelwood, wood residues and by-products:** Fuelwood or firewood (in log, brushwood, pellet or chip form) obtained from natural or managed forests or isolated trees. Also included are wood residues used as fuel and in which the original composition of wood is retained. Charcoal and black liquor are excluded.
- **Wood pellets:** Wood pellets are a cylindrical product which has been agglomerated from wood residues by compression with or without the addition

of a small quantity of binder. The pellets have a diameter not exceeding 25 mm and a length not exceeding 45 mm.

- **Black liquor:** Energy from the alkaline-spent liquor obtained from the digesters during the production of sulphate or soda pulp required for paper manufacture.
- **Bagasse:** Fuel obtained from the fibre which remains after juice extraction in sugar cane processing.
- **Animal Waste:** Energy from excreta of animals, meat and fish residues which, when dry, are used directly as a fuel. This excludes waste used in anaerobic fermentation plants. Fuel gases from these plants are included under biogases.
- **Other vegetal materials and residuals:** Biofuels not specified elsewhere and including straw, vegetable husks, ground nut shells, pruning brushwood, olive pomace and other wastes arising from the maintenance, cropping and processing of plants.
- **Charcoal** covers the solid residue of the destructive distillation and pyrolysis of wood and other vegetal material. Charcoal produced from solid biofuels is also included here. Since charcoal is a secondary product, its treatment is slightly different than that of the other primary biofuels. Production of charcoal (an output in the transformation process) is offset by the inputs of primary biofuels into the charcoal production process. The losses from this process are included in the row other transformation. Other supply (e.g. trade and stock changes) as well as consumption are aggregated directly with the primary biofuels.

Biogases

Biogases are gases arising from the anaerobic fermentation of biomass and the gasification of solid biomass (including biomass in wastes). The biogases from anaerobic fermentation are composed principally of methane and carbon dioxide and comprise landfill gas, sewage sludge gas and other biogases from anaerobic fermentation.

Biogases can also be produced from thermal processes (by gasification or pyrolysis) of biomass and are mixtures containing hydrogen and carbon monoxide (usually known as syngas) along with other components. These gases may be further processed to modify their composition and can be further processed to produce substitute natural gas.

Biogases are used mainly as a fuel but can be used as a chemical feedstock.

- **Landfill gas:** covers gas formed by the digestion of landfilled waste.
- **Sewage sludge gas:** covers gas produced from the anaerobic fermentation of sewage sludge.
- **Other biogases from anaerobic digestion:** such as biogases produced from the anaerobic fermentation of animal slurries and of waste abattoirs, breweries and other agro-food industries.
- **Biogases from thermal processes:** biogases produced from thermal processes (by gasification or pyrolysis) of biomass.

Liquid biofuels

Liquid biofuels include the liquid biofuels that are blended into gasoline and gas/diesel oil and other liquid biofuels. It does not include the total volume of gasoline or diesel into which the biofuels are blended.

- **Biogasoline:** includes bioethanol (ethanol produced from biomass and/or the biodegradable fraction of waste), biomethanol (methanol produced from biomass and/or the biodegradable fraction of waste), bioETBE (ethyl-tertio-butyl-ether produced on the basis of bioethanol; the percentage by volume of bioETBE that is calculated as biofuel is 47%) and bioMTBE (methyl-tertio-butyl-ether produced on the basis of biomethanol: the percentage by volume of bioMTBE that is calculated as biofuel is 36%).
- **Biodiesels:** includes biodiesel (a methyl-ester produced from vegetable or animal oil, of diesel quality), biodimethylether (dimethylether produced from biomass), Fischer Tropsh (Fischer-Tropsh produced from biomass), cold pressed bio-oil (oil produced from oil seed through mechanical processing only) used straight as road diesel or for electricity and heat generation.
- **Other liquid biofuels:** includes liquid biofuels, used directly as fuel, not included in biogasoline or biodiesels.

Municipal waste - renewable

- Renewable municipal waste consists of the biodegradable part of municipal waste products that are combusted directly to produce heat and/or electricity. It comprises waste produced by the residential, commercial and public services sectors that is collected by local authorities for disposal in a central location, including biodegradable hospital waste.

Non-renewable waste

This section includes non-renewable municipal waste and industrial waste.

Industrial waste

Industrial waste (e.g. tyres) consists of solid, liquid or gaseous products which are combusted directly, usually in specialised plants, to produce heat and/or electricity. Industrial waste is of non-renewable origin and renewable industrial waste is included with solid biofuels, biogases or liquid biofuels.

Municipal waste - non-renewable

Non-renewable municipal waste consists of the non-biodegradable part of municipal waste products that are combusted directly to produce heat and/or electricity. It includes waste produced by the residential, commercial and public services sectors that is collected by local authorities for disposal in a central location, including non-biodegradable hospital waste.

Flows: energy balance

The renewables and waste balances are presented in detail in Part III. Table 6, Renewables and waste data, presents the sources of energy in the columns and the origins and uses in the rows.

Each table is divided into three main parts: the first shows supply elements, the second shows the transformation processes and energy industries, and the third shows final consumption broken down into the various end-use sectors.

The rows, or “flows”, defined below are also used in other tables in this publication (i.e. Total primary energy supply). The energy balance flows have the following functions:

Production

Production refers to the quantities of fuels extracted or produced, calculated after any operation for removal of inert matter or impurities. The calculation of production of hydroelectricity, geothermal, etc. is explained in Section 4, Energy conventions and units.

Import and exports

Imports and exports comprise amounts having crossed the national territorial boundaries of the country, whether or not customs clearance has taken place.

Stock changes

Stock changes reflects the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. A stock build is shown as a negative number, and a stock draw as a positive number.

Total primary energy supply

Total primary energy supply (TPES) is made up of **production + imports - exports ± stock changes**.

Statistical difference

Statistical difference is essentially the difference between supply and demand. It is defined as deliveries to final consumption + use for transformation processes + consumption by energy industry own use + losses - TPES. Statistical differences arise because the data for the individual components of supply and demand are often derived from different data sources by the national administration. Furthermore, the inclusion of changes in some large consumers' stocks in the supply part of the balance introduces distortions which also contribute to the statistical differences.

Electricity plants

Electricity plants refers to plants which are designed to produce electricity only. If one or more units of the plant is a CHP unit (and the inputs and outputs cannot be distinguished on a unit basis), then the whole plant is designated as a CHP plant. The row **electricity plants** shows fuel used by electricity plants for electricity generation. These figures are reported based on the physical energy content method as explained in Section 4. These are shown as a negative and the generation is shown in electricity column as a positive.

Combined heat and power plants

Combined heat and power plants (CHP) refers to plants which are designed to produce both heat and electricity, sometimes referred to as co-generation power stations. If possible, fuel inputs and electricity/heat outputs are on a unit basis rather than on a plant basis. However, if data are not available on a unit basis, the convention for defining a CHP plant noted above is adopted. Both main activity producer and autoproducer plants are included here.

*Note that for autoproducer CHP plants, all fuel inputs to electricity production are taken into account, while only the part of fuel inputs to heat **sold** is shown. Fuel inputs for the production of heat consumed within the autoproducer's establishment are **not** included here but are included with figures for the final consumption of fuels in the appropriate consuming sector.*

Heat plants

Heat plants refers to plants (including heat pumps and electric boilers) designed to produce heat only and who sell heat to a third party (e.g. residential, commercial or industrial consumers) under the provisions of a contract. Both main activity producer and autoproducer plants are included here. Heat pumps that are operated within the residential sector where the heat is not sold are not considered a transformation process and are not included here – the electricity consumption would appear as residential use.

Charcoal production plants

Charcoal production plants includes the transformation of primary solid biofuels into charcoal. Since charcoal is a secondary product, the production of charcoal (which appears as a positive number in this row) is offset by the inputs of primary solid biofuels (which appears as a negative number in this row) into the charcoal production process.

Other transformation

Other transformation covers non-specified transformation not shown elsewhere.

Energy industry own use

Energy industry own use covers the amount of fuels used by the energy producing industries (e.g. for heating, lighting and operation of all equipment used in the extraction process, for traction and for distribution). It includes energy consumed by energy industries for heating, pumping, traction and lighting purposes [ISIC¹ 05, 06, 19 and 35, Group 091 and Classes 0892 and 0721].

Losses

Losses includes losses in energy distribution, transmission and transport.

1. International Standard Industrial Classification of All Economic Activities, Series M, No. 4 / Rev. 4, United Nations, New York, 2008.

Total final consumption

Total final consumption (TFC) is the sum of consumption in the different end-use sectors. This implies that energy used for transformation processes and for own use of the energy producing industries is excluded. Final consumption reflects for the most part deliveries to consumers (see note on stock changes).

Industry

Industry consumption is specified in the following sub-sectors (Energy used for transport by industry is not included here but is reported under transport):

Iron and steel	ISIC Group 241 and Class 2431
Chemical and petrochemical industry	ISIC Divisions 20 and 21, excluding petrochemical feedstocks
Non-ferrous metals	ISIC Group 242 and Class 2432
Non-metallic minerals	ISIC Division 23, such as glass, ceramic, cement, etc.
Transport equipment	ISIC Divisions 29 and 30
Machinery	ISIC Divisions 25 to 28, comprises fabricated metal products, machinery and equipment other than transport equipment
Mining (excluding fuels) and quarrying	ISIC Divisions 07 and 08 and Group 099
Food and tobacco	ISIC Divisions 10 to 12
Paper, pulp and printing	ISIC Divisions 17 and 18
Wood and wood products	ISIC Division 16, other than pulp and paper
Construction	ISIC Divisions 41 to 43
Textile and leather	ISIC Divisions 13 to 15
Non-specified	ISIC Divisions 22, 31 and 32, includes any manufacturing industry not included above Note: Most countries have difficulties supplying an industrial breakdown for all fuels. In these cases, the non-specified industry row has been used. Regional aggregates of industrial consumption should therefore be used with caution.

Transport

Transport covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing [ISIC Divisions 49 to 51], and is specified as follows:

- **Road:** includes fuels used in road vehicles as well as agricultural and industrial highway use. It excludes military consumption as well as motor gasoline used in stationary engines and diesel oil for use in tractors that are not for highway use.
- **Other:** includes all transport not elsewhere specified.

Other

- **Residential:** includes consumption by households, excluding fuels used for transport. It includes households with employed persons [ISIC Divisions 97 and 98] which is a small part of total residential consumption.
- **Commercial and public services:** Commercial and public services [ISIC Divisions 33, 36-39, 45-47, 52, 53, 55, 56, 58-66, 68-75, 77-82, 84 (excluding Class 8422), 85-88, 90-96 and 99].
- **Agriculture/forestry:** includes deliveries to users classified as agriculture, hunting and forestry by the ISIC, and therefore includes energy consumed by such users whether for traction (excluding agricultural highway use), power or heating (agricultural and domestic) [ISIC Divisions 01 and 02].
- **Fishing:** includes fuels used for inland, coastal and deep-sea fishing. Fishing covers fuels delivered to ships of all flags that have refuelled in the country (including international fishing) as well as energy used in the fishing industry [ISIC Division 03]. *Prior to the 2007 edition, fishing was included with agriculture/forestry and this may continue to be the case for some countries.*
- **Non-specified:** includes all fuel use not elsewhere specified as well as consumption in the above-designated categories for which separate figures have not been provided. Military fuel use for all mobile and stationary consumption is included here (e.g. ships, aircraft, road and energy used in living quarters) regardless of whether the fuel delivered is for the military of that country or for the military of another country.

Electricity and Heat Output

Electricity generated shows the total number of GWh generated by thermal power plants separated into electricity plants and CHP plants, as well as production by hydroelectricity (excluding pumped storage production), geothermal, etc.

Heat generated shows the total number of TJ generated by power plants separated into CHP plants and heat plants.

Flows: commodity balance

The flows defined below describe the aggregated commodity balance presented in Table 7. These tables include sources of renewable and waste energy, both primary (geothermal, solar thermal, industrial waste, municipal waste, primary solid biofuels, biogases, and liquid biofuels) and secondary (charcoal). Data for each product are in original units (see Section 4 for more detail on units).

Production

Production refers to the quantities of fuels extracted or produced, calculated after any operation for removal of inert matter or impurities. The calculation of production of hydroelectricity, geothermal, etc. is explained in Section 4, Energy conventions and Units.

Net imports

Net imports are the sum of total imports minus total exports.

Stock changes

Stock changes reflects the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries and large consumers. A stock build is shown as a negative number, and a stock draw as a positive number.

Gross consumption

Gross consumption consists of production + net imports \pm stock changes.

Statistical differences

Statistical difference is essentially the difference between supply and demand. It is defined as deliveries to final consumption + use for transformation processes + consumption by energy industry own use + losses - gross consumption. Statistical differences arise because the data for the individual components of supply and demand are often derived from different data sources by the national administration. Furthermore, the inclusion of changes in some large consumers' stocks in the supply part of the balance introduces distortions which also contribute to the statistical differences.

Transformation processes

Transformation processes are the conversion of primary forms of energy to secondary forms including further transformation.

Energy industry own use

Energy industry own use covers the amount of fuels used by the energy producing industries (e.g. for heating, lighting and operation of all equipment used in the extraction process, for traction and for distribution). It includes energy consumed by energy industries for heating, pumping, traction and lighting purposes [ISIC² 05, 06, 19 and 35, Group 091 and Classes 0892 and 0721].

Losses

Losses includes losses in energy distribution, transmission and transport.

Final energy consumption

Final consumption (equal to the sum of the consumption in the end-use sectors) implies that energy used for transformation processes and for own use of the energy producing industries is excluded. Final consumption reflects for the most part deliveries to consumers (see note on stock changes).

Industry

See Flows: Energy Balance for the sub-sectors included in industry.

Transport

See Flows: Energy Balance for the sub-sectors included in transport.

Other

See Flows: Energy Balance for the sub-sectors included in other.

Additional definitions

Net maximum capacity

Net maximum capacity is the maximum active power that can be supplied, continuously, with all plants running, at the point of outlet to the network. It is assumed that all equipment is in full working order, that the power produced can be disposed of without any restrictions and that optimum conditions prevail as regards primary sources (i.e. flow and head in the case of hydroelectric plants; grades and quantity of fuel in hand and water supply, temperature and purity, in the

2. International Standard Industrial Classification of All Economic Activities, Series M, No. 4 / Rev. 4, United Nations, New York, 2008.

case of combustible fuel-fired plants and assuming that the output and method of production in CHP plants are those which contribute to maximum electricity production). It represents the sum of all individual plants' maximum capacities available to run continuously throughout a prolonged period of operation in a day.

The capacity is net in the sense that it is the output capacity measured at the plant busbars, i.e. after deducting the power needed by plant auxiliaries and losses in plant transformers.

Capacity factor

The capacity factor is defined as: the annual gross electricity generation (in MWh) divided by the net capacity (in MW) times 365 (days/year) times 24 (hours/day).

Care should be taken when using this figure for several reasons:

- The ratio is done between the gross generation and the net capacity, hence not taking into account the own use of the plant.
- A large addition to capacity in the year (especially toward the end of the year) will impact negatively the capacity factor, as that capacity would only have been producing for a part of the year.
- Reciprocally, a decommissioning of some of the capacity (especially toward the end of the year) can cause the capacity factor to increase.
- In the case of co-firing, some issues can arise since the capacity is sometimes only reported under the main fuel, and sometimes double reporting of the capacity can occur.

2. SOURCES AND NOTES

General notes

Energy data for OECD countries are submitted by all OECD member countries to the IEA Secretariat in a common format and methodology to allow for international comparisons.

One general issue regarding renewable statistics is that the variety of definitions for the word “renewable” may not refer to the same energy sources. Some of the definitions of renewable energy used by national and international bodies include specific renewables technologies such as large hydro, geothermal, peat, municipal waste or industrial waste while others exclude them. Similarly, renewables may or may not include non-commercial biofuels, which has substantial effects regarding renewable data for developing countries.

The Renewable Energy Working Party of the International Energy Agency set down the following broad definition:

“Renewable Energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly or indirectly from the sun, or from heat generated deep within the earth. Included in the definition is energy generated from solar, wind, biofuels, geothermal, hydropower and ocean resources, and biofuels and hydrogen derived from renewable resources.”

Therefore, in this publication the renewable products are: hydro (large, medium and small), geothermal, solar photovoltaic, solar thermal, tide, wave, ocean, wind, solid biofuels, biogases, liquid biofuels and renewable municipal waste. All these definitions are consistent with the International Recommendations for Energy Statistics (IRES).

It follows that total renewables does not include industrial waste, non-renewable municipal waste, waste

heat, net heat generated by heat pumps, and electricity generated with hydro pumped storage.

While some OECD member countries accept industrial waste and non-renewable municipal waste as renewable energy sources, many countries exclude them on the grounds that they are not biodegradable. Under the IEA methodology, industrial waste and non-renewable municipal waste are excluded from the definition of renewable energy sources. However, these data are included in this publication in order to account for the full range of statistics collected in the Annual Renewables and Waste Questionnaire.

Even though data quality improves with each new edition due to the continuous efforts of the IEA in partnership with national administrations, it is important to highlight that difficulties exist in the collection of some data. As a result, there can be breaks in the time series for the countries, as explained in the country notes.

For example, one continuing problem is the breakdown between municipal waste and industrial waste. In some countries industrial waste statistics are not of the same quality as those for other products, because renewables and waste data collection systems were not in place in many countries in the early 1990s. Furthermore, the breakdown between the renewable and non-renewable portions of municipal waste is sometimes not known and as a result is based on estimates. The breakdown is important because most countries include the renewable (biodegradable) part of municipal waste in their renewables definition, while they exclude the remainder. The classification of waste as renewable is also important because the non-renewable component is counted when calculating CO₂ emissions.

Data collection from off-grid systems that work independently or are connected to a local distribution system remains a problem. These systems are frequently

omitted in national statistics due to difficulties in collecting these data. This is, for example, the case regarding solar energy data, where for a number of countries, production is likely to be higher than indicated in this publication, although capacity is more accurate. Collection of the data presents national governments with some unique challenges. Renewable energy systems tend to be smaller than conventional systems, and harder to track. Operators tend to be more diverse and more numerous.

Many systems are connected to the grid at the distribution level, rather than at the transmission level, and so do not require interconnection permits. National governments are seeking to improve data collection methods to capture the total nature of their renewable energies. In general, the dispersion of renewables and waste production, specifically off-grid production (such as domestic solar collectors and/or small wind turbines), creates transparency and measurement problems. Thus, the nature and structure of the renewables energy market impedes data quality and reliability when compared to that of the traditional fossil fuels, which mainly produce heat and electricity in grid-connected plants.

Non-commercial biofuels are included in the IEA definition, but data are not always complete. Electricity from fuel cells using hydrogen from renewable, as well as non-renewable, sources is not included in this publication due to a lack of reliable information.

When using these data, special attention should also be given to the percentage that renewables represents in TPES in countries where the net trade of electricity is large and also represents a significant percentage. In these cases, the high net imports of electricity can heavily influence the percentage of renewables in TPES.

Additional information on the methodologies and reporting conventions used here are included in the notes in *World Energy Balances*.

Qualifiers

Data marked as 'e' are the estimates of the IEA Secretariat. Data marked as 'c' means that data are confidential due to country specific regulations. Data marked as '.' means that data are not available (either not collected or not submitted by national government). Data marked as 'x' means that the data point is not applicable, that is, there is no meaningful explanation of a value there (for example it is difficult to show the share in total energy sources of stock changes).

Data sources

Historical data (1990-2015)

The annual historical data in Part II of this report are taken from the IEA/OECD databases of Energy Statistics which are based on annual submissions from all OECD member countries.

i) IEA/OECD renewables statistics

This database of annual statistics for OECD countries covers hydroelectricity, solid biofuels, geothermal, renewable municipal waste, wind, gas from biomass, liquid biofuels, solar photovoltaic, solar thermal, tide/wave/ocean, non-renewable municipal waste and industrial waste. It includes electricity and heat production from renewable sources and supply/demand balances of renewable and waste products.

The main data from this system are published annually in this publication.

ii) IEA/OECD electricity statistics

This database of annual statistics for OECD countries covers generating capacity and electricity production from main activity producer and autoproducer plants. It includes information on electricity production by fuel type and supply/demand balances for electricity and for heat sold to third parties from different types of power and heat plants.

The main data from this system are published annually in the IEA/OECD publication *Electricity Information*.

iii) World energy balances

Overall energy balances are constructed annually for all OECD countries from the basic energy statistics systems of the IEA. The overall energy balance data are expressed in a common energy unit of tonnes of oil equivalent (toe) and presented in a standard matrix format. The balances are published annually in the IEA/OECD publication *World Energy Balances* in which detailed country notes referring to historical data can be found.

iv) OECD main economic indicators

OECD Main Economic Indicators is a monthly compilation of a range of indicators on recent economic developments for the 35 OECD member countries. Please refer to this publication for detailed notes regarding the selected indicators.

v) Other sources

GDP: The main source of these data for 1990 to 2016 is the OECD *National Accounts Statistics* database. Growth rates from the series in the *OECD Economic Outlook No 98* and other data previously published by the OECD were also used to estimate data for **Hungary** (prior to 1991) and **Slovak Republic** (prior to 1992). Data for **Estonia** (prior to 1992) are IEA Secretariat estimates based on GDP growth rates from the World Bank.

The GDP data have been compiled for individual countries at market prices in local currency and annual rates. These data have been scaled up/down to the price levels of 2010 and then converted to US dollars using the yearly average 2010 exchange rates.

Population: The main source of these data for 1990 to 2016 is the OECD *National Accounts Statistics* database. Data for 2016 for **Australia, Canada, Chile, Greece, Iceland, Israel, Japan, Korea, Mexico,**

New Zealand, the Slovak Republic, Switzerland, Turkey and the United States were estimated using the growth rates from the population series in *OECD Economic Outlook No. 95*, long-term baseline projections. Growth rates from the *OECD Factbook 2015* were used to estimate data for **Estonia** (prior to 1993), **Israel** (prior to 1995) and **Slovenia** (prior to 1995).

Latest year data: 2016

Energy data reported for 2016 (shown as 2016p) in this publication are provisional estimates based on submissions received in spring 2017 and on monthly submissions to the IEA from member countries. In some instances it has been necessary for the IEA to estimate some data; explanations of the estimates are provided in the country notes. Final 2016 data on renewables and waste will be submitted by OECD member countries to the secretariat in Annual Questionnaires in late 2017. As a result, final data for 2016 and provisional 2017 data will be published in the 2018 edition of *Renewables Information*.

3. GEOGRAPHICAL COVERAGE

The **Organisation for Economic Co-Operation and Development (OECD)** includes Australia; Austria; Belgium; Canada; Chile; the Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Israel; Italy; Japan; Korea; Latvia¹; Luxembourg; Mexico; the Netherlands; New Zealand; Norway; Poland; Portugal; the Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; the United Kingdom; the United States.

OECD Americas includes Canada; Chile; Mexico and the United States.

OECD Asia Oceania includes Australia; Israel; Japan; Korea and New Zealand.

OECD Europe includes Austria; Belgium; the Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; Latvia¹; Luxembourg; the Netherlands; Norway; Poland; Portugal; the Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; the United Kingdom.

Estonia, Latvia and Slovenia are included starting in 1990. Prior to 1990, Estonia and Latvia are included in Former Soviet Union and Slovenia is included in Former Yugoslavia.

Within the **OECD**:

- **Australia** excludes the overseas territories;
- **Denmark** excludes Greenland and the Faroe Islands, except prior to 1990, where data on oil for Greenland were included with the Danish statistics. The Administration is planning to revise the series back to 1974 to exclude these amounts;
- **France** includes Monaco and excludes the following overseas departments: Guadeloupe; French Guiana; Martinique; Mayotte and Réunion; and collectivities: New Caledonia; French Polynesia; Saint Barthélemy; Saint Martin; Saint Pierre and Miquelon; and Wallis and Futuna;
- **Germany** includes the new federal states of Germany from 1970 onwards;
- The statistical data for **Israel** are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
- **Italy** includes San Marino and the Holy See;
- **Japan** includes Okinawa;
- **Netherlands** excludes Suriname, Aruba and the other former Netherlands Antilles (Bonaire, Curaçao, Saba, Saint Eustatius and Sint Maarten);
- **Portugal** includes the Azores and Madeira;
- **Spain** includes the Canary Islands;
- **Switzerland** includes Liechtenstein for oil data; data for other fuels do not include Liechtenstein;
- Shipments of coal and oil to the Channel Islands and the Isle of Man from the **United Kingdom** are not classed as exports. Supplies of coal and oil to these islands are, therefore, included as part of UK supply. Exports of natural gas to the Isle of Man are included with the exports to Ireland;
- **United States** includes the 50 states and the District of Columbia but generally excludes all territories, and all trade between the U.S. and its territories. Oil statistics include Guam, Puerto Rico² and the United States Virgin Islands; trade statistics for coal include international trade to and from Puerto Rico and the United States Virgin Islands.

1. Latvia became an OECD member in July 2016. Accordingly, Latvia appears in the list of OECD members and is included in the zone aggregates for data starting in 1990, starting with the 2017 edition. Prior to 1990, data for Latvia are included in Former Soviet Union.

2. Natural gas and electricity data for Puerto Rico are included under Other Non-OECD Americas.

The **International Energy Agency (IEA)** includes Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Estonia³, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

World includes OECD Total; Africa; Non-OECD Americas; Non-OECD Asia (excluding China); China (People's Republic of China and Hong Kong, China); Non-OECD Europe and Eurasia; Middle East; World aviation bunkers and World marine bunkers.

Africa includes Algeria; Angola; Benin; Botswana (from 1981); Cameroon; the Republic of the Congo (Congo)⁴; Côte d'Ivoire; the Democratic Republic of the Congo; Egypt; Eritrea; Ethiopia; Gabon; Ghana; Kenya; Libya; Mauritius; Morocco; Mozambique; Namibia (from 1991); Niger (from 2000); Nigeria; Senegal; South Africa; South Sudan (from 2012); Sudan; the United Republic of Tanzania (Tanzania); Togo; Tunisia; Zambia; Zimbabwe and **Other Africa**.

Other Africa includes Botswana (until 1980); Burkina Faso; Burundi; Cabo Verde; Central African Republic; Chad; Comoros; Djibouti; Equatorial Guinea; Gambia; Guinea; Guinea-Bissau; Lesotho; Liberia; Madagascar; Malawi; Mali; Mauritania; Namibia (until 1990); Niger (until 1999); Réunion; Rwanda; Sao Tome and Principe; the Seychelles; Sierra Leone; Somalia; Swaziland; Uganda.

Middle East includes Bahrain; the Islamic Republic of Iran; Iraq; Jordan; Kuwait; Lebanon; Oman; Qatar; Saudi Arabia; the Syrian Arab Republic; the United Arab Emirates; Yemen.

Non-OECD Europe and Eurasia includes Albania; Armenia; Azerbaijan; Belarus; Bosnia and Herzegovina; Bulgaria; Croatia; Cyprus⁵; the Former Yugoslav Republic of Macedonia; Georgia; Gibraltar; Kazakhstan;

Kosovo; Kyrgyzstan; Lithuania; Malta; the Republic of Moldova (Moldova); Montenegro; Romania; the Russian Federation; Serbia⁶; Tajikistan; Turkmenistan; Ukraine; Uzbekistan; the Former Soviet Union and Former Yugoslavia.⁷

Non-OECD Americas includes Argentina; the Plurinational State of Bolivia (Bolivia); Brazil; Colombia; Costa Rica; Cuba; Curaçao⁸; the Dominican Republic; Ecuador; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Nicaragua; Panama; Paraguay; Peru; Suriname (from 2000), Trinidad and Tobago; Uruguay; the Bolivarian Republic of Venezuela (Venezuela); **Other Non-OECD Americas**.

Other Non-OECD Americas includes Antigua and Barbuda; Aruba; the Bahamas; Barbados; Belize; Bermuda; Bonaire (from 2012); the British Virgin Islands; the Cayman Islands; Dominica; the Falkland Islands (Malvinas); French Guiana; Grenada; Guadeloupe; Guyana; Martinique; Montserrat; Puerto Rico⁹ (for natural gas and electricity); Saba (from 2012); Saint Eustatius (from 2012); Saint Kitts and Nevis; Saint Lucia; Saint Pierre and Miquelon; Saint Vincent and the Grenadines; Sint Maarten (from 2012); Suriname (until 1999); and the Turks and Caicos Islands.

China includes the (People's Republic of) China and Hong Kong, China.

Non-OECD Asia excluding China includes Bangladesh; Brunei Darussalam; Cambodia (from 1995); India; Indonesia; the Democratic People's Republic of Korea; Malaysia; Mongolia (from 1985); Myanmar; Nepal; Pakistan; the Philippines; Singapore; Sri Lanka; Chinese Taipei; Thailand; Viet Nam; **Other non-OECD Asia**.

Other non-OECD Asia includes Afghanistan; Bhutan; Cambodia (until 1994); Cook Islands; Fiji; French Polynesia; Kiribati; Lao People's Democratic Republic; Macau, China; the Maldives; Mongolia (until 1984);

3. Estonia is included starting in 1990. Prior to 1990, data for Estonia are included in Former Soviet Union.

4. Short country names are included in parentheses.

5. Note by Turkey:

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

Note by all the European Union member states of the OECD and the European Union:

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Turkey. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

6. Serbia includes Montenegro until 2004 and Kosovo until 1999.

7. Latvia became an OECD member in July 2016. Accordingly, Latvia appears in the list of OECD members and is not included in the non-OECD aggregates for data starting in 1990, starting with the 2017 edition. Prior to 1990, data for Latvia are included in Former Soviet Union.

8. The Netherlands Antilles was dissolved on 10 October 2010 resulting in two new "constituent countries" (Curaçao and Sint Maarten) with the other islands joining The Netherlands as "special municipalities". However, due to lack of detailed data the IEA secretariat's data and estimates under the "Netherlands Antilles" still refer to the whole territory of the Netherlands Antilles as it was known prior to 10 October 2010 up to the end of 2011. Data refer only to the island of Curaçao from 2012. The other islands of the former Netherlands Antilles are added to Other Non-OECD Americas from 2012.

9. Oil statistics as well as coal trade statistics for Puerto Rico are included under the United States.

New Caledonia; Palau (from 1994); Papua New Guinea; Samoa; the Solomon Islands; Timor-Leste; Tonga and Vanuatu.

Please note that the following countries have not been considered due to lack of data:

- **Non-OECD Europe and Eurasia:** Andorra; Faroe Islands; Liechtenstein¹⁰ (except for oil data); the Palestinian Authority; Svalbard; Jan Mayen Islands;
- **Africa:** British Indian Ocean Territory; French Southern and Antarctic Lands; Mayotte; Saint Helena; Western Sahara;
- **Non-OECD Americas:** Anguilla; Bouvet Island; Saint Barthélemy; Greenland (after 1990); Saint Martin (French Part); South Georgia and the South Sandwich Islands;
- Antarctica
- **Non-OECD Asia excluding China:** American Samoa; Cocos (Keeling) Islands; Christmas Island; Heard Island and McDonald Islands; Marshall Islands; Micronesia (Federated States of); Nauru; Niue; Norfolk Island; Northern Mariana Islands; Pitcairn; Tokelau; Tuvalu; United States Minor Outlying Islands; Wallis and Futuna Islands.

10. Oil data for Liechtenstein are included under Switzerland.

4. ENERGY CONVENTIONS AND UNITS

Primary energy conventions

When constructing an energy balance, it is necessary to adopt conventions for primary energy from several sources, such as nuclear, geothermal, solar, hydro, wind, etc. The two types of assumptions that have to be made are described below.

Choice of the primary energy form

For each of these sources, there is a need to define the form of primary energy to be considered; for instance, in the case of hydro energy, a choice must be made between the kinetic energy of falling water and the electricity produced. For nuclear energy, the choice is between the energy content of the nuclear fuel, the heat generated in the reactors and the electricity produced. For photovoltaic electricity, the choice is between the solar radiation received and the electricity produced.

The principle adopted by the IEA is that the primary energy form should be the first energy form downstream in the production process for which multiple energy uses are practical. The application of this principle leads to the choice of the following primary energy forms:

- **Heat** for nuclear, geothermal and solar thermal;
- Electricity for hydro, wind, tide/wave/ocean and solar photovoltaic.

Calculation of the primary energy equivalent

There are essentially two methods that can be used to calculate the primary energy equivalent of the above energy sources: the partial substitution method and the physical energy content method.

The physical energy content method (the method used by the IEA): This method uses the physical energy

content of the primary energy source as the primary energy equivalent. As a consequence, there is an obvious link between the principles adopted in defining the primary energy forms of energy sources and the primary energy equivalent of these sources.

For instance, in the case of nuclear electricity production, as heat is the primary energy form, the primary energy equivalent is the quantity of heat generated in the reactors. However, as the amount of heat produced is not always known, the IEA estimates the primary energy equivalent from the electricity generation by assuming an efficiency of 33%, which is the average of nuclear power plants in Europe.

In the case of hydro and solar PV, as electricity is the primary energy form selected, the primary energy equivalent is the physical energy content of the electricity generated in the plant, which amounts to assuming an efficiency of 100%. A more detailed presentation of the assumptions used by the IEA in establishing its energy balances is given in this section.

For geothermal and solar thermal, if no country-specific information is reported, the primary energy equivalent is calculated as follows:

- 10% for geothermal electricity;
- 50% for geothermal heat;
- 33% for solar thermal electricity;
- 100% for solar thermal heat.

The partial substitution method: In this method, the primary energy equivalent of the above sources of electricity generation represents the amount of energy that would be necessary to generate an identical amount of electricity in conventional thermal power plants. The primary energy equivalent is calculated using an average generating efficiency of these plants. This method has several shortcomings, including the difficulty of

choosing an appropriate generating efficiency and the fact that the partial substitution method is not relevant for countries with a high share of hydroelectricity. For these reasons, the IEA, as most international organisations, has now stopped using this method and adopted the physical energy content method.

Since these two methods differ significantly in the treatment of electricity from solar, hydro, wind, etc., the share of renewables in total energy supply will appear to be very different depending on the method used. As a result, when looking at the percentages of various energy sources in total supply, it is important to understand the underlying conventions that were used to calculate the primary energy supply.

Units

Original units

Electricity is expressed in gigawatt hours and heat is expressed in terajoules

Non-combustible renewables have original units of their primary energy form (see Primary energy conventions for the primary energy form of non-combustible renewables).

Primary solid biofuels, biogases, municipal waste, and industrial waste are presented in their original units in terajoules on a net calorific basis. The Secretariat does not receive information on volumes and other characteristics of these fuels.

Liquid biofuels and charcoal have original units in 1000 tonnes.

Energy balance units

The IEA energy balance methodology is based on the net calorific content of the energy commodities and a common unit of account. The unit of account adopted by the IEA is the tonne of oil equivalent (toe) which is defined as 10^7 kilocalories (41.868 gigajoules). This quantity of energy is, within a few percent, equal to the net heat content of 1 tonne of crude oil. Throughout this publication 1 tonne means 1 metric ton or 1000 kg.

Conversion (from original units to toe)

The change from using the original units to tonnes of oil equivalent implies choosing coefficients of equivalence between different forms and sources of energy. This

problem can be approached in many different ways. For example, one could adopt a single equivalence for each major primary energy source in all countries, e.g. 29 307 kJ/kg (7 000 kcal/kg) for hard coal, 41 868 kJ/kg (10 000 kcal/kg) for oil, etc.

The main objection to this method is that it results in distortions since there can be a wide spread between calorific values of fuels (i.e. liquid biofuels) in different countries.

For charcoal, biogasoline, biodiesels and other liquid biofuels, specific factors have been used for production, imports and exports based on consultations with experts from the national administrations.

The balances are expressed in terms of “net” calorific value. The difference between the “net” and the “gross” calorific value for each fuel is the latent heat of vaporisation of the water produced during combustion of the fuel. For coal and oil, net calorific value is about 5% less than gross, for most forms of natural and manufactured gas the difference is 9-10%, while for electricity and heat there is no difference as the concept has no meaning in this case. The use of net calorific value is consistent with the practice of the Statistical Offices of the European Communities and the United Nations.

Electricity data are converted from original units of gigawatt hours to million tonnes of oil equivalent using the relationship: 1 terawatt hour = 0.086 Mtoe.

Biofuels and waste

Data for primary solid biofuels, biogases, municipal waste and industrial waste are converted from original units in terajoules to energy balance units in tonne of oil equivalent using 1 terajoule = 0.0002388 Mtoe.

Data for charcoal and liquid biofuels are converted from original units in tonnes to energy balance units in tonne of oil equivalent using the average net calorific values. Unless country-specific information has been provided, data are converted using the following average net calorific values:

- Charcoal: 30 800 kJ/kg
- Biogasoline: 26 800 kJ/kg
- Biodiesels: 36 800 kJ/kg
- Other liquid biofuels: 36 800 kJ/kg

Electricity

Figures for electricity production, trade, and final consumption are calculated using the energy content of the electricity (i.e. at a rate of 1 TWh = 86 ktoe).

Hydroelectricity production (excluding pumped storage) and electricity produced by other non-thermal means (wind, tide/wave/ocean, solar PV, etc.) are accounted for similarly using 1 TWh = 86 ktoe.

The primary energy equivalent of nuclear electricity is calculated from the gross generation by assuming a 33% conversion efficiency, i.e. 1 TWh = $(86 \div 0.33)$ ktoe.

In the case of electricity produced from geothermal heat, if the actual geothermal efficiency is not known, then the primary equivalent is calculated assuming an efficiency of 10%, so 1 TWh = $(86 \div 0.1)$ ktoe.

For electricity produced from solar thermal heat, the primary equivalent is calculated assuming an efficiency

of 33%, so 1 TWh = $(86 \div 0.33)$ ktoe, unless the actual efficiency is known.

Heat

Information on heat is supplied in terajoules and 1 terajoule = 0.02388 ktoe.

In the case of heat produced in a geothermal plant, if the actual geothermal efficiency is not known, then the primary equivalent is calculated assuming an efficiency of 50%, so 1 TJ = $(0.02388 \div 0.5)$ ktoe.

For heat produced (output) in a solar thermal plant, the primary equivalent is equal to the heat content (input) assuming an efficiency of 100%, i.e. 1 TJ = 0.02388 ktoe.

For direct use of geothermal and solar thermal heat, all the heat consumed is accounted for in production and consumption.

ABBREVIATIONS

kW	:	kilowatt
kW _p	:	kilowatt peak
kW _{th}	:	kilowatt thermal
GW	:	gigawatt
MW	:	megawatt (electric)
MW _{th}	:	megawatt thermal
kWh	:	kilowatt hour
MWh	:	megawatt hour
GWh	:	gigawatt hour
TWh	:	terawatt hour
GJ	:	gigajoule (10 ⁹ joules)
TJ	:	terajoule (10 ¹² joules)
EJ	:	exajoule (10 ¹⁸ joules)
m ²	:	metre squared
t	:	metric ton = tonne
kt	:	kilotonne (1000 tonnes)
1 toe	:	tonne of oil equivalent
1 ktoe	:	kilotonne of oil equivalent
1 Mtoe	:	million tonnes of oil equivalent
GDP	:	Gross domestic product
RES	:	Renewable energy Sources
TPES	:	Total primary energy supply
0 or 0.0	:	negligible
c	:	confidential data
e	:	estimated data
..	:	data not available
x	:	not applicable

CONVERSION FACTORS

General conversion factors for energy

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	multiply by:				
terajoule (TJ)	1	2.388x10 ²	2.388x10 ⁻⁵	9.478x10 ²	2.778x10 ⁻¹
gigacalorie (Gcal)	4.187x10 ⁻³	1	1.000x10 ⁻⁷	3.968	1.163x10 ⁻³
million tonnes of oil equivalent (Mtoe)	4.187x10 ⁴	1.000x10 ⁷	1	3.968x10 ⁷	1.163x10 ⁴
million British thermal units (MBtu)	1.055x10 ⁻³	2.520x10 ⁻¹	2.520x10 ⁻⁸	1	2.931x10 ⁻⁴
gigawatt hour (GWh)	3.600	8.598x10 ²	8.598x10 ⁻⁵	3.412x10 ³	1

Conversion factors for mass

To:	kg	t	lt	st	lb
From:	multiply by:				
kilogramme (kg)	1	1.000x10 ⁻³	9.842x10 ⁻⁴	1.102x10 ⁻³	2.205
tonne (t)	1.000x10 ³	1	9.842x10 ⁻¹	1.102	2.205x10 ³
long ton (lt)	1.016x10 ³	1.016	1	1.120	2.240x10 ³
short ton (st)	9.072x10 ²	9.072x10 ⁻¹	8.929x10 ⁻¹	1	2.000x10 ³
pound (lb)	4.536x10 ⁻¹	4.536x10 ⁻⁴	4.464x10 ⁻⁴	5.000x10 ⁻⁴	1

Conversion factors for volume

To:	gal U.S.	gal U.K.	bbl	ft ³	l	m ³
From:	multiply by:					
U.S. gallon (gal)	1	8.327x10 ⁻¹	2.381x10 ⁻²	1.337x10 ⁻¹	3.785	3.785x10 ⁻³
U.K. gallon (gal)	1.201	1	2.859x10 ⁻²	1.605x10 ⁻¹	4.546	4.546x10 ⁻³
Barrel (bbl)	4.200x10 ¹	3.497x10 ¹	1	5.615	1.590x10 ²	1.590x10 ⁻¹
Cubic foot (ft ³)	7.481	6.229	1.781x10 ⁻¹	1	2.832x10 ¹	2.832x10 ⁻²
Litre (l)	2.642x10 ⁻¹	2.200x10 ⁻¹	6.290x10 ⁻³	3.531x10 ⁻²	1	1.000x10 ⁻³
Cubic metre (m ³)	2.642x10 ²	2.200x10 ²	6.290	3.531x10 ¹	1.000x10 ³	1

Decimal prefixes

10 ¹	deca (da)	10 ⁻¹	deci (d)
10 ²	hecto (h)	10 ⁻²	centi (c)
10 ³	kilo (k)	10 ⁻³	milli (m)
10 ⁶	mega (M)	10 ⁻⁶	micro (μ)
10 ⁹	giga (G)	10 ⁻⁹	nano (n)
10 ¹²	tera (T)	10 ⁻¹²	pico (p)
10 ¹⁵	peta (P)	10 ⁻¹⁵	femto (f)
10 ¹⁸	exa (E)	10 ⁻¹⁸	atto (a)

PART II

WORLD and OECD RENEWABLES AND WASTE DATA

Table 1. World energy balance in 2015

Million tonnes of oil equivalent											
SUPPLY AND CONSUMPTION	Coal ¹	Crude oil ²	Oil products	Natural gas	Nuclear	Hydro	Geotherm./Solar/etc.	Biofuels/Waste	Electricity	Heat	Total
Production	3871.53	4416.26	-	2975.71	670.73	334.40	200.56	1319.00	-	1.83	13790.02
Imports	791.76	2303.19	1258.87	868.66	-	-	-	20.75	64.66	0.01	5307.89
Exports	-820.39	-2262.47	-1350.24	-883.43	-	-	-	-16.58	-62.37	-0.01	-5395.47
Stock changes	-6.83	-14.88	-16.46	-17.22	-	-	-	0.31	-	-	-55.08
TPES	3836.09	4442.11	-107.83	2943.72	670.73	334.40	200.56	1323.47	2.28	1.83	13647.37
Transfers	-0.97	-230.46	259.77	-	-	-	-	-0.42	-	-	27.92
Statistical differences	-14.63	-0.75	11.34	2.20	-	-	-0.02	0.50	-1.24	-0.07	-2.68
Electricity plants	-2060.04	-42.30	-192.28	-835.51	-663.14	-334.40	-158.36	-100.35	1903.83	-0.95	-2483.50
CHP plants	-171.02	-0.01	-19.16	-303.06	-7.58	-	-2.73	-58.50	182.09	145.47	-234.52
Heat plants	-136.72	-0.65	-11.51	-67.52	-	-	-1.16	-11.27	-0.43	180.13	-49.13
Blast furnaces	-205.36	-	-0.21	-0.07	-	-	-	-0.05	-	-	-205.70
Gas works	-11.18	-0.00	-2.51	4.61	-	-	-	-0.11	-	-	-9.20
Coke/pat.fuel/BKB/PB plants	-85.69	-	-2.56	-0.03	-	-	-	-0.12	-	-	-88.40
Oil refineries	-	-4188.73	4128.69	-	-	-	-	-	-	-	-60.04
Petrochemical plants	-	34.97	-34.75	-	-	-	-	-	-	-	0.22
Liquefaction plants	-10.10	14.34	-	-17.41	-	-	-	-	-	-	-13.18
Other transformation	-0.37	10.70	-0.58	-12.78	-	-	-	-86.53	-	-0.85	-90.40
Energy industry own use	-91.78	-11.51	-207.51	-293.73	-	-	-0.00	-14.28	-178.57	-36.74	-834.11
Losses	-4.13	-8.61	-0.42	-19.28	-	-	-0.01	-0.13	-170.73	-17.75	-221.06
TFC	1044.09	19.10	3820.49	1401.13	-	-	38.27	1052.21	1737.23	271.08	9383.60
INDUSTRY	826.39	9.07	298.93	529.81	-	-	0.70	192.71	730.66	124.09	2712.37
Iron and steel	305.47	-	6.71	53.35	-	-	-	3.69	94.71	15.15	479.07
Chemical and petrochemical	109.25	0.05	55.16	118.37	-	-	0.00	1.88	102.46	51.96	439.15
Non-ferrous metals	24.54	-	5.07	16.62	-	-	0.00	0.10	89.88	4.00	140.21
Non-metallic minerals	231.71	0.00	44.84	53.53	-	-	0.00	8.85	50.79	3.02	392.73
Transport equipment	3.13	-	2.09	11.78	-	-	0.00	0.03	24.06	3.77	44.86
Machinery	13.22	-	6.39	24.27	-	-	0.00	0.16	75.52	5.03	124.59
Mining and quarrying	8.76	-	22.53	8.12	-	-	0.00	0.16	28.33	1.99	69.89
Food and tobacco	30.94	0.01	10.11	44.99	-	-	0.00	29.42	41.83	10.56	167.86
Paper pulp and printing	17.70	-	4.14	23.80	-	-	0.10	59.27	36.89	12.09	153.99
Wood and wood products	2.88	-	2.14	3.10	-	-	0.00	7.94	8.75	1.75	26.56
Construction	4.65	-	30.26	6.47	-	-	0.00	0.31	15.66	0.98	58.34
Textile and leather	13.13	0.01	3.30	6.56	-	-	0.00	0.23	29.14	7.99	60.38
Non-specified	61.02	9.00	106.20	158.84	-	-	0.60	80.66	132.62	5.81	554.75
TRANSPORT	2.53	0.01	2490.99	97.59	-	-	0.00	75.99	35.90	-	2703.00
World aviation bunkers	-	-	176.95	-	-	-	-	-	-	-	176.95
Domestic aviation	-	-	112.71	-	-	-	-	-	-	-	112.71
Road	-	-	1907.05	40.99	-	-	-	75.55	10.63	-	2034.22
Rail	2.49	-	29.40	-	-	-	-	0.20	20.37	-	52.45
Pipeline transport	-	0.01	0.33	56.34	-	-	-	-	2.54	-	59.22
World marine bunkers	-	-	204.68	-	-	-	-	0.17	-	-	204.84
Domestic navigation	-	-	50.72	0.10	-	-	-	0.07	-	-	50.89
Non-specified	0.04	-	9.16	0.15	-	-	0.00	0.00	2.36	-	11.72
OTHER	154.20	0.07	425.88	613.33	-	-	37.57	783.51	970.67	146.99	3132.22
Residential	74.14	-	210.56	419.82	-	-	28.30	745.27	470.05	102.43	2050.57
Comm. and public services	35.85	-	85.85	181.48	-	-	6.74	25.47	386.33	34.60	756.31
Agriculture/forestry	15.30	0.01	104.98	8.93	-	-	1.48	10.08	50.64	3.08	194.49
Fishing	0.00	-	5.60	0.10	-	-	0.04	0.01	0.55	0.03	6.33
Non-specified	28.91	0.06	18.90	3.01	-	-	1.00	2.68	63.10	6.85	124.51
NON-ENERGY USE	60.96	9.95	604.69	160.41	-	-	-	-	-	-	836.01
in industry/transf./energy	60.62	9.95	563.73	160.41	-	-	-	-	-	-	794.70
of which: chem./petrochem.	3.01	9.89	419.14	158.87	-	-	-	-	-	-	590.93
in transport	-	-	9.85	-	-	-	-	-	-	-	9.85
in other	0.35	-	31.11	-	-	-	-	-	-	-	31.46
Electricity and Heat Output											
Electr. Generated - TWh	9538.30	147.03	842.84	5543.36	2571.37	3888.32	1191.62	528.05	-	3.96	24254.84
Electricity plants	8935.27	147.02	780.68	4346.00	2544.63	3888.32	1182.15	309.53	-	2.65	22136.24
CHP plants	603.03	0.01	62.16	1197.36	26.74	-	9.46	218.53	-	1.31	2118.60
Heat Generated - PJ	5941.04	18.00	584.07	5703.41	25.82	-	401.32	940.49	9.08	87.97	13711.20
CHP plants	1835.32	0.14	189.67	3449.38	25.82	-	14.04	577.19	0.32	44.65	6136.52
Heat plants	4105.73	17.86	394.40	2254.02	-	-	387.28	363.30	8.76	43.32	7574.68

1. Includes peat and oil shale.

2. Includes crude oil, NGL, refinery feedstocks, additives and other hydrocarbons.

Source: World Energy Balances.

Table 2. OECD energy balance in 2015

Million tonnes of oil equivalent											
SUPPLY AND CONSUMPTION	Coal ¹	Crude oil ²	Oil products	Natural gas	Nuclear	Hydro	Geotherm. / Solar / etc.	Biofuels / Waste	Electricity	Heat	Total
Production	921.66	1125.77	-	1080.13	513.69	118.74	108.37	294.91	-	0.82	4164.09
Imports	400.14	1422.20	600.29	632.55	-	-	-	18.72	44.22	0.01	3118.12
Exports	-358.33	-411.15	-646.77	-326.55	-	-	-	-11.66	-43.70	-0.01	-1798.17
Intl. marine bunkers	-	-	-70.36	-	-	-	-	-0.17	-	-	-70.53
Intl. aviation bunkers	-	-	-95.41	-	-	-	-	-	-	-	-95.41
Stock changes	-15.84	-16.75	-13.47	-12.09	-	-	-	-0.49	-	-	-58.65
TPES	947.63	2120.07	-225.74	1374.05	513.69	118.74	108.37	301.31	0.52	0.82	5259.45
Transfers	-	-103.43	119.04	-	-	-	-	-0.42	-	-	15.20
Statistical differences	-4.75	-3.53	10.85	1.75	-	-	-0.02	0.49	1.22	-0.68	5.34
Electricity plants	-666.26	-4.94	-41.86	-397.25	-506.60	-118.74	-94.50	-50.61	839.91	-0.52	-1041.38
CHP plants	-77.54	-	-12.95	-107.76	-7.08	-	-2.73	-46.00	93.91	54.63	-105.53
Heat plants	-3.78	-	-1.02	-8.18	-	-	-1.14	-6.44	-0.43	17.15	-3.84
Blast furnaces	-53.34	-	-0.21	-0.07	-	-	-	-	-	-	-53.63
Gas works	-2.22	-	-2.20	3.24	-	-	-	-0.10	-	-	-1.28
Coke/pat. fuel/BKB/PB plants	-7.55	-	-1.09	-0.03	-	-	-	-0.11	-	-	-8.79
Oil refineries	-	-2042.01	2021.04	-	-	-	-	-	-	-	-20.97
Petrochemical plants	-	30.93	-31.26	-	-	-	-	-	-	-	-0.33
Liquefaction plants	-1.29	0.80	-	-	-	-	-	-	-	-	-0.49
Other transformation	-0.19	9.08	-0.00	-9.37	-	-	-	-0.22	-	-0.85	-1.54
Energy industry own use	-18.56	-0.06	-107.71	-136.43	-	-	-0.00	-0.85	-67.50	-7.73	-338.84
Losses	-1.16	-	-0.05	-1.85	-	-	-0.01	-0.04	-59.46	-5.30	-67.87
TFC	110.99	6.90	1726.83	718.10	-	-	9.96	197.01	808.17	57.53	3635.50
INDUSTRY	89.44	0.04	92.39	257.42	-	-	0.45	72.38	255.18	24.27	791.57
Iron and steel	37.60	-	2.58	25.41	-	-	-	0.09	26.73	0.67	93.08
Chemical and petrochemical	11.03	0.03	19.75	70.51	-	-	0.00	1.65	37.38	11.09	151.43
Non-ferrous metals	1.86	-	1.61	11.61	-	-	0.00	0.09	24.23	0.22	39.61
Non-metallic minerals	20.61	-	13.84	26.46	-	-	0.00	5.84	14.78	0.27	81.81
Transport equipment	0.20	-	1.06	8.04	-	-	0.00	0.02	13.38	0.67	23.37
Machinery	0.31	-	2.87	18.68	-	-	0.00	0.14	30.21	0.63	52.85
Mining and quarrying	0.39	-	10.85	4.36	-	-	0.00	0.11	10.64	0.12	26.47
Food and tobacco	5.68	0.00	4.50	36.19	-	-	0.00	4.61	22.00	1.81	74.80
Paper, pulp and printing	5.17	-	2.65	20.25	-	-	0.10	49.36	24.44	3.13	105.11
Wood and wood products	0.09	-	1.36	2.56	-	-	-	7.20	4.71	0.66	16.58
Construction	0.03	-	16.74	2.77	-	-	0.00	0.30	7.91	0.04	27.79
Textile and leather	0.87	0.01	1.03	5.15	-	-	0.00	0.08	6.09	0.66	13.89
Non-specified	5.59	-	13.55	25.44	-	-	0.35	2.87	32.67	4.32	84.79
TRANSPORT	0.01	-	1148.14	25.17	-	-	0.00	49.63	9.25	-	1232.20
Domestic aviation	-	-	73.41	-	-	-	-	-	-	-	73.41
Road	-	-	1035.30	4.07	-	-	-	49.37	0.48	-	1089.22
Rail	0.01	-	18.14	-	-	-	-	0.20	7.33	-	25.69
Pipeline transport	-	-	0.04	20.86	-	-	-	-	0.48	-	21.38
Domestic navigation	-	-	20.70	0.10	-	-	-	0.06	-	-	20.86
Non-specified	-	-	0.56	0.12	-	-	0.00	0.00	0.95	-	1.64
OTHER	18.65	-	182.19	402.36	-	-	9.51	75.01	543.75	33.25	1264.72
Residential	11.63	-	81.02	249.50	-	-	5.56	63.45	251.61	21.71	684.48
Comm. and public services	5.94	-	51.83	146.02	-	-	2.96	8.40	257.74	11.08	483.97
Agriculture/forestry	1.04	-	42.14	5.57	-	-	0.83	3.12	11.54	0.22	64.47
Fishing	-	-	3.47	0.05	-	-	0.04	0.01	0.39	0.02	3.98
Non-specified	0.04	-	3.73	1.21	-	-	0.12	0.02	22.47	0.21	27.81
NON-ENERGY USE	2.89	6.86	304.11	33.15	-	-	-	-	-	-	347.01
in industry/transf./energy	2.68	6.86	287.94	33.15	-	-	-	-	-	-	330.63
of which: chem./petrochem.	1.54	6.86	218.76	33.15	-	-	-	-	-	-	260.30
in transport	-	-	8.19	-	-	-	-	-	-	-	8.19
in other	0.21	-	7.98	-	-	-	-	-	-	-	8.19
Electricity and Heat Output											
Electr. generated - TWh	3227.78	24.68	236.21	2847.22	1970.68	1380.71	816.32	353.55	-	1.23	10858.37
Electricity plants	2932.84	24.68	193.88	2292.39	1943.94	1380.71	806.86	189.88	-	0.65	9765.83
CHP plants	294.93	-	42.33	554.83	26.74	-	9.46	163.67	-	0.58	1092.54
Heat generated - PJ	759.84	-	163.21	1266.05	4.77	-	61.67	730.38	8.53	45.64	3040.11
CHP plants	632.06	-	129.49	985.28	4.77	-	14.04	521.92	0.32	20.05	2307.93
Heat plants	127.79	-	33.73	280.77	-	-	47.63	208.46	8.21	25.59	732.18

1. Includes peat and oil shale.

2. Includes crude oil, NGL, refinery feedstocks, additives and other hydrocarbons.

Source: World Energy Balances.

Table 3. Share of renewables in TPES in 2015

	TPES Mtoe	Of which: renewables Mtoe	Share of renewables in TPES ¹ (%)	Share of main fuel categories in total renewables (%)		
				Hydro	Geothermal, solar, wind, tide	Biofuels and renewable waste
Africa	787.6	392.2	49.8	2.6	1.2	96.1
Non-OECD Americas	627.7	185.5	29.6	30.0	3.6	66.5
Non-OECD Asia excluding China	1769.2	442.2	25.0	6.2	7.3	86.5
China	2987.1	250.9	8.4	38.2	18.4	43.4
Non-OECD Europe and Eurasia	1105.7	45.2	4.1	55.1	3.9	41.0
Middle East	728.8	2.7	0.4	56.9	10.6	32.5
OECD	5259.4	504.0	9.6	23.6	21.4	55.0
World Marine & Aviation Bunkers	381.8	x	x	x	x	x
World	13647.4	1822.5	13.4	18.3	11.0	70.7
Albania	2.2	0.8	34.4	67.3	1.6	31.1
Algeria	54.0	0.0	0.0	49.7	26.4	23.9
Angola	15.0	7.7	51.7	5.8	-	94.2
Argentina	86.0	6.8	7.9	47.9	0.8	51.3
Armenia	3.1	0.4	12.4	49.9	0.1	50.0
Australia	125.3	8.2	6.5	14.0	22.6	63.3
Austria	32.8	9.7	29.4	33.0	7.4	59.6
Azerbaijan	14.4	0.3	1.8	54.1	0.3	45.6
Bahrain	14.3	-	-	-	-	-
Bangladesh	37.9	9.4	24.8	0.5	0.1	99.3
Belarus	25.3	1.4	5.5	0.7	0.2	99.1
Belgium	53.3	3.6	6.8	0.8	21.1	78.1
Benin	4.6	2.7	59.6	0.0	0.0	99.9
Bolivia	8.3	1.3	15.6	16.4	0.2	83.5
Bosnia and Herzegovina	8.0	2.0	24.9	23.9	-	76.1
Botswana	2.7	0.6	20.4	-	0.0	100.0
Brazil	298.0	119.9	40.3	25.8	2.1	72.1
Brunei Darussalam	2.7	0.0	0.0	-	100.0	-
Bulgaria	18.6	2.0	10.7	24.5	15.0	60.5
Cambodia	7.0	4.4	62.4	3.9	0.0	96.1
Cameroon	7.8	5.5	70.0	8.0	-	92.0
Canada	270.2	48.9	18.1	66.9	5.2	27.8
Chile	36.1	9.7	26.8	21.2	3.3	75.5
China (People's Rep. of)	2973.3	250.8	8.4	38.2	18.4	43.3
Colombia	33.8	7.7	22.7	50.3	0.1	49.6
Congo	2.7	1.6	60.2	5.0	-	95.0
Costa Rica	4.9	2.6	52.7	26.7	48.3	25.0
Cote d'Ivoire	13.0	9.5	73.2	1.2	-	98.8
Croatia	8.4	2.0	23.3	28.0	4.8	67.1
Cuba	12.0	1.7	14.1	0.2	0.3	99.5
Cyprus ²	2.0	0.1	7.3	-	67.8	32.2
Czech Republic	42.1	4.3	10.2	3.6	6.1	90.3
DPR of Korea	7.8	2.0	25.0	43.8	-	56.2
Dem. Rep. of the Congo	28.9	28.0	97.0	2.7	-	97.3
Denmark	16.1	4.8	29.6	0.0	27.4	72.6
Dominican Republic	8.2	1.0	12.0	10.2	9.1	80.7
Ecuador	15.1	2.0	13.3	56.2	0.7	43.1
Egypt	79.4	3.0	3.8	38.0	4.5	57.5
El Salvador	4.3	2.1	48.0	5.6	63.8	30.5
Eritrea	0.9	0.7	76.9	-	0.0	100.0
Estonia	5.4	0.9	16.7	0.3	6.8	93.0
Ethiopia	50.0	46.7	93.4	1.8	0.1	98.1

1. Share may exceed 100% due to large hydro production included in renewables and electricity trade in the TPES calculations. 2. Please refer to Part I Section 3, Geographical coverage

Source: World Energy Balances.

Table 3. Share of renewables in TPES in 2015 (continued)

	TPES Mtoe	Of which: renewables Mtoe	Share of renewables in TPES ¹ (%)	Share of main fuel categories in total renewables (%)		
				Hydro	Geothermal, solar, wind, tide	Biofuels and renewable waste
Finland	32.5	10.5	32.3	13.8	1.9	84.3
France	246.5	21.8	8.8	21.5	12.9	65.7
FYR of Macedonia	2.7	0.4	15.7	38.1	4.9	57.1
Gabon	5.1	3.9	76.7	2.0	0.0	98.0
Georgia	4.6	1.1	24.7	63.6	1.6	34.8
Germany	307.8	38.4	12.5	4.3	28.8	67.0
Ghana	9.7	4.1	42.5	12.2	0.0	87.8
Gibraltar	0.2	-	-	-	-	-
Greece	23.2	2.8	12.0	18.9	33.8	47.3
Guatemala	12.7	8.0	63.0	4.2	3.0	92.9
Haiti	4.3	3.3	77.5	0.2	-	99.8
Honduras	5.7	2.7	47.3	7.5	2.1	90.4
Hong Kong, China	13.9	0.1	0.8	-	0.2	99.8
Hungary	25.2	3.0	12.0	0.7	6.2	93.2
Iceland	5.6	4.9	88.3	24.0	75.7	0.3
India	851.1	212.7	25.0	5.6	2.3	92.1
Indonesia	225.4	75.3	33.4	1.6	23.0	75.5
Islamic Rep. of Iran	236.5	1.7	0.7	69.6	1.1	29.3
Iraq	47.9	0.3	0.6	82.7	-	17.3
Ireland	13.3	1.1	8.1	6.5	54.0	39.5
Israel	23.0	0.5	2.1	0.4	94.3	5.3
Italy	152.6	26.3	17.2	14.9	33.9	51.2
Jamaica	2.9	0.5	18.6	2.1	2.0	95.9
Japan	429.8	22.9	5.3	32.0	27.3	40.6
Jordan	8.6	0.2	2.1	2.5	94.5	3.0
Kazakhstan	78.1	0.9	1.1	89.6	1.7	8.7
Kenya	25.1	20.4	81.2	1.6	18.9	79.5
Korea	272.7	4.0	1.5	4.6	16.1	79.3
Kuwait	34.7	-	-	-	-	-
Kyrgyzstan	4.0	1.0	24.1	99.7	-	0.3
Latvia	4.3	1.5	36.1	10.4	0.8	88.8
Lebanon	7.6	0.2	2.5	21.2	12.2	66.5
Libyan Arab Jamahiriya	17.2	0.2	0.9	-	-	100.0
Lithuania	7.2	1.4	19.6	2.1	5.5	92.4
Luxembourg	3.7	0.2	5.5	4.2	9.6	86.3
Malaysia	85.9	3.2	3.7	37.9	0.7	61.3
Malta	0.6	0.0	3.2	-	60.4	39.6
Mauritius	1.5	0.3	17.6	4.1	1.0	94.9
Mexico	187.4	15.5	8.3	17.1	27.2	55.7
Republic of Moldova	3.4	0.3	10.3	7.6	0.1	92.3
Mongolia	4.9	0.2	3.2	-	9.3	90.7
Morocco	19.4	1.7	8.6	9.7	12.9	77.4
Mozambique	13.0	10.7	82.8	13.8	-	86.2
Myanmar	19.8	10.9	55.1	7.4	-	92.6
Namibia	1.9	0.4	19.7	35.0	0.7	64.3
Nepal	11.7	9.8	84.1	3.1	0.0	96.9
Netherlands	73.8	3.6	4.9	0.2	22.8	77.0
Netherland Antilles / Curaçao	2.1	0.0	0.1	-	100.0	-
New Zealand	20.6	8.4	40.6	25.2	60.7	14.0
Nicaragua	3.9	2.2	56.3	1.2	29.8	69.0

1. Share may exceed 100% due to large hydro production included in renewables and electricity trade in the TPES calculations.

Source: World Energy Balances.

Table 3. Share of renewables in TPES in 2015 (continued)

	TPES Mtoe	Of which: renewables Mtoe	Share of renewables in TPES ¹ (%)	Share of main fuel categories in total renewables (%)		
				Hydro	Geothermal, solar, wind, tide	Biofuels and renewable waste
Niger	3.0	2.2	74.7	-	0.0	100.0
Nigeria	139.4	112.1	80.4	0.4	-	99.6
Norway	29.6	13.4	45.3	88.4	1.6	10.0
Oman	25.4	-	-	-	-	-
Pakistan	93.9	35.8	38.1	8.2	0.2	91.6
Panama	4.3	0.9	21.1	59.9	4.2	36.0
Paraguay	5.4	7.0	130.0	68.1	-	31.9
Peru	24.6	5.0	20.2	40.9	1.9	57.1
Philippines	52.1	19.0	36.3	3.9	50.5	45.6
Poland	94.9	9.0	9.5	1.8	11.2	87.1
Portugal	22.0	5.0	22.6	15.0	26.9	58.1
Qatar	45.4	-	-	-	-	-
Romania	31.9	6.0	18.7	24.0	13.5	62.5
Russian Federation	709.7	17.4	2.5	83.0	0.9	16.1
Saudi Arabia	221.7	0.0	0.0	-	1.3	98.7
Senegal	4.1	1.9	45.8	1.6	0.0	98.4
Serbia	14.8	1.9	13.1	44.9	0.4	54.7
Singapore	25.6	0.4	1.5	-	1.5	98.5
Slovak Republic	16.4	1.6	9.6	21.1	3.6	75.3
Slovenia	6.6	1.1	16.1	31.0	7.4	61.6
South Africa	142.0	16.3	11.5	0.4	3.0	96.5
South Sudan	0.6	0.2	36.2	-	0.1	99.9
Spain	118.9	16.6	14.0	14.6	44.8	40.6
Sri Lanka	11.4	5.4	47.0	9.6	0.6	89.9
Sudan	15.7	10.4	66.4	7.0	-	93.0
Suriname	0.7	0.2	24.8	71.0	-	29.0
Sweden	45.5	19.2	42.2	33.7	7.4	58.9
Switzerland	24.5	5.5	22.3	60.2	9.3	30.5
Syrian Arab Republic	10.0	0.0	0.4	86.2	-	13.8
Chinese Taipei	108.8	1.9	1.7	20.7	16.8	62.5
Tajikistan	2.7	1.5	53.8	100.0	-	-
United Rep. of Tanzania	26.0	22.0	84.7	0.8	0.0	99.2
Thailand	135.2	25.9	19.2	1.6	0.9	97.5
Togo	3.4	2.7	78.9	0.2	-	99.8
Trinidad and Tobago	19.4	0.0	0.1	-	-	100.0
Tunisia	10.9	1.2	10.7	0.5	7.6	91.9
Turkey	128.8	15.7	12.2	36.8	42.6	20.5
Turkmenistan	27.6	0.0	0.0	-	-	100.0
Ukraine	90.1	2.7	3.0	17.2	5.0	77.8
United Arab Emirates	73.3	0.1	0.2	-	59.4	40.6
United Kingdom	180.7	14.7	8.2	3.7	28.3	68.0
United States	2188.3	147.0	6.7	14.7	21.3	64.0
Uruguay	5.0	2.9	58.4	24.2	6.2	69.6
Uzbekistan	42.6	1.0	2.4	99.6	-	0.4
Venezuela	59.4	7.2	12.1	89.7	-	10.3
Viet Nam	73.8	20.4	27.6	23.7	0.1	76.2
Yemen	3.5	0.1	3.4	-	-	100.0
Zambia	10.2	9.1	89.0	12.3	-	87.7
Zimbabwe	11.3	7.9	70.4	5.4	-	94.6

1. Share may exceed 100% due to large hydro production included in renewables and electricity trade in the TPES calculations.

Source: World Energy Balances.

Table 4. Share of renewables in TFC in 2015

	TFC Mtoe	Of which: renewables Mtoe	Share of renewables in TFC (%)	Share of main fuel categories in total renewables (%)			
				Geothermal and Solar thermal	Renewable wastes and Biogases	Solid biofuels	Liquid biofuels
Africa	572.9	311.7	54.4	0.1	0.0	99.9	0.0
Non-OECD Americas	465.3	91.5	19.7	0.8	0.0	77.1	22.1
Non-OECD Asia excluding China	1236.8	346.4	28.0	0.2	0.3	98.4	1.1
China	1914.6	116.5	6.1	22.5	6.4	69.3	1.8
Non-OECD Europe and Eurasia	701.2	15.2	2.2	1.4	0.3	94.8	3.5
Middle East	475.5	0.9	0.2	19.3	-	80.7	-
OECD	3635.5	199.3	5.5	5.0	2.3	67.4	25.3
World Marine & Aviation Bunkers	-381.8	x	x	x	x	x	x
World	8620.0	1081.3	12.5	3.5	1.2	88.2	7.1
Albania	2.0	0.2	12.2	5.0	-	82.9	12.1
Algeria	37.5	0.0	0.0	-	-	100.0	-
Angola	12.0	5.4	45.5	-	-	100.0	-
Argentina	61.8	2.6	4.2	-	-	55.0	45.0
Armenia	2.1	0.2	9.2	-	-	100.0	-
Australia	81.3	4.6	5.7	7.7	1.3	85.7	5.3
Austria	27.0	3.8	14.2	5.0	1.2	76.0	17.8
Azerbaijan	8.7	0.1	0.9	-	-	100.0	-
Bahrain	6.3	-	-	-	-	-	-
Bangladesh	27.9	9.2	32.8	-	-	100.0	-
Belarus	18.3	0.6	3.5	-	0.0	96.9	3.0
Belgium	41.8	1.6	3.8	1.4	6.2	75.5	16.9
Benin	3.6	1.8	50.7	-	-	100.0	-
Bolivia	6.7	1.0	14.2	-	-	100.0	-
Bosnia and Herzegovina	4.4	1.4	32.6	-	-	100.0	-
Botswana	1.9	0.6	28.6	-	-	100.0	-
Brazil	226.9	61.6	27.1	1.1	-	69.4	29.4
Brunei Darussalam	1.0	-	-	-	-	-	-
Bulgaria	10.0	1.2	12.1	4.6	0.9	82.6	11.9
Cambodia	5.9	3.6	61.1	-	-	100.0	-
Cameroon	6.8	4.8	70.3	-	-	100.0	-
Canada	193.4	10.5	5.5	0.4	0.7	82.1	16.8
Chile	25.1	3.7	14.7	0.8	0.4	98.8	-
China (People's Rep. of)	1905.7	116.4	6.1	22.6	6.4	69.3	1.8
Colombia	25.9	3.0	11.5	-	-	99.1	0.9
Congo	2.1	1.2	59.7	-	-	100.0	-
Costa Rica	3.7	0.6	16.2	-	0.0	100.0	-
Cote d'Ivoire	6.8	4.3	62.9	-	-	100.0	-
Croatia	7.0	1.2	17.7	1.7	-	96.4	1.9
Cuba	7.5	1.3	17.8	-	-	83.1	16.9
Cyprus ²	1.4	0.1	7.5	64.4	10.8	15.8	9.0
Czech Republic	25.5	2.7	10.7	0.6	6.0	82.5	10.9
DPR of Korea	6.6	0.9	13.4	-	-	100.0	-
Dem. Rep. of the Congo	21.5	20.0	92.9	-	-	100.0	-
Denmark	13.3	1.4	10.9	1.0	3.7	79.4	16.0
Dominican Republic	5.7	0.7	12.9	1.1	-	98.9	-
Ecuador	12.2	0.6	4.9	0.4	-	97.3	2.3
Egypt	55.2	1.7	3.2	-	-	100.0	-
El Salvador	2.5	0.3	12.7	-	-	100.0	-
Eritrea	0.6	0.4	79.5	-	-	100.0	-
Estonia	2.8	0.5	17.0	-	0.9	98.5	0.7
Ethiopia	40.9	36.9	90.2	-	-	100.0	0.0

Source: World Energy Balances.

Table 4. Share of renewables in TFC in 2015 (continued)

	TFC Mtoe	Of which: renewables Mtoe	Share of renewables in TFC (%)	Share of main fuel categories in total renewables (%)			
				Geothermal and Solar thermal	Renewable wastes and Biogases	Solid biofuels	Liquid biofuels
Finland	24.3	5.4	22.1	0.0	1.1	89.5	9.3
France	147.8	11.5	7.8	1.1	2.2	71.2	25.6
FYR of Macedonia	1.9	0.2	12.8	3.0	-	97.0	-
Gabon	4.7	3.8	80.3	-	-	100.0	-
Georgia	4.1	0.4	10.1	4.0	-	96.0	-
Germany	220.2	14.0	6.3	5.3	13.2	62.1	19.4
Ghana	6.9	2.4	35.0	-	-	100.0	-
Gibraltar	0.2	-	-	-	-	-	-
Greece	16.4	1.4	8.8	14.3	1.1	73.3	11.3
Guatemala	10.3	6.1	58.9	-	-	100.0	-
Haiti	3.3	2.5	75.9	-	-	100.0	-
Honduras	4.7	2.2	45.5	-	-	100.0	-
Hong Kong, China	9.0	0.1	0.7	-	-	89.2	10.8
Hungary	18.9	2.2	11.5	2.9	0.7	88.3	8.1
Iceland	2.9	0.1	3.4	84.3	1.7	-	14.0
India	577.7	177.8	30.8	0.4	-	99.4	0.2
Indonesia	162.8	55.5	34.1	-	-	98.2	1.8
Islamic Rep. of Iran	175.7	0.5	0.3	-	-	100.0	-
Iraq	18.1	0.0	0.1	-	-	100.0	-
Ireland	10.5	0.3	3.1	3.9	10.8	58.5	26.7
Israel	13.8	0.4	2.6	97.6	-	2.4	-
Italy	119.2	8.4	7.0	3.6	0.5	81.9	13.9
Jamaica	2.0	0.3	15.2	-	-	89.6	10.4
Japan	291.4	2.8	1.0	17.8	-	82.2	-
Jordan	5.5	0.2	2.9	97.7	-	2.3	-
Kazakhstan	38.4	0.1	0.2	-	-	100.0	-
Kenya	15.8	10.8	68.4	-	-	100.0	-
Korea	174.2	2.4	1.4	6.7	9.7	66.3	17.2
Kuwait	17.6	-	-	-	-	-	-
Kyrgyzstan	3.4	0.0	0.1	-	-	100.0	-
Latvia	3.8	0.9	24.8	-	0.9	96.5	2.6
Lebanon	4.9	0.1	2.8	17.1	-	82.9	-
Libyan Arab Jamahiriya	8.3	0.2	1.8	-	-	100.0	-
Lithuania	5.9	0.7	11.8	-	1.1	89.2	9.8
Luxembourg	3.6	0.1	3.7	1.4	2.6	33.9	62.1
Malaysia	51.6	1.2	2.4	-	-	68.6	31.4
Malta	0.5	0.0	2.3	41.3	5.5	11.0	42.2
Mauritius	0.8	0.0	4.6	-	-	100.0	-
Mexico	119.8	7.1	6.0	3.0	-	97.0	-
Republic of Moldova	2.3	0.3	12.9	-	-	100.0	-
Mongolia	3.1	0.1	3.0	-	-	100.0	-
Morocco	15.0	1.3	8.5	-	-	100.0	-
Mozambique	10.4	8.0	76.8	-	-	100.0	-
Myanmar	17.7	10.1	56.8	-	-	100.0	-
Namibia	1.7	0.1	7.7	1.9	-	98.1	-
Nepal	11.6	9.5	82.3	-	2.9	97.1	-
Netherlands	56.6	1.2	2.2	7.0	13.4	53.6	26.0
Netherland Antilles / Curaçao	0.7	-	-	-	-	-	-
New Zealand	14.1	1.2	8.6	15.3	0.5	84.0	0.2
Nicaragua	2.5	1.0	41.6	-	-	100.0	-

Source: World Energy Balances.

Table 4. Share of renewables in TFC in 2015 (continued)

	TFC	Of which: renewables	Share of renewables in TFC	Share of main fuel categories in total renewables (%)						
				Mtoe	Mtoe	TFC (%)	Geothermal and Solar thermal	Renewable wastes and Biogases	Solid biofuels	Liquid biofuels
Niger	2.7	2.1	78.8	-	-	100.0	-			
Nigeria	120.5	102.8	85.3	-	-	100.0	-			
Norway	20.5	1.0	4.6	-	3.8	81.4	14.8			
Oman	20.4	-	-	-	-	-	-			
Pakistan	77.7	32.1	41.4	-	-	100.0	-			
Panama	3.5	0.3	7.3	-	-	100.0	-			
Paraguay	4.9	2.1	42.8	-	-	94.1	5.9			
Peru	17.9	2.6	14.4	1.0	-	83.6	15.4			
Philippines	29.6	6.4	21.5	-	-	93.3	6.7			
Poland	66.2	5.5	8.2	1.2	2.2	82.3	14.3			
Portugal	16.3	2.2	13.4	3.7	0.4	80.1	15.8			
Qatar	19.6	-	-	-	-	-	-			
Romania	22.5	3.5	15.7	0.6	0.1	93.6	5.7			
Russian Federation	456.9	2.0	0.4	-	-	100.0	-			
Saudi Arabia	145.1	0.0	0.0	-	-	100.0	-			
Senegal	2.8	1.1	40.8	-	-	100.0	-			
Serbia	8.5	1.0	12.3	0.6	0.2	99.2	-			
Singapore	17.1	-	-	-	-	-	-			
Slovak Republic	10.0	0.6	6.3	1.1	6.2	70.1	22.7			
Slovenia	4.8	0.6	13.0	8.5	0.3	86.5	4.7			
South Africa	74.8	11.7	15.6	1.0	-	99.0	-			
South Sudan	0.4	0.2	39.0	-	-	100.0	-			
Spain	79.8	5.3	6.6	5.6	1.2	74.7	18.6			
Sri Lanka	9.9	4.7	47.8	-	-	100.0	-			
Sudan	10.7	5.8	54.7	-	-	100.0	-			
Suriname	0.6	0.0	7.9	-	-	100.0	-			
Sweden	32.3	6.6	20.4	0.2	2.2	81.7	16.0			
Switzerland	18.9	1.4	7.2	29.2	6.2	61.3	3.3			
Syrian Arab Republic	6.6	0.0	0.1	-	-	100.0	-			
Chinese Taipei	68.6	0.3	0.4	35.6	3.3	37.5	23.6			
Tajikistan	2.4	-	-	-	-	-	-			
United Rep. of Tanzania	22.5	19.1	84.9	-	-	100.0	-			
Thailand	98.0	16.0	16.3	-	4.1	86.3	9.6			
Togo	2.2	1.5	67.6	-	-	100.0	-			
Trinidad and Tobago	13.8	0.0	0.1	-	-	100.0	-			
Tunisia	7.9	0.9	11.6	5.1	-	94.9	-			
Turkey	93.5	5.6	6.0	48.3	-	49.8	1.9			
Turkmenistan	18.0	0.0	0.0	-	-	100.0	-			
Ukraine	50.8	1.3	2.5	-	-	97.4	2.6			
United Arab Emirates	53.2	0.0	0.1	-	-	100.0	-			
United Kingdom	125.3	3.8	3.0	1.4	5.1	68.8	24.8			
United States	1520.1	78.3	5.2	3.3	0.9	52.8	43.0			
Uruguay	4.5	1.8	39.1	-	-	95.6	4.4			
Uzbekistan	29.4	0.0	0.0	-	-	100.0	-			
Venezuela	37.3	0.7	2.0	-	-	100.0	-			
Viet Nam	58.2	14.6	25.1	-	-	100.0	-			
Yemen	2.6	0.1	2.3	-	-	100.0	-			
Zambia	8.3	6.3	75.7	-	-	100.0	-			
Zimbabwe	9.5	7.4	78.3	-	-	99.6	0.4			

Source: World Energy Balances.

Table 5. Contribution of renewable¹ energy sources to TPES (%)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
<i>OECD Total</i>	6.0	6.0	7.8	9.1	9.4	9.6	9.7	3.0
<i>OECD Americas</i>	6.7	6.3	7.1	8.3	8.2	8.2	8.5	1.9
<i>OECD Asia Oceania</i>	4.0	3.4	3.9	4.3	4.8	5.0	4.8	2.2
<i>OECD Europe</i>	5.8	7.0	10.8	12.9	13.5	14.0	14.2	4.6
<i>IEA Total</i>	5.7	5.7	7.6	8.9	9.2	9.4	9.6	3.3
<i>Non-OECD Total</i>	21.0	21.7	16.5	16.2	16.2	16.5	..	..
<i>World</i>	12.8	12.8	12.4	13.0	13.1	13.4	..	..
Australia	5.9	6.2	5.5	6.2	6.5	6.5	6.5	0.3
Austria	20.3	23.0	26.9	29.9	30.0	29.4	30.0	1.7
Belgium	1.0	1.1	4.7	6.3	6.4	6.8	6.7	11.9
Canada	17.2	17.6	16.6	18.3	17.6	18.1	17.5	-0.0
Chile	27.8	25.1	22.1	31.3	27.1	26.8	26.8	0.4
Czech Republic	2.3	3.9	6.9	9.4	9.9	10.2	10.5	6.3
Denmark	5.9	9.6	20.1	25.2	27.7	29.6	30.0	7.3
Estonia	1.9	10.9	15.1	14.0	14.3	16.7	17.6	3.0
Finland	19.3	23.9	25.5	29.8	30.2	32.3	31.2	1.7
France	6.8	6.2	8.0	9.0	8.8	8.8	9.6	2.7
Germany	1.5	2.7	8.5	10.5	11.6	12.5	12.7	10.2
Greece	5.2	5.2	7.7	11.2	10.6	12.0	12.1	5.4
Hungary	2.6	3.3	10.5	13.0	12.0	12.0	11.5	8.0
Iceland	71.4	77.4	88.5	89.6	89.1	88.3	89.5	0.9
Ireland	1.7	1.7	4.6	6.5	7.5	8.1	7.9	10.1
Israel	3.2	3.3	5.0	1.7	2.1	2.1	2.4	-2.1
Italy	4.4	5.9	12.6	17.0	18.1	17.2	17.3	7.0
Japan	3.4	3.1	3.8	4.4	4.8	5.3	4.8	2.9
Korea	1.1	0.4	0.7	1.0	1.5	1.5	1.7	9.5
Latvia	13.2	31.1	31.8	37.1	37.2	36.1	39.1	1.4
Luxembourg	0.5	1.2	3.0	3.9	5.0	5.5	5.6	10.3
Mexico	12.1	11.2	8.5	7.8	8.5	8.3	7.9	-2.2
Netherlands	1.1	1.8	3.9	4.4	4.7	4.9	4.9	6.5
New Zealand	32.9	30.3	38.7	38.8	39.8	40.6	40.5	1.8
Norway	54.1	51.6	34.4	38.6	47.0	45.3	49.2	-0.3
Poland	1.5	4.3	7.2	8.8	9.2	9.5	8.5	4.4
Portugal	19.5	15.3	23.2	24.7	26.0	22.6	24.3	2.9
Slovak Republic	1.5	2.8	7.4	8.3	8.9	9.6	9.6	8.1
Slovenia	9.1	12.3	15.3	17.1	18.1	16.1	16.7	2.0
Spain	6.9	5.6	11.8	15.2	15.5	14.0	14.5	6.1
Sweden	24.4	31.0	33.4	34.6	35.9	42.2	37.0	1.1
Switzerland	14.9	17.7	19.0	20.3	21.1	22.3	22.3	1.4
Turkey	18.3	13.3	10.9	11.2	9.9	12.2	12.8	-0.2
United Kingdom	0.5	1.0	3.6	5.6	6.9	8.2	8.2	14.0
United States	5.0	4.5	5.7	6.6	6.7	6.7	7.1	2.9

1. Renewable sources include hydroelectricity, geothermal, solar thermal, solar PV, tide, wind, renewable municipal waste, solid biofuels, liquid biofuels and biogases.

Source: World Energy Balances.

Table 6. Contribution of renewable¹ energy sources to TFC (%)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
<i>OECD Total</i>	3.2	3.8	5.1	5.5	5.5	5.5	2.5
<i>OECD Americas</i>	2.8	4.0	5.0	5.6	5.5	5.4	1.9
<i>OECD Asia Oceania</i>	2.1	1.8	1.9	1.8	2.0	2.0	0.6
<i>OECD Europe</i>	4.1	4.4	6.6	7.1	7.2	7.3	3.5
<i>IEA Total</i>	2.9	3.5	4.9	5.3	5.4	5.4	2.8
<i>Non-OECD Total</i>	23.6	24.7	17.6	16.6	16.4	16.4	-2.7
<i>World</i>	13.6	14.0	12.7	12.5	12.5	12.5	-0.7
Australia	5.6	6.1	5.6	5.6	5.4	5.7	-0.5
Austria	10.6	10.2	13.4	14.5	13.8	14.2	2.2
Belgium	1.0	1.0	3.6	4.1	4.1	3.8	9.4
Canada	6.1	6.1	5.6	5.9	5.6	5.5	-0.8
Chile	24.8	20.1	18.0	22.0	16.2	14.7	-2.1
Czech Republic	3.1	4.6	8.3	10.1	10.6	10.7	5.8
Denmark	4.2	4.5	8.5	9.6	9.7	10.9	6.1
Estonia	3.2	16.5	18.6	15.8	16.7	17.0	0.2
Finland	15.8	18.3	18.5	20.0	21.9	22.1	1.3
France	6.8	5.5	7.2	7.8	7.5	7.8	2.4
Germany	1.2	2.1	5.5	5.6	6.1	6.3	7.7
Greece	6.6	5.7	6.1	8.7	8.7	8.8	3.0
Hungary	3.4	4.5	10.4	13.6	11.7	11.5	6.5
Iceland	4.8	4.6	4.0	3.2	3.2	3.4	-2.0
Ireland	1.4	1.1	2.6	2.7	3.3	3.1	7.3
Israel	5.2	5.0	7.6	2.5	2.8	2.6	-4.2
Italy	0.8	1.4	6.8	7.0	6.4	7.0	11.6
Japan	1.4	1.1	1.0	0.9	1.0	1.0	-0.9
Korea	0.7	0.3	0.5	0.9	1.5	1.4	11.5
Latvia	9.6	25.0	23.2	26.5	27.0	24.8	-0.0
Luxembourg	-	0.5	2.4	2.7	3.4	3.7	14.6
Mexico	10.3	8.6	6.1	6.5	6.0	6.0	-2.4
Netherlands	0.7	0.8	1.4	1.8	2.2	2.2	6.6
New Zealand	8.1	9.0	9.9	9.0	8.4	8.6	-0.3
Norway	5.1	6.0	6.0	5.1	4.3	4.6	-1.7
Poland	1.8	6.1	7.5	8.4	8.1	8.2	2.0
Portugal	17.5	12.6	13.3	13.7	13.2	13.4	0.4
Slovak Republic	1.1	0.8	4.7	3.9	5.3	6.3	14.8
Slovenia	7.1	9.4	12.6	13.9	12.4	13.0	2.2
Spain	6.5	4.1	5.8	6.2	6.5	6.6	3.3
Sweden	14.4	15.0	16.3	18.6	19.4	20.4	2.1
Switzerland	4.2	4.4	6.2	6.8	6.6	7.2	3.4
Turkey	18.9	12.7	8.0	7.0	6.5	6.0	-4.8
United Kingdom	0.3	0.4	2.0	2.6	2.9	3.0	14.6
United States	1.8	3.3	4.6	5.3	5.3	5.2	3.1

1. Renewable sources include hydroelectricity, geothermal, solar thermal, solar PV, tide, wind, renewable municipal waste, solid biofuels, liquid biofuels and biogases.

Source: World Energy Balances.

Table 7. Share of electricity production from renewable¹ sources (%)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
<i>OECD Total</i>	17.3	15.5	17.7	21.3	22.1	23.0	23.8	2.7
<i>OECD Americas</i>	18.5	15.5	16.6	19.3	19.8	20.0	21.4	2.0
<i>OECD Asia Oceania</i>	12.3	8.9	9.1	10.4	11.7	12.7	12.7	2.2
<i>OECD Europe</i>	17.6	19.0	24.1	30.2	31.5	33.0	33.3	3.6
<i>IEA Total</i>	17.0	15.3	17.6	21.4	22.1	23.0	23.9	2.8
<i>Non-OECD Total</i>	23.2	23.1	21.5	22.1	22.6	22.7	..	..
<i>World</i>	19.4	18.3	19.6	21.7	22.4	22.8	..	..
Australia	9.7	8.4	8.6	13.3	14.9	13.6	14.7	3.6
Austria	66.2	72.5	66.2	78.0	81.1	76.5	77.7	0.4
Belgium	0.8	1.3	6.9	14.2	17.1	20.8	16.5	17.4
Canada	62.4	60.6	61.4	63.3	62.8	63.0	65.7	0.5
Chile	53.8	48.5	40.2	35.7	42.4	43.6	39.1	-1.3
Czech Republic	1.9	3.1	6.9	10.8	10.8	11.4	11.4	8.4
Denmark	3.2	15.5	32.0	46.0	55.9	65.5	60.6	8.9
Estonia	-	0.2	8.1	9.2	11.2	14.4	12.8	29.2
Finland	29.5	33.4	30.0	36.0	38.6	44.5	44.5	1.8
France	13.4	13.0	13.9	17.0	16.5	15.9	17.3	1.8
Germany	3.5	6.2	16.7	24.1	26.1	29.2	29.3	10.2
Greece	5.1	7.8	18.3	25.1	24.2	28.7	30.5	8.9
Hungary	0.7	0.7	8.1	9.2	10.7	10.6	10.1	18.2
Iceland	99.9	99.9	100.0	100.0	100.0	100.0	100.0	0.0
Ireland	4.9	5.0	13.2	22.0	24.8	28.0	24.4	10.4
Israel	0.0	0.1	0.3	0.9	1.5	1.9	2.7	25.5
Italy	16.4	18.8	25.8	38.9	43.4	38.7	38.1	4.5
Japan	11.3	9.1	10.5	12.2	14.1	16.0	15.9	3.5
Korea	6.0	1.4	1.2	1.6	1.6	1.9	2.2	2.6
Latvia	67.6	68.3	54.9	56.9	54.5	50.2	54.2	-1.4
Luxembourg	13.3	41.0	8.3	20.0	20.9	32.4	58.2	2.2
Mexico	24.7	19.8	16.6	13.3	17.5	15.4	14.9	-1.8
Netherlands	1.1	3.3	9.4	12.0	11.3	12.4	12.9	8.9
New Zealand	80.0	71.5	73.2	74.3	79.2	80.1	84.2	1.0
Norway	99.8	99.7	95.7	97.7	97.7	97.7	97.8	-0.1
Poland	1.1	1.6	6.9	10.4	12.5	13.8	13.7	14.2
Portugal	34.7	29.7	52.8	58.3	60.7	47.5	52.8	3.7
Slovak Republic	7.4	15.0	21.6	22.3	22.9	22.7	24.8	3.2
Slovenia	23.7	28.7	29.2	32.3	38.5	29.4	31.2	0.5
Spain	17.2	15.6	32.8	39.6	40.1	34.9	38.6	5.8
Sweden	51.0	57.2	55.3	54.0	55.8	63.3	56.7	-0.1
Switzerland	55.0	57.0	56.7	59.2	58.0	62.2	62.0	0.5
Turkey	40.4	24.9	26.4	28.8	20.9	32.0	32.9	1.8
United Kingdom	1.8	2.7	6.8	15.0	19.3	24.8	24.7	14.9
United States	11.5	8.2	10.1	12.6	13.0	13.2	14.9	3.8

1. Renewable sources include hydroelectricity, geothermal, solar thermal, solar PV, tide, wind, renewable municipal waste, solid biofuels, liquid biofuels and biogases.

Source: World Energy Balances.

**Table 8. Share of electricity production from renewable¹ sources
excluding hydroelectricity (%)**

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
<i>OECD Total</i>	1.8	1.8	5.3	8.2	9.2	10.3	10.9	11.8
<i>OECD Americas</i>	2.8	1.9	3.9	6.0	6.7	7.2	8.3	9.5
<i>OECD Asia Oceania</i>	1.2	1.1	2.9	4.1	5.2	6.3	6.5	11.5
<i>OECD Europe</i>	0.7	2.0	8.6	13.9	15.2	17.0	17.2	14.4
<i>IEA Total</i>	1.8	1.8	5.4	8.4	9.3	10.4	11.1	12.1
<i>Non-OECD Total</i>	0.4	0.7	1.8	3.0	3.4	4.0	..	..
<i>World</i>	1.3	1.4	3.6	5.4	6.0	6.8	..	..
Australia	0.5	0.6	3.3	6.0	7.5	8.3	8.8	18.4
Austria	2.3	2.7	9.7	12.9	14.5	16.5	16.5	12.1
Belgium	0.4	0.7	6.6	13.7	16.7	20.3	16.1	21.6
Canada	0.8	1.4	3.2	4.4	5.6	6.3	6.3	9.9
Chile	5.2	2.3	4.3	8.7	10.1	11.9	14.1	11.9
Czech Republic	-	0.7	3.6	7.6	8.5	9.2	9.0	17.1
Denmark	3.1	15.4	31.9	45.9	55.9	65.4	60.6	8.9
Estonia	-	0.2	7.8	9.0	10.9	14.2	12.5	31.7
Finland	9.5	12.5	14.0	18.0	18.9	20.1	21.5	3.5
France	0.5	0.6	2.7	4.6	5.2	6.2	6.7	16.6
Germany	0.3	2.4	13.4	20.4	23.0	26.3	26.0	16.1
Greece	0.0	0.8	5.3	14.0	15.3	16.9	19.1	21.5
Hungary	0.1	0.2	7.6	8.5	9.7	9.8	9.3	27.7
Iceland	6.7	17.2	26.2	29.0	29.0	26.7	27.4	2.9
Ireland	-	1.4	11.1	19.7	22.0	25.1	22.1	18.7
Israel	-	-	0.2	0.9	1.5	1.9	2.7	-
Italy	1.5	2.5	8.7	20.6	22.3	22.5	23.6	15.1
Japan	1.3	1.3	3.3	4.8	6.3	7.8	8.1	12.3
Korea	0.0	0.0	0.5	0.8	1.1	1.5	1.7	27.4
Latvia	-	0.1	1.7	10.0	15.8	16.6	14.8	37.0
Luxembourg	2.1	11.6	4.9	13.6	15.3	24.9	43.8	8.7
Mexico	4.4	3.7	3.1	3.9	4.6	5.5	5.8	2.8
Netherlands	1.0	3.2	9.3	11.9	11.2	12.4	12.9	9.2
New Zealand	8.2	9.2	18.1	21.0	23.3	24.6	24.9	6.4
Norway	0.2	0.2	1.0	1.7	1.8	1.9	1.5	13.6
Poland	0.0	0.2	5.1	8.9	11.1	12.7	12.4	31.4
Portugal	2.5	3.6	22.7	31.1	30.8	30.6	29.1	14.0
Slovak Republic	-	-	2.5	5.3	7.4	8.2	7.5	-
Slovenia	-	0.5	1.4	3.0	3.0	3.7	3.4	12.6
Spain	0.4	2.8	18.6	26.5	25.9	24.8	25.2	14.6
Sweden	1.3	3.1	10.6	13.9	14.3	16.8	16.8	11.1
Switzerland	0.8	1.3	2.1	3.2	3.8	4.3	5.2	9.1
Turkey	0.1	0.2	1.9	4.1	4.8	6.3	8.3	25.5
United Kingdom	0.2	1.3	5.9	13.7	17.5	23.0	23.1	19.7
United States	3.0	1.9	4.1	6.3	6.9	7.4	8.6	9.9

1. Renewable sources include geothermal, solar thermal, solar PV, tide, wind, renewable municipal waste, solid biofuels, liquid biofuels and biogases.

Source: World Energy Balances.

Table 9. Primary energy supply from renewable sources in 2015 (ktoe)

	Hydro ¹	Wind	Solar/ tide	Geo-thermal	Biofuels and renewable waste ²	Total ³
<i>OECD Total</i>	118741.4	47842.2	25256.4	34892.1	277298.7	504030.8
<i>OECD Americas</i>	59023.5	19805.6	6436.7	12203.9	123621.2	221090.8
<i>OECD Asia Oceania</i>	10772.3	1736.4	5153.9	7393.0	18865.1	43920.7
<i>OECD Europe</i>	48945.6	26300.2	13665.8	15295.2	134812.4	239019.3
<i>IEA Total</i>	112362.9	46893.6	24393.4	27906.7	259329.4	470885.9
<i>Non-OECD Total</i>	215654.2	24228.2	28778.7	39190.7	1010814.9	1318666.7
<i>World</i>	334395.6	72070.4	54035.1	74082.7	1287947.0	1822530.8
Australia	1149.0	986.2	868.6	0.5	5192.2	8196.6
Austria	3186.8	416.2	265.5	34.8	5748.4	9651.8
Belgium	27.3	479.4	285.7	3.2	2837.1	3632.8
Canada	32732.1	2274.4	292.1	-	13603.7	48902.2
Chile	2053.8	181.9	138.1	-	7300.1	9673.9
Czech Republic	154.4	49.3	212.4	-	3862.8	4278.9
Denmark	1.5	1215.4	86.1	3.3	3454.9	4761.3
Estonia	2.3	61.5	-	-	841.6	905.4
Finland	1442.1	200.1	2.3	-	8843.4	10487.9
France	4681.8	1827.4	765.2	213.1	14325.3	21812.8
Germany	1632.0	6811.7	4001.5	213.6	25692.8	38351.5
Greece	524.4	397.4	531.7	9.8	1313.9	2777.2
Hungary	20.1	59.6	21.3	105.3	2807.7	3014.0
Iceland	1185.2	0.9	-	3728.9	15.2	4930.2
Ireland	69.4	565.3	13.2	-	422.4	1070.3
Israel	2.1	0.6	452.2	-	25.5	480.4
Italy	3916.3	1276.6	2163.0	5468.4	13441.9	26266.2
Japan	7326.6	443.8	3416.7	2390.3	9296.7	22874.1
Korea	184.6	103.3	404.8	135.0	3175.6	4003.3
Latvia	160.0	12.6	-	-	1364.2	1536.8
Luxembourg	8.5	8.8	10.8	-	176.5	204.6
Mexico	2650.1	752.1	238.2	3213.2	8613.3	15466.8
Netherlands	8.0	649.3	123.6	58.5	2806.0	3645.4
New Zealand	2110.0	202.6	11.6	4867.1	1175.0	8366.3
Norway	11860.6	216.3	-	-	1346.0	13422.9
Poland	157.6	933.8	49.9	21.7	7823.7	8986.6
Portugal	744.8	998.3	148.7	187.0	2887.7	4966.4
Slovak Republic	332.5	0.5	49.0	7.1	1186.6	1575.6
Slovenia	327.5	0.5	34.5	43.3	650.9	1056.7
Spain	2420.0	4242.0	3184.2	18.8	6752.3	16617.4
Sweden	6476.8	1399.0	19.6	-	11296.9	19192.4
Switzerland	3290.2	9.5	152.6	343.8	1665.3	5461.3
Turkey	5774.6	1002.1	844.1	4833.7	3218.9	15673.3
United Kingdom	540.9	3466.7	701.1	0.8	10030.2	14739.6
United States	21587.5	16597.3	5768.3	8990.7	94104.1	147047.9

1. Hydro does not include pumped hydro.

2. Biofuels and renewable waste include solid biofuels, liquid biofuels, renewable municipal waste and biogases.

3. Total does not include non-renewable waste.

Source: World Energy Balances.

Table 10. Provisional primary energy supply from renewable sources in 2016 (ktoe)

	Hydro ¹	Wind	Solar/ tide	Geo-thermal	Biofuels and renewable waste ²	Total ³
<i>OECD Total</i>	120564.8	51548.7	28362.8	36780.3	274947.1	512203.6
<i>OECD Americas</i>	60594.4	23195.5	8276.7	12524.2	121189.5	225780.4
<i>OECD Asia Oceania</i>	10537.0	1833.3	5996.5	6922.7	17417.5	42707.0
<i>OECD Europe</i>	49433.4	26519.9	14089.6	17333.3	136340.0	243716.3
<i>IEA Total</i>	114611.9	50447.3	27293.4	29157.1	257161.7	478671.4
<i>Non-OECD Total</i>	..	..	..	..	..	..
<i>World</i>	..	..	..	..	..	..
Australia	1297.8	1040.4	959.7	-	5246.9	8544.8
Austria	3434.0	450.7	276.0	31.5	5815.4	10007.6
Belgium	28.2	446.1	277.2	3.2	3015.5	3770.2
Canada	33375.7	2387.4	306.3	-	12638.9	48708.2
Chile	1681.6	195.9	249.0	-	7936.7	10063.2
Czech Republic	172.0	42.7	202.2	-	3917.0	4333.9
Denmark	1.6	1099.3	108.2	10.6	3736.7	4956.4
Estonia	3.1	52.6	-	-	992.9	1048.6
Finland	1359.3	263.8	2.9	-	8933.9	10560.0
France	5050.7	1801.9	855.1	216.6	15113.7	23038.0
Germany	1797.8	6657.4	3953.9	242.0	26935.3	39586.5
Greece	476.8	442.6	536.2	10.1	1299.2	2764.9
Hungary	22.4	58.8	28.7	99.7	2722.5	2932.0
Iceland	1158.4	0.8	-	4528.2	16.3	5703.7
Ireland	58.6	529.0	14.2	-	482.2	1084.0
Israel	2.1	0.6	503.7	-	25.5	531.9
Italy	3526.2	1515.2	2173.0	5507.6	13131.4	25853.4
Japan	6757.6	447.5	4008.3	2065.4	7176.3	20455.1
Korea	244.8	144.7	511.6	165.7	3793.8	4860.6
Latvia	217.6	11.0	0.1	-	1395.9	1624.6
Luxembourg	9.6	9.2	10.3	-	177.4	206.5
Mexico	2505.9	892.5	282.8	3050.9	7743.2	14475.2
Netherlands	8.6	700.2	161.1	67.9	2781.3	3719.2
New Zealand	2234.7	200.0	13.2	4691.6	1175.0	8314.5
Norway	12335.1	182.0	-	-	1452.7	13969.8
Poland	184.0	1082.3	65.5	22.2	7075.7	8429.7
Portugal	1154.6	1072.8	154.3	148.5	2667.7	5197.9
Slovak Republic	385.3	0.5	51.1	1.3	1145.3	1583.5
Slovenia	387.3	0.5	33.9	44.2	667.8	1133.6
Spain	3129.0	4206.6	3144.6	19.4	6766.0	17265.6
Sweden	5309.0	1326.6	23.5	-	11153.4	17812.5
Switzerland	2977.6	9.3	171.5	379.9	1789.5	5327.7
Turkey	5785.0	1332.3	910.4	5999.6	3202.3	17229.6
United Kingdom	461.6	3225.6	935.8	0.8	9953.0	14576.8
United States	23031.2	19719.7	7438.6	9473.4	92870.7	152533.7

1. Hydro does not include pumped hydro.

2. Biofuels and renewable waste include solid biofuels, liquid biofuels, renewable municipal waste and biogases.

3. Total does not include non-renewable waste.

Source: World Energy Balances.

PART III

DETAILED OECD RENEWABLES AND WASTE DATA

DIRECTORY OF PART III TABLES

Part III of *Renewables Information* contains detailed statistical information on renewables and waste for the 35 member countries of the OECD and for OECD/IEA regional aggregates. The tables of regional aggregates are presented before the country tables, which are set out in alphabetical order. As data for some countries were not available for all years (particularly the early years), these aggregate regional table should be used with caution.

A full list of the figures and the tables is set out below.

Tables:

1. Energy supply, GDP and population
2. Net generating capacity of renewable and waste sources (in MW)
3. Capacity factors (%)
4. Gross electricity generation from renewable and waste sources (in GWh)
- 5A. Heat production from renewable and waste sources in the transformation sector (in TJ)
- 5B. Heat production from heat pumps and waste heat (in TJ)
6. Renewable and waste balance for 2015 (in ktoe)
7. Aggregated renewable and waste statistics (in TJ and kt)

Graphs:

1. Contribution of renewables in 1990 (%)
2. Contribution of renewables in 2016 provisional (%)
3. Electricity production by renewables and waste energy source (in TWh)

OECD TOTAL

Figure 1. Contribution of renewables in 1990

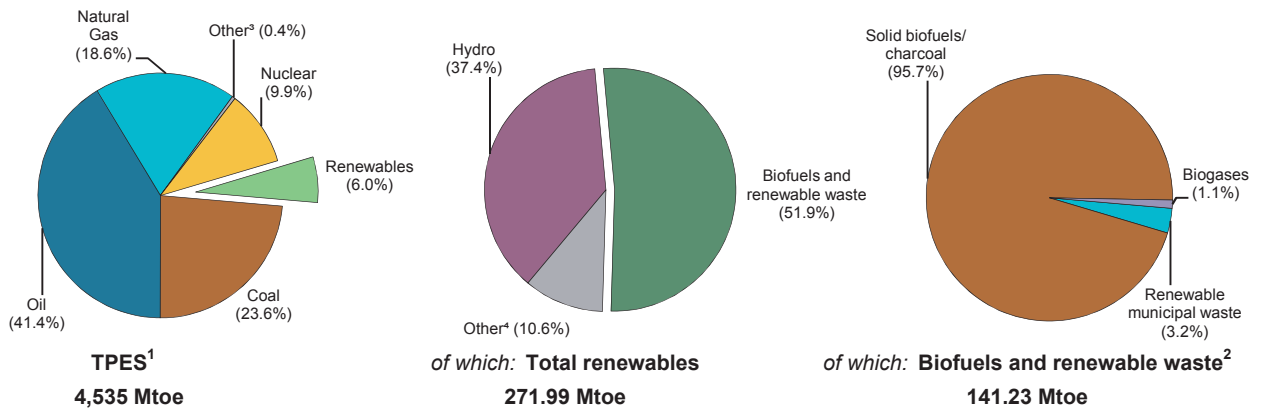


Figure 2. Contribution of renewables in 2016 provisional

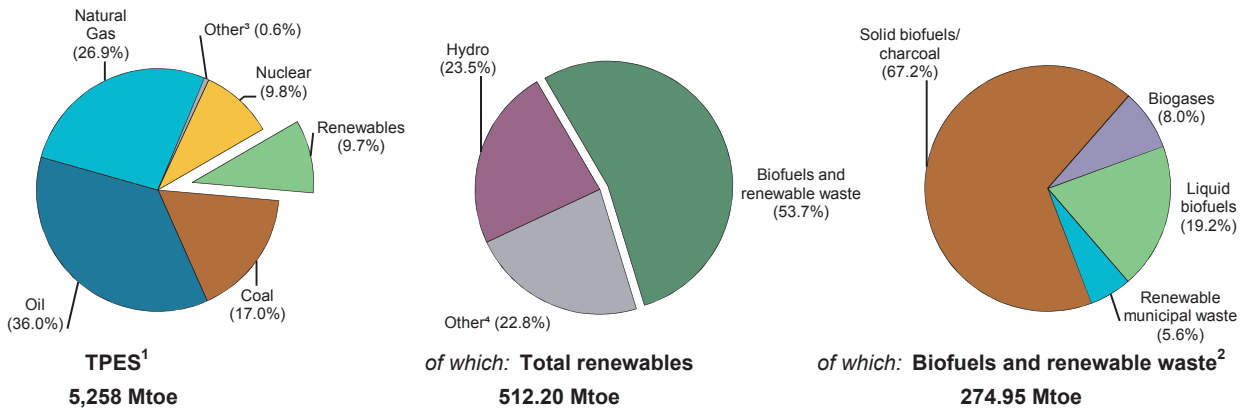
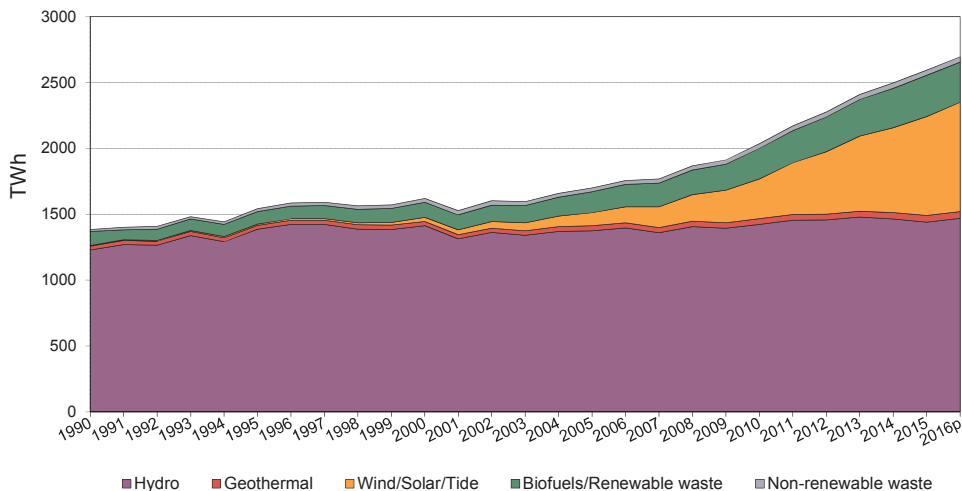


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

OECD TOTAL

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	4535.25	5299.64	5433.65	5310.76	5273.74	5259.45	5257.68	-0.0
<i>of which: Renewables (Mtoe)</i> ¹	271.99	320.44	424.65	485.06	493.47	504.03	512.20	3.0
<i>Renewables/TPES(%)</i>	6.0	6.0	7.8	9.1	9.4	9.6	9.7	3.0
GDP (billion 2010 US dollars)	29343.79	38277.10	44737.07	46763.73	47671.53	48750.41	49591.55	1.6
TPES/GDP ²	0.15	0.14	0.12	0.11	0.11	0.11	0.11	-1.7
TPES/GDP (year 2010 = 100)	127	114	100	94	91	89	87	-1.7
Population (millions)	1072.84	1156.35	1240.14	1261.89	1269.10	1276.74	1284.61	0.7
TPES/population (toe per capita)	4.23	4.58	4.38	4.21	4.16	4.12	4.09	-0.7
Electricity generation (TWh) ³	7672.8	9772.4	10905.7	10846.4	10817.8	10858.4	10896.7	0.7
<i>of which: Renewables (TWh)</i> ^{1,3}	1324.49	1519.51	1933.71	2310.23	2394.35	2494.05	2588.29	3.4
<i>Renew./Total Elec.(%)</i> ^{1,4}	17.3	15.5	17.7	21.3	22.1	23.0	23.8	2.7
Road energy consumption (Mtoe)	792.8	988.8	1059.7	1054.3	1068.9	1089.2	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	0.01	4.03	38.94	46.20	47.62	49.37	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	0.0	0.4	3.7	4.4	4.5	4.5	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	401470	472215	683849	843754	892922	957278	4.8
Hydro	376960	425886	457026	470643	474660	483364	0.8
<i>Hydro <1MW</i>	968	3149	3280	3591	3592	3659	1.0
<i>Hydro 1-10MW</i>	5604	16806	20252	21612	22001	22752	2.0
<i>Hydro 10+MW</i>	103952	247256	325757	334712	337297	343619	2.2
<i>Mixed plants</i>	19791	21479	41452	41962	42164	42589	4.7
<i>Pure pumped storage</i>	..	68281	66284	68766	69606	70746	..
Geothermal	4463	5393	6069	6512	6704	7061	1.8
Solar photovoltaic	..	757	37528	110258	133053	161697	..
Solar thermal	339	419	1210	3591	3972	4063	16.4
Tide, wave, ocean	260	261	263	519	520	520	4.7
Wind	2369	15392	134036	194841	213961	238512	20.0
Industrial waste	..	1791	2433	2519	2665	2243	..
Municipal waste	..	6632	9864	11657	11726	12629	..
Solid biofuels	..	13280	25947	29374	30468	31584	..
Biogases	..	2404	8222	11821	12916	13220	..
Liquid biofuels	-	-	1251	2019	2277	2385	-
Solar collectors surface (1000 m ²)	22493	46445	96741	119230	123615	128501	7.0
<i>Cap. of solar collectors (MW_{th})</i> ⁶	15747	32513	67720	83466	86533	89954	7.0

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

OECD TOTAL

Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	39.40 e	39.16 e	33.98 e	32.61 e	31.92 e	30.95 e	x
Hydro	37.23 e	37.89 e	35.54	35.86	35.23	34.05	35.35
<i>of which: <1MW</i>	18.20 e	41.81	41.28	40.26	41.12	37.07	37.96
<i>of which: 1-10MW</i>	27.32 e	37.88	41.17	40.52	39.74	36.04	38.05
<i>of which: 10+MW</i>	56.08 e	41.14	44.55	45.25	44.42	43.09	44.75
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	73.19	69.80	81.74	80.74	82.40	81.56	81.84
Solar photovoltaic	11.48	10.93 e	9.43 e	12.03 e	12.66 e	12.94 e	11.90
Solar thermal	22.33	14.33	15.50	18.39	23.41	25.69	21.87
Tide, wave and ocean	23.21	23.59 e	21.97	20.20	21.75	21.93	21.40
Wind	18.53	21.16 e	22.89	26.18	26.03	26.63	25.56
Industrial waste	87.77 e	81.43 e	41.78	42.19	39.79	45.31	44.68
Municipal waste	58.96 e	55.94 e	64.30 e	57.72 e	60.29 e	58.19 e	60.83
Solid biofuels	88.39 e	72.76 e	67.25	66.97	69.55	70.17	67.86
Biogases	67.66 e	62.31 e	62.29	68.63	67.39	68.35	66.13
Biodiesels	-	-	-	16.29	16.25	19.95	19.28
Other liquid biofuels	-	-	46.24	25.38	28.14	33.44	27.64

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

OECD TOTAL

Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	1385717	1619996	2035591	2410438	2496406	2595568	2695483	3.2
Hydro	1229269	1413658	1422994	1478500	1464802	1441854	1469114	0.2
<i>of which: pumped storage</i>	<i>47165</i>	<i>71687</i>	<i>66863</i>	<i>62227</i>	<i>62418</i>	<i>61141</i>	<i>67198</i>	<i>-0.4</i>
Geothermal	28614	32976	43457	46061	48393	50447	51764	2.9
Solar photovoltaic	19	725	30993	116184	147561	183270	218283	42.9
Solar thermal	663	526	1644	5787	8147	9142	11045	21.0
Tide, wave, ocean	529	539	506	919	991	998	1008	4.0
Wind	3845	28528	268727	446875	487826	556304	599403	21.0
Industrial waste	7665	12777	8904	9309	9287	8902	7997	-2.9
Municipal waste renew.	8228	16482	29451	30268	31578	32900	32790	4.4
Municipal waste non-renew.	8078	16019	26122	28673	30355	31474	32002	4.4
Solid biofuels	95155	84644	152865	172313	185633	194154	184251	5.0
Biogases	3652	13122	44861	71072	76239	79154	81327	12.1
Liquid biofuels	-	-	5067	4477	5594	6969	6499	-
<i>of which:</i>								
<i>Electricity only plants</i>	<i>1309156</i>	<i>1549715</i>	<i>1904725</i>	<i>2251497</i>	<i>2329969</i>	<i>2427310</i>	<i>..</i>	<i>-</i>
Hydro	1229269	1413658	1422994	1478500	1464802	1441854	..	-
<i>of which: pumped storage</i>	<i>47165</i>	<i>71687</i>	<i>66863</i>	<i>62227</i>	<i>62418</i>	<i>61141</i>	<i>..</i>	<i>-</i>
Geothermal	28557	32085	41933	41231	43554	45860	..	-
Solar photovoltaic	19	725	30993	116184	147561	183270	..	-
Solar thermal	663	526	1644	5787	8147	9142	..	-
Tide, wave, ocean	529	539	506	919	991	998	..	-
Wind	3845	28528	268727	446875	487826	556304	..	-
Industrial waste	3403	5495	4207	4984	5174	5368	..	-
Municipal waste renew.	6719	12473	19158	18032	18617	19822	..	-
Municipal waste non-renew.	6738	12214	17214	17845	18645	19738	..	-
Solid biofuels	26425	33342	70380	82152	93752	103110	..	-
Biogases	2989	10130	24578	36075	37210	37064	..	-
Liquid biofuels	-	-	2391	2913	3690	4780	..	-
<i>CHP plants</i>	<i>76561</i>	<i>70281</i>	<i>130866</i>	<i>158941</i>	<i>166437</i>	<i>168258</i>	<i>..</i>	<i>-</i>
Geothermal	57	891	1524	4830	4839	4587	..	-
Industrial waste	4262	7282	4697	4325	4113	3534	..	-
Municipal waste renew.	1509	4009	10293	12236	12961	13078	..	-
Municipal waste non-renew.	1340	3805	8908	10828	11710	11736	..	-
Solid biofuels	68730	51302	82485	90161	91881	91044	..	-
Biogases	663	2992	20283	34997	39029	42090	..	-
Liquid biofuels	-	-	2676	1564	1904	2189	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

OECD TOTAL

Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	300115	617845	731892	743392	765056	789685	6.2
Geothermal	-	18314	26006	28328	29225	33745	41006	5.2
Solar thermal	-	24	192	536	783	929	1352	28.7
Industrial waste	-	6445	19514	34437	28023	23391	24565	8.7
Municipal waste renew.	-	63641	109437	124017	129995	137974	139271	5.0
Municipal waste non-renew.	-	61500	96775	115291	119940	126560	128071	4.7
Solid biofuels	-	145221	344060	398632	401946	406048	418555	6.8
Biogases	-	4931	12163	24348	28843	31918	34012	12.8
Liquid biofuels	-	39	9698	6303	4637	4491	2853	30.8
<i>of which:</i>								
CHP plants	..	192074	403368	493722	510598	528790	..	-
Geothermal	..	5046	5750	6073	5835	6869	..	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	3249	13194	15488	15936	15766	..	-
Municipal waste renew.	..	46676	77348	95554	103070	109861	..	-
Municipal waste non-renew.	..	45275	68152	84935	91151	97685	..	-
Solid biofuels	..	87941	228285	269767	269004	270626	..	-
Biogases	..	3887	7856	19303	23431	25688	..	-
Liquid biofuels	..	-	2783	2602	2171	2295	..	-
Heat only plants	..	108041	214477	238170	232794	236266	..	-
Geothermal	..	13268	20256	22255	23390	26876	..	-
Solar thermal	..	24	192	536	783	929	..	-
Industrial waste	..	3196	6320	18949	12087	7625	..	-
Municipal waste renew.	..	16965	32089	28463	26925	28113	..	-
Municipal waste non-renew.	..	16225	28623	30356	28789	28875	..	-
Solid biofuels	..	57280	115775	128865	132942	135422	..	-
Biogases	..	1044	4307	5045	5412	6230	..	-
Liquid biofuels	..	39	6915	3701	2466	2196	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	27374	33344	36430	36776	39898	42586	2.8
Heat pumps ²	-	21781	18941	17083	18677	20517	14651	-2.4
(-) Input to heat pumps	-	6561	5411	4924	6041	7614	3994	-3.1
Other sources ³	-	12154	19813	24270	24140	26995	31929	6.2

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

OECD TOTAL

Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	118741	47842	86	15761	34892	9409	9286	14758
Imports	-	-	-	-	-	-	60	233
Exports	-	-	-	-	-	-	-	-35
Stock changes	-	-	-	-	-	-	-	-
TPES	118741	47842	86	15761	34892	9409	9345	14956
Statistical differences	-	-	-	-	-24	-	-22	-
Main activity electricity plants	-113234	-45969	-86	-9642	-27525	-2917	-614	-4545
Autoproducer electricity plants	-5508	-1874	-	-6119	-190	-	-939	-1950
Main activity CHP plants	-	-	-	-	-2649	-	-756	-3506
Autoproducer CHP plants	-	-	-	-	-41	-	-426	-2661
Main heat plants	-	-	-	-	-920	-22	-97	-696
Autoproducer heat plants	-	-	-	-	-43	-	-166	-290
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-114	-
Energy Industry own use	-	-	-	-	-	-	-74	-37
Losses	-	-	-	-	-9	-	-	-
TFC	-	-	-	-	3492	6470	6138	1272
Industry	-	-	-	-	143	310	6031	603
Iron and steel	-	-	-	-	-	-	56	-
Chemical and petrochemical	-	-	-	-	-	-	1128	25
Non-ferrous metals	-	-	-	-	-	-	42	-
Non-metallurgical minerals	-	-	-	-	-	-	3370	414
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	4	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	1	25	1
Paper, pulp and print	-	-	-	-	97	-	961	90
Wood and wood products	-	-	-	-	-	-	43	-
Construction	-	-	-	-	-	-	5	9
Textile and leather	-	-	-	-	-	-	46	1
Non-specified	-	-	-	-	45	308	351	63
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	3350	6160	107	669
Residential	-	-	-	-	1975	3581	-	6
Commercial and public services	-	-	-	-	512	2448	107	662
Agriculture/forestry	-	-	-	-	822	8	-	-
Fishing	-	-	-	-	40	-	-	-
Non-specified	-	-	-	-	-	122	-	-
Electricity generated - GWh	1380714	556305	998	183270	50447	9142	8902	32900
<i>Electricity plants</i>	<i>1380714</i>	<i>556305</i>	<i>998</i>	<i>183270</i>	<i>45860</i>	<i>9142</i>	<i>5368</i>	<i>19822</i>
<i>CHP plants</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>4587</i>	<i>-</i>	<i>3534</i>	<i>13078</i>
Heat generated - TJ	-	-	-	-	33745	929	23391	137974
<i>CHP plants</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>6869</i>	<i>-</i>	<i>15766</i>	<i>109861</i>
<i>Heat plants</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>26876</i>	<i>929</i>	<i>7625</i>	<i>28113</i>

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

OECD TOTAL

Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
14464	184961	-	21447	35776	13248	971	521642	12.5%
230	7366	174	-	2238	7620	802	18723	0.6%
-28	-3457	-40	-	-2847	-5254	-	-11661	0.7%
-	-115	-1	-	-255	-125	-	-496	x
14666	188756	133	21447	34911	15323	1773	528041	10.0%
-1	108	-	-2	1	405	1	466	x
-4501	-15265	-	-7023	-	-26	-910	-232257	x
-1979	-10085	-	-2739	-	-	-38	-31421	x
-3118	-12416	-	-5591	-	-4	-366	-28406	x
-2451	-12750	-	-1873	-	-2	-77	-20281	x
-647	-3703	-	-201	-	-	-59	-6345	x
-350	-189	-	-45	-	-	-1	-1084	x
-	-324	106	-	-	-	-	-218	x
-	-	-	-99	-	-	-	-213	x
-50	-31	-	-526	-	-95	-37	-850	x
-	-1	-	-36	-	-	-	-46	x
1569	134101	238	3312	34912	15185	286	206975	5.7%
787	63570	8	859	-	271	248	72830	9.2%
-	27	-	2	-	2	-	87	0.1%
25	363	-	77	-	27	11	1656	1.1%
-	49	-	1	-	-	-	92	0.2%
540	1488	-	14	-	9	5	5840	7.1%
-	19	-	2	-	2	1	24	0.1%
-	119	-	10	-	7	3	143	0.3%
-	58	-	7	-	45	-	110	0.4%
-	4408	7	162	-	10	1	4615	6.2%
72	47466	-	543	-	3	227	49459	47.1%
-	7148	-	1	-	8	-	7200	43.4%
13	120	-	-	-	151	-	298	1.1%
2	29	1	2	-	-	-	81	0.6%
134	2275	-	38	-	7	-	3221	3.8%
-	-	-	139	34905	14572	14	49630	4.0%
-	-	-	138	34903	14312	14	49367	4.5%
-	-	-	-	2	260	-	262	0.2%
782	70531	230	2314	7	342	24	84516	6.7%
6	63193	193	53	-	1	-	69008	10.1%
775	4744	33	1911	1	142	24	11359	2.4%
1	2581	-	350	1	191	-	3954	6.1%
-	-	-	-	1	5	-	46	1.2%
-	13	4	1	4	2	-	146	0.5%
31474	194154	-	79153	-	28	6940	2534427	23.3%
19738	103110	-	37065	-	3	4775	2366170	24.2%
11736	91044	-	42088	-	25	2165	168257	15.4%
126560	406048	-	31918	-	31	4460	765056	25.2%
97685	270626	-	25688	-	31	2264	528790	22.9%
28875	135422	-	6230	-	-	2196	236266	32.3%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

OECD TOTAL

Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	1109795	1274762	1238245	1322793	1393905	1461142	1540213	0.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1109795	1274762	1238245	1322793	1393905	1461142	1540213	0.9
Statistical differences	-1144	-634	93	-1785	-1281	-989	..	..
Transformation processes	1045998	1182850	1119841	1195114	1266175	1313548	..	0.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	232	311	363	360	361	359	..	..
Final energy consumption	62421	90967	118134	125534	126088	146246	..	3.2
<i>Industry</i>	5190	11097	7205	5898	5716	5971	..	-4.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	57231	79870	110929	119636	120372	140275	..	3.8
Solar thermal (TJ)								
Production	86970	163580	263868	339059	374520	394027	397982	6.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	86970	163580	263868	339059	374520	394027	397982	6.0
Statistical differences	4847	-	-	-1	-	-1	..	..
Transformation processes	7239	5593	20471	87743	113789	123093	..	22.9
Energy industry own use	-	-	4	4	3	3	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	84578	157987	243393	251311	260728	270930	..	3.7
<i>Industry</i>	372	4163	6063	12565	12739	12989	..	7.9
<i>Transport</i>	-	-	-	3	3	3	..	-
<i>Other</i>	84206	153824	237330	238743	247986	257938	..	3.5
Industrial waste (TJ)								
Production	184136	336929	346746	383167	378456	388854	366526	1.0
Net imports ¹	-	-	41	917	1257	2492	2414	-
Stock changes	-	-29	-3	117	-10	4	-70	-
Gross consumption	184136	336900	346784	384201	379703	391350	368870	1.0
Statistical differences	-72	-655	-977	-234	-464	-910	..	..
Transformation processes	113741	137881	116002	137574	137613	130293	..	-0.4
Energy industry own use	5222	229	2328	2828	2705	3109	..	19.0
Losses	-	-	53	30	7	-	..	..
Final energy consumption	65101	198135	227424	243535	238914	257038	..	1.8
<i>Industry</i>	63028	194980	220511	232760	236095	252540	..	1.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2073	3155	6913	10775	2819	4498	..	2.4
Municipal waste - renewables (TJ)								
Production	191125	358709	557071	580989	595690	618015	630845	3.7
Net imports ¹	-	-	-	8925	9317	8293	8422	-
Stock changes	-	4	-7	5	-	-	-	-
Gross consumption	191125	358713	557064	589919	605007	626308	639267	3.8
Statistical differences	2	-2896	2222	119	1	2	..	..
Transformation processes	189050	298228	521864	540344	556085	571494	..	4.4
Energy industry own use	34	4	426	1011	1796	1540	..	48.7
Losses	-	-	-	-	-	-	..	..
Final energy consumption	2043	57585	36996	48683	47127	53276	..	-0.5
<i>Industry</i>	16	25051	8505	22673	22708	25252	..	0.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2027	32534	28491	26010	24419	28024	..	-1.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

OECD TOTAL

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	186916	349930	508682	570575	587571	605697	626865	3.7
Net imports ¹	-	-	761	8907	9735	8446	7778	-
Stock changes	-	4	-19	-108	160	14	135	-
Gross consumption	186916	349934	509424	579374	597466	614157	634778	3.8
Statistical differences	-	-3065	1622	-8	-23	-28	..	-
Transformation processes	185480	291238	466263	516824	535102	546340	..	4.3
Energy industry own use	34	4	426	1618	2492	2083	..	51.7
Losses	-	-	4	-	-	-	..	-
Final energy consumption	1402	55627	44353	60924	59849	65706	..	1.1
<i>Industry</i>	13	24493	15185	32104	31670	32945	..	2.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1389	31134	29168	28820	28179	32761	..	0.3
Solid Biofuel excluding charcoal (TJ)								
Production	5643510	6273915	7416896	7923802	7775610	7745426	7554131	1.4
Net imports ¹	6997	10842	103289	122509	161795	163731	182051	19.8
Stock changes	7938	-417	1948	5743	-5720	-4806	-2110	-
Gross consumption	5658445	6284340	7522133	8052054	7931685	7904351	7734072	1.5
Statistical differences	1518	1087	-14046	-6772	-1794	4539	..	-
Transformation processes	1676415	1059287	1793917	2179225	2258030	2291956	..	5.3
Energy industry own use	31	136	10889	12115	11783	1287	..	16.2
Losses	80	12	127	6	11	28	..	-
Final energy consumption	3983437	5225992	5703154	5853936	5660067	5615619	..	0.5
<i>Industry</i>	1460065	2631749	2521825	2644010	2659297	2662053	..	0.1
<i>Transport</i>	1	-	-	-	-	-	..	-
<i>Other</i>	2523371	2594243	3181329	3209926	3000770	2953566	..	0.9
Charcoal (kt)								
Production	330	362	325	336	153	152	167	-5.6
Net imports ¹	11	58	182	211	176	184	169	8.0
Stock changes	-	-	1	-	-	-2	-	-
Gross consumption	341	420	508	547	329	334	336	-1.5
Statistical differences	-	-	-	-	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	341	420	508	547	328	334	..	-1.5
<i>Industry</i>	-	28	10	11	14	11	..	-6.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	341	392	498	536	314	323	..	-1.3
Biogases (TJ)								
Production	63971	236257	520094	801348	872478	898103	921054	9.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	63971	236257	520094	801348	872478	898103	921054	9.3
Statistical differences	1	-23	43	126	166	-83	..	-
Transformation processes	48323	154748	429937	658335	713673	735804	..	11.0
Energy industry own use	-	68	19885	23344	22870	22006	..	47.0
Losses	-	-	1440	1294	1149	1528	..	-
Final energy consumption	15649	81418	68875	118501	134952	138682	..	3.6
<i>Industry</i>	9154	67112	15332	28941	37992	35966	..	-4.1
<i>Transport</i>	-	7	1498	5177	5747	5804	..	56.5
<i>Other</i>	6495	14299	52045	84383	91213	96912	..	13.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

OECD TOTAL

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	4735	42277	44016	46746	47587	48980	16.6
Net imports ¹	-	79	500	370	-786	-539	-1428	-
Stock changes	-	77	-304	460	-328	-330	235	-
Gross consumption	-	4891	42473	44846	45632	46718	47787	16.2
Statistical differences	-	365	-174	-13	-1	1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	142	153	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	5256	42299	44691	45478	46719	..	15.7
<i>Industry</i>	-	-	-	35	37	-	..	-
<i>Transport</i>	-	5256	42294	44136	44929	46709	..	15.7
<i>Other</i>	-	-	5	520	512	10	..	-
Biodiesel (kt)								
Production	7	738	11685	13053	15079	14486	13542	22.0
Net imports ¹	-	11	1793	3212	1670	2322	3716	42.9
Stock changes	-	-5	41	-543	15	-505	-502	-
Gross consumption	7	744	13519	15687	16687	16559	16756	23.0
Statistical differences	1	-	-68	-30	9	407	..	-
Transformation processes	-	-	-	17	23	31	..	-
Energy industry own use	-	-	-	109	123	88	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	8	744	13451	15531	16550	16436	..	22.9
<i>Industry</i>	-	-	35	286	322	265	..	-
<i>Transport</i>	7	742	13230	14876	15845	15819	..	22.6
<i>Other</i>	1	2	186	369	383	352	..	41.2
Other liquid biofuels (kt)								
Production	-	17	1405	1028	1149	1386	1209	34.1
Net imports ¹	-	-	644	725	866	917	913	-
Stock changes	-	-	-	-	-	-	1	-
Gross consumption	-	17	2049	1753	2015	2303	2123	38.7
Statistical differences	-	-	3	-3	-	1	..	-
Transformation processes	-	1	1475	1216	1480	1742	..	64.5
Energy industry own use	-	-	16	29	33	32	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	16	561	505	502	530	..	26.3
<i>Industry</i>	-	-	296	465	449	473	..	-
<i>Transport</i>	-	16	67	8	15	17	..	0.4
<i>Other</i>	-	-	198	32	38	40	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

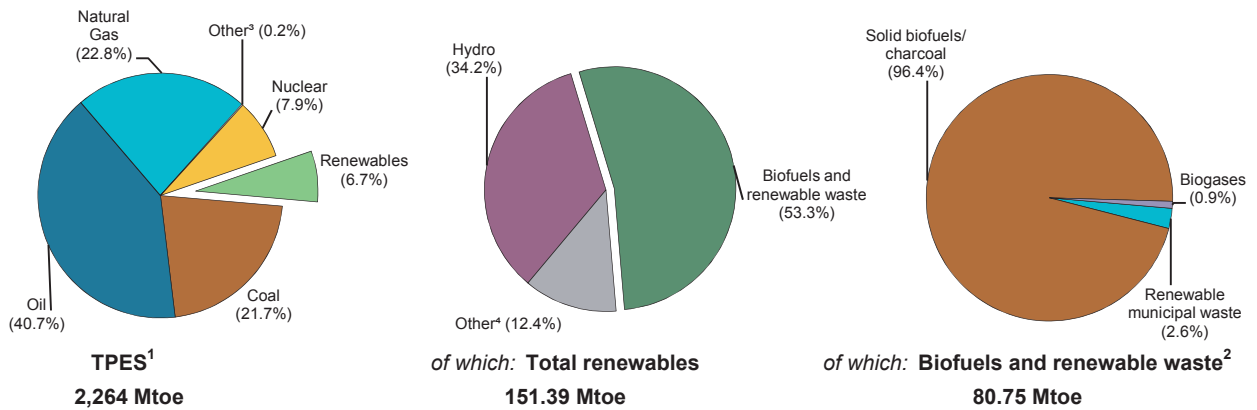


Figure 2. Contribution of renewables in 2016 provisional

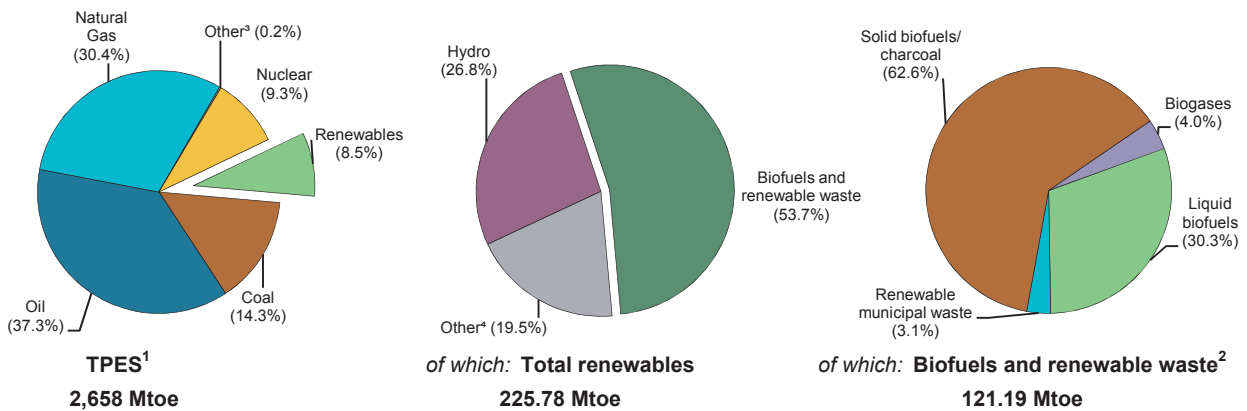
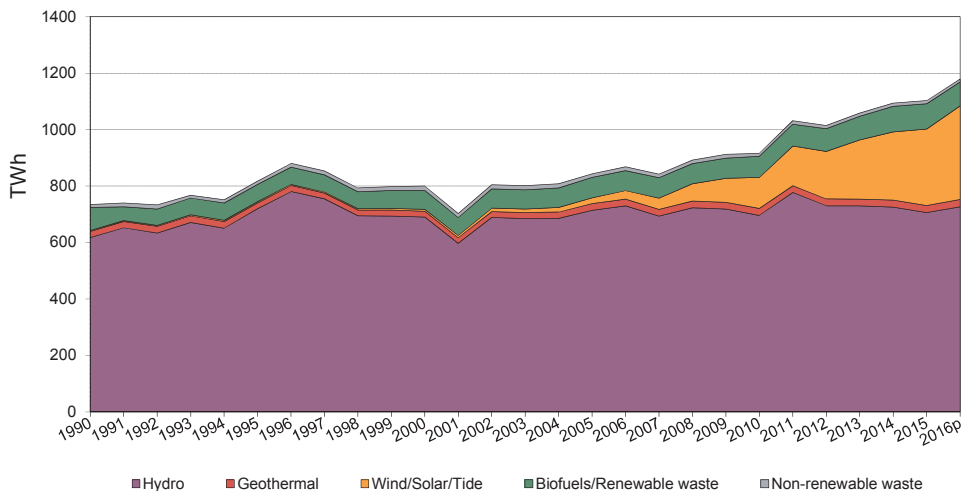


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	2264.03	2702.94	2689.84	2680.74	2719.03	2681.95	2657.78	-0.1
of which: Renewables (Mtoe) ¹	151.39	169.77	191.24	221.42	224.06	221.09	225.78	1.8
Renewables/TPES(%)	6.7	6.3	7.1	8.3	8.2	8.2	8.5	1.9
GDP (billion 2010 US dollars)	10772.57	15069.88	17845.30	18941.56	19391.26	19864.66	20191.17	1.8
TPES/GDP ²	0.21	0.18	0.15	0.14	0.14	0.14	0.13	-1.9
TPES/GDP (year 2010 = 100)	139	119	100	94	93	90	87	-1.9
Population (millions)	378.12	429.38	475.16	487.99	492.33	496.61	500.99	1.0
TPES/population (toe per capita)	5.99	6.30	5.66	5.49	5.52	5.40	5.31	-1.1
Electricity generation (TWh) ³	3819.1	4877.2	5294.2	5322.8	5360.2	5354.3	5346.5	0.6
of which: Renewables (TWh) ^{1,3}	708.43	757.55	881.47	1028.49	1062.42	1071.85	1146.45	2.6
Renew./Total Elec.(%) ^{1,4}	18.5	15.5	16.6	19.3	19.8	20.0	21.4	2.0
Road energy consumption (Mtoe)	454.2	569.0	621.1	623.3	635.0	644.9	..	..
of which: Liquid biofuels (Mtoe)	-	3.32	25.36	32.36	32.85	34.66	..	..
Liq. biofuels/road tr.(%) ⁵	-	0.6	4.1	5.2	5.2	5.4	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	..	199111	258556	300299	313616	336154	..
Hydro	162257	180371	193166	194853	196541	200380	0.7
Hydro <1MW	1	637	72	78	72	81	-12.8
Hydro 1-10MW	48	5769	3914	4204	4373	4379	-1.8
Hydro 10+MW	10467	87036	158183	159380	160807	164542	4.3
Mixed plants	-	-	12308	12331	12339	12339	-
Pure pumped storage	..	19699	18688	18860	18950	19040	..
Geothermal	3369	3648	3370	3430	3327	3448	-0.4
Solar photovoltaic	..	197	3159	13066	17079	24991	..
Solar thermal	339	419	473	1286	1667	1758	10.0
Tide, wave, ocean	20	20	20	20	20	20	-
Wind	1915	2486	43784	70197	77226	87966	26.8
Industrial waste	..	638	529	632	627	222	..
Municipal waste	..	2641	2255	2305	2307	2325	..
Solid biofuels	..	7699	9824	11903	12078	12316	..
Biogases	..	992	1793	2452	2589	2573	..
Liquid biofuels	-	-	183	155	155	155	-
Solar collectors surface (1000 m ²)	18530	19768	28297	32775	34291	35749	4.0
Cap. of solar collectors (MW _{th}) ⁶	12971	13838	19807	22943	24004	25025	4.0

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	46.66 e	45.87 e	40.47 e	40.27 e	39.81 e	37.44 e	x
Hydro	43.49	43.69 e	41.17	42.75	42.17	40.25	42.77
<i>of which: <1MW</i>	-	43.17	52.59	55.03	39.47	33.37	48.48
<i>of which: 1-10MW</i>	33.30	24.84	37.45	33.26	30.88	29.36	33.37
<i>of which: 10+MW</i>	35.19	38.02	47.58	49.97	49.26	46.82	49.88
<i>of which: pure pumped storage²</i>	x	15.58 e	x	x	x	x	x
Geothermal	71.62	64.22	81.96	81.51	84.78	82.96	82.72
Solar photovoltaic	9.13	11.91 e	12.10 e	14.39 e	16.53 e	16.67 e	14.47
Solar thermal	22.33	14.33	21.20	9.00	18.41	23.01	19.00
Tide, wave and ocean	14.84	18.26 e	15.96	8.55	8.93	7.39	11.11
Wind	18.28	27.24 e	27.49	31.29	31.68	29.89	29.78
Industrial waste	99.94 e	128.29	77.57	59.29	52.74	119.90	87.63
Municipal waste	60.79 e	72.96	85.22	82.99	83.41	82.43	84.16
Solid biofuels	94.36 e	77.91 e	63.74	58.55	62.79	61.62	62.58
Biogases	86.03 e	68.53 e	68.24	64.77	65.09	65.74	65.56
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	5.89	14.19	15.29	16.45	13.57

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	734404	800026	916629	1059320	1093705	1102593	1178973	2.5
Hydro	618214	690255	696642	729713	726100	706542	727140	0.3
<i>of which: pumped storage</i>	<i>15919</i>	<i>26893</i>	<i>24178</i>	<i>19368</i>	<i>20165</i>	<i>20222</i>	<i>22554</i>	<i>-1.1</i>
Geothermal	21136	20522	24195	24492	24710	25058	25277	1.3
Solar photovoltaic	4	206	3348	16471	24736	36493	56131	42.0
Solar thermal	663	526	879	1014	2688	3544	5533	15.8
Tide, wave, ocean	26	32	28	15	16	13	13	-5.5
Wind	3067	5933	105443	192415	214299	230298	269715	26.9
Industrial waste	4710	7170	3595	3283	2898	2331	1772	-8.4
Municipal waste renew.	5382	8463	9446	8579	8633	8599	8533	0.1
Municipal waste non-renew.	5348	8417	7389	8177	8223	8189	8194	-0.2
Solid biofuels	73337	52547	54855	61054	66432	66484	62225	1.1
Biogases	2517	5955	10715	13914	14762	14819	14222	5.6
Liquid biofuels	-	-	94	193	208	223	218	-
of which:								
Electricity only plants	671437	757120	876955	1014890	1049006	1058308	..	-
Hydro	618214	690255	696642	729713	726100	706542	..	-
<i>of which: pumped storage</i>	<i>15919</i>	<i>26893</i>	<i>24178</i>	<i>19368</i>	<i>20165</i>	<i>20222</i>	..	-
Geothermal	21136	20522	24195	24492	24710	25058	..	-
Solar photovoltaic	4	206	3348	16471	24736	36493	..	-
Solar thermal	663	526	879	1014	2688	3544	..	-
Tide, wave, ocean	26	32	28	15	16	13	..	-
Wind	3067	5933	105443	192415	214299	230298	..	-
Industrial waste	749	923	870	912	805	764	..	-
Municipal waste renew.	4846	7286	8399	7722	7665	7617	..	-
Municipal waste non-renew.	4847	7275	6586	7387	7327	7281	..	-
Solid biofuels	15368	19532	21245	22441	27578	27533	..	-
Biogases	2517	4630	9311	12268	13032	13101	..	-
Liquid biofuels	-	-	9	40	50	64	..	-
CHP plants	62967	42906	39674	44430	44699	44285	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	3961	6247	2725	2371	2093	1567	..	-
Municipal waste renew.	536	1177	1047	857	968	982	..	-
Municipal waste non-renew.	501	1142	803	790	896	908	..	-
Solid biofuels	57969	33015	33610	38613	38854	38951	..	-
Biogases	-	1325	1404	1646	1730	1718	..	-
Liquid biofuels	-	-	85	153	158	159	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	29132	48700	46998	51708	48991	50092	3.4
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	187	3807	4904	4938	4300	5319	23.3
Municipal waste renew.	-	8935	7736	6334	7384	7442	7573	-1.0
Municipal waste non-renew.	-	8330	5738	5256	6265	6321	6481	-1.6
Solid biofuels	-	9489	26954	27494	29987	27400	26165	6.5
Biogases	-	2191	4465	3010	3134	3528	4554	4.7
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	..	27751	44745	42699	47409	44692	..	-
Geothermal	..	-	-	-	-	-	-	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	187	3807	4904	4938	4300	..	-
Municipal waste renew.	..	8037	6819	4834	5884	5942	..	-
Municipal waste non-renew.	..	7847	5244	4449	5458	5514	..	-
Solid biofuels	..	9489	26954	27494	29987	27400	..	-
Biogases	..	2191	1921	1018	1142	1536	..	-
Liquid biofuels	..	-	-	-	-	-	-	-
Heat only plants	..	1381	3955	4299	4299	4299	..	-
Geothermal	..	-	-	-	-	-	-	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	-	-	-	-	-	-	-
Municipal waste renew.	..	898	917	1500	1500	1500	..	-
Municipal waste non-renew.	..	483	494	807	807	807	..	-
Solid biofuels	..	-	-	-	-	-	-	-
Biogases	..	-	2544	1992	1992	1992	..	-
Liquid biofuels	..	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	59024	19806	1	3138	12204	3297	1360	3703
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	59024	19806	1	3138	12204	3297	1360	3703
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-56158	-19210	-1	-2209	-11914	-720	-182	-2605
Autoproducer electricity plants	-2865	-596	-	-930	-20	-	-219	-385
Main activity CHP plants	-	-	-	-	-	-	-236	-301
Autoproducer CHP plants	-	-	-	-	-	-	-174	-73
Main heat plants	-	-	-	-	-	-	-	-66
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	269	2577	549	274
Industry	-	-	-	-	-	11	549	40
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	140	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	138	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	6	-
Paper, pulp and print	-	-	-	-	-	-	265	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	11	-	40
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	269	2566	-	233
Residential	-	-	-	-	269	346	-	-
Commercial and public services	-	-	-	-	-	2149	-	233
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	72	-	-
Electricity generated - GWh	686320	230298	13	36493	25058	3544	2331	8599
<i>Electricity plants</i>	686320	230298	13	36493	25058	3544	764	7617
<i>CHP plants</i>	-	-	-	-	-	-	1567	982
Heat generated - TJ	-	-	-	-	-	-	4300	7442
<i>CHP plants</i>	-	-	-	-	-	-	4300	5942
<i>Heat plants</i>	-	-	-	-	-	-	-	1500

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
3508	79955	-	4787	33475	1850	290	226398	8.4%
-	120	-	-	780	2361	-	3261	0.4%
-	-630	-	-	-1884	-498	-	-3012	0.5%
-	-	-	-	-272	-248	-	-520	x
3508	79445	-	4787	32100	3297	290	225960	8.4%
-	77	-	-3	2	-27	1	50	x
-2490	-5052	-	-3345	-	-24	-11	-103921	x
-370	-4154	-	-334	-	-	-1	-9874	x
-280	-2157	-	-249	-	-1	-	-3224	x
-70	-7520	-	-241	-	-1	-52	-8131	x
-35	-	-	-52	-	-	-	-153	x
-	-	-	-36	-	-	-	-36	x
-	-121	49	-	-	-	-	-72	x
-	-	-	-1	-	-	-	-1	x
-	-2	-	-2	-	-95	-	-99	x
-	-	-	-	-	-	-	-	-
263	60516	49	523	32101	3150	227	100498	5.4%
39	36843	-	449	-	203	227	38361	11.0%
-	-	-	1	-	2	-	3	0.0%
-	53	-	1	-	26	2	222	0.3%
-	-	-	-	-	-	-	-	-
-	445	-	-	-	6	2	591	2.2%
-	-	-	2	-	1	-	3	0.0%
-	-	-	-	-	6	-	6	0.0%
-	1	-	-	-	38	-	39	0.2%
-	1380	-	2	-	5	-	1393	4.4%
-	32972	-	441	-	3	223	33904	56.8%
-	1313	-	-	-	8	-	1321	21.3%
-	-	-	-	-	101	-	101	0.6%
-	-	-	-	-	-	-	-	-
39	679	-	2	-	6	-	777	1.5%
-	-	-	-	32101	2785	-	34886	4.7%
-	-	-	-	32101	2557	-	34658	5.4%
-	-	-	-	-	228	-	228	0.2%
224	23673	49	75	-	161	-	27250	4.5%
-	21247	43	-	-	-	-	21905	6.9%
224	1477	6	74	-	-	-	4163	1.7%
-	949	-	-	-	161	-	1110	3.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	72	0.4%
8189	66484	-	14819	-	-	223	1082371	20.2%
7281	27533	-	13101	-	-	64	1038086	20.8%
908	38951	-	1718	-	-	159	44285	12.4%
6321	27400	-	3528	-	-	-	48991	11.0%
5514	27400	-	1536	-	-	-	44692	10.2%
807	-	-	1992	-	-	-	4299	99.7%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	774965	760527	505376	500984	505754	511050	524466	-2.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	774965	760527	505376	500984	505754	511050	524466	-2.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	760896	738792	494624	490629	494785	499770	..	-2.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	14069	21735	10752	10355	10969	11280	..	-4.3
<i>Industry</i>	-	4642	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	14069	17093	10752	10355	10969	11280	..	-2.7
Solar thermal (TJ)								
Production	3114	67693	93724	107865	127052	138071	144402	4.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	3114	67693	93724	107865	127052	138071	144402	4.9
Statistical differences	4846	-	-	-	-	-	..	-
Transformation processes	7233	5569	7719	8746	23271	30141	..	11.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	727	62124	86005	99119	103781	107930	..	3.8
<i>Industry</i>	34	85	218	381	415	462	..	11.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	693	62039	85787	98738	103366	107468	..	3.7
Industrial waste (TJ)								
Production	82284	175354	85870	66915	64987	56941	36816	-7.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	82284	175354	85870	66915	64987	56941	36816	-7.2
Statistical differences	-	-	-1	-	-	-	..	-
Transformation processes	80721	69406	42274	39554	39428	33947	..	-4.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	1563	105948	43595	27361	25559	22994	..	-9.7
<i>Industry</i>	1563	105293	43457	27361	25559	22994	..	-9.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	655	138	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	89439	174721	166232	156088	155500	155047	158849	-0.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	89439	174721	166232	156088	155500	155047	158849	-0.8
Statistical differences	-	-	-1	-1	-	1	..	-
Transformation processes	89439	131946	154734	145039	144833	143594	..	0.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	42775	11497	11048	10667	11454	..	-8.4
<i>Industry</i>	-	23850	1140	1496	1601	1679	..	-16.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	18925	10357	9552	9066	9775	..	-4.3

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	88273	173229	129764	147938	147328	146893	151679	-1.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	88273	173229	129764	147938	147328	146893	151679	-1.1
Statistical differences	-	-	1	-	-	-	..	..
Transformation processes	88273	130454	120731	137322	137079	135888	..	0.3
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	42775	9034	10616	10249	11005	..	-8.7
<i>Industry</i>	-	23850	896	1438	1538	1614	..	-16.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	18925	8138	9178	8711	9391	..	-4.6
Solid Biofuel excluding charcoal (TJ)								
Production	3260675	3436578	3240344	3598663	3547325	3348193	3206015	-0.2
Net imports ¹	-515	-3127	-18311	-22768	-22014	-21359	-29656	13.7
Stock changes	-	-	-	2681	-	-	-	..
Gross consumption	3260160	3433451	3222033	3578576	3525311	3326834	3176359	-0.2
Statistical differences	1	2	-2	-2	6206	3237	..	..
Transformation processes	1435508	637703	564294	774617	812290	795807	..	1.5
Energy industry own use	25	-	-	130	90	90	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	1824628	2795750	2657737	2803827	2719137	2534174	..	-0.7
<i>Industry</i>	725591	1726726	1485962	1597194	1571891	1542836	..	-0.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1099037	1069024	1171775	1206633	1147246	991338	..	-0.5
Charcoal (kt)								
Production	249	253	248	247	72	73	78	-8.0
Net imports ¹	-	-	37	40	-	-	-	-
Stock changes	-	-	-	-	-	-	-	..
Gross consumption	249	253	285	287	72	73	78	-8.0
Statistical differences	-	-	-	-	-1	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	249	253	285	287	71	73	..	-8.0
<i>Industry</i>	-	-	-	-	3	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	249	253	285	287	68	73	..	-8.0
Biogases (TJ)								
Production	31687	132324	132578	178604	204351	200450	202098	2.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	..
Gross consumption	31687	132324	132578	178604	204351	200450	202098	2.8
Statistical differences	-	-	-1	-1	85	-144	..	..
Transformation processes	31687	71680	128980	162144	180546	178312	..	6.3
Energy industry own use	-	-	38	78	78	78	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	60644	3559	16381	23812	21916	..	-6.6
<i>Industry</i>	-	57399	1657	14528	21601	18795	..	-7.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	3245	1902	1853	2211	3121	..	-0.3

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	4642	39137	39835	42978	43991	45362	16.2
Net imports ¹	-	79	-762	172	-1322	-1301	-2186	-
Stock changes	-	79	-317	484	-379	-356	247	
Gross consumption	-	4800	38058	40491	41277	42334	43423	15.6
Statistical differences	-	365	-162	-	-1	2	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	142	153	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	5165	37896	40349	41123	42336	..	15.1
<i>Industry</i>	-	-	-	35	37	-	..	-
<i>Transport</i>	-	5165	37896	39804	40584	42336	..	15.1
<i>Other</i>	-	-	-	510	502	-	..	-
Biodiesel (kt)								
Production	-	21	1415	1989	2160	1770	1191	34.4
Net imports ¹	-	-	-147	1608	970	1756	2767	-
Stock changes	-	-	9	-338	138	-231	-621	
Gross consumption	-	21	1277	3224	3191	3140	3337	39.6
Statistical differences	-	-	1	-	-	-25	..	
Transformation processes	-	-	-	12	17	24	..	-
Energy industry own use	-	-	-	109	123	88	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	21	1278	3103	3051	3003	..	39.2
<i>Industry</i>	-	-	-	226	252	189	..	-
<i>Transport</i>	-	21	1278	2707	2621	2664	..	38.1
<i>Other</i>	-	-	-	170	178	150	..	-
Other liquid biofuels (kt)								
Production	-	-	194	536	525	563	510	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	
Gross consumption	-	-	194	536	525	563	510	-
Statistical differences	-	-	-	-	1	1	..	
Transformation processes	-	-	29	111	116	124	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	165	425	410	440	..	-
<i>Industry</i>	-	-	165	425	410	440	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

OECD ASIA OCEANIA

Figure 1. Contribution of renewables in 1990

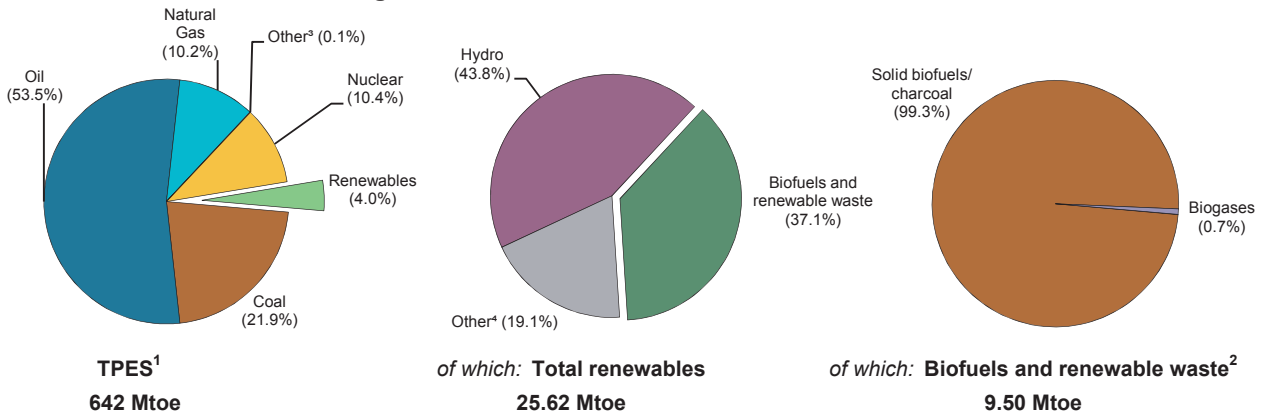


Figure 2. Contribution of renewables in 2016 provisional

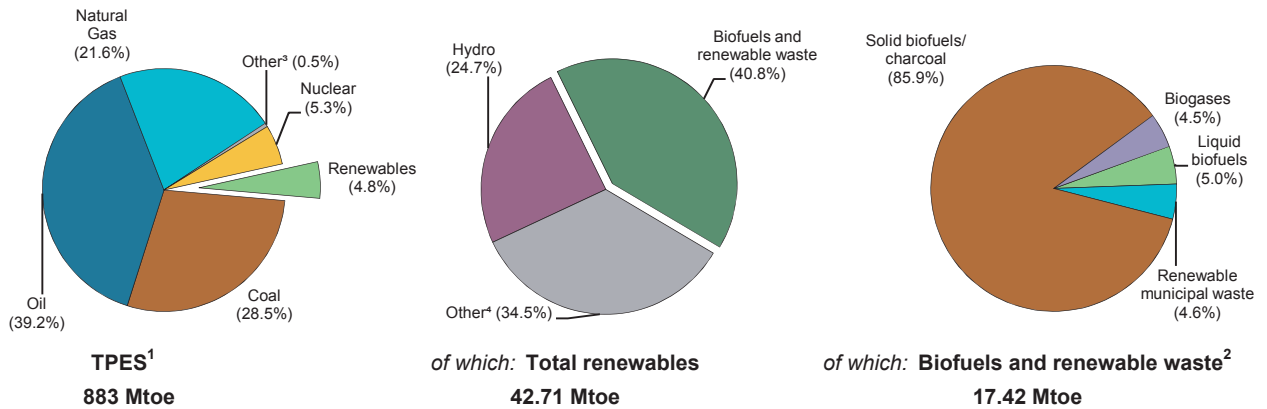
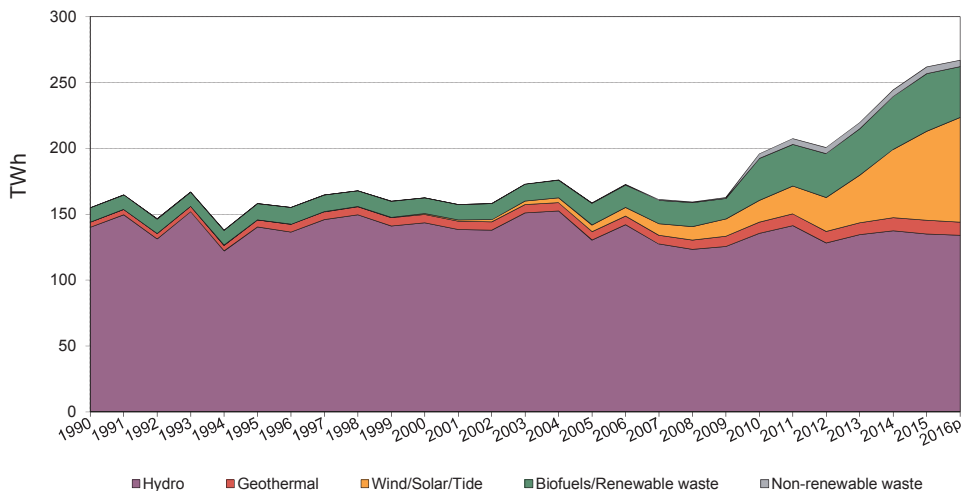


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	642.18	844.50	917.77	886.61	874.86	871.38	883.24	0.3
of which: Renewables (Mtoe) ¹	25.62	28.82	36.05	38.35	42.01	43.92	42.71	2.5
Renewables/TPES(%)	4.0	3.4	3.9	4.3	4.8	5.0	4.8	2.2
GDP (billion 2010 US dollars)	5897.18	7296.13	8468.73	8919.47	9026.46	9182.97	9331.86	1.5
TPES/GDP ²	0.11	0.12	0.11	0.10	0.10	0.09	0.09	-1.2
TPES/GDP (year 2010 = 100)	100	107	100	92	89	88	87	-1.2
Population (millions)	191.68	203.19	211.66	213.41	213.95	214.66	215.13	0.4
TPES/population (toe per capita)	3.35	4.16	4.34	4.15	4.09	4.06	4.11	-0.1
Electricity generation (TWh) ³	1185.4	1668.4	1992.9	1951.7	1952.7	1945.2	1972.1	1.1
of which: Renewables (TWh) ^{1,3}	145.28	148.99	181.04	203.92	229.16	246.91	250.61	3.3
Renew./Total Elec.(%) ^{1,4}	12.3	8.9	9.1	10.4	11.7	12.7	12.7	2.2
Road energy consumption (Mtoe)	94.3	126.9	128.8	131.8	129.5	131.7	..	..
of which: Liquid biofuels (Mtoe)	-	-	0.50	0.60	0.63	0.67	..	..
Liq. biofuels/road tr.(%) ⁵	-	-	0.4	0.5	0.5	0.5	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	54051	67095	82350	100557	114464	128355	4.4
Hydro	53110	63867	67971	69433	70124	70576	0.7
Hydro <1MW	1	10	38	31	32	29	7.4
Hydro 1-10MW	1427	1671	4726	4615	4551	4609	7.0
Hydro 10+MW	26778	34791	32517	31927	32076	32273	-0.5
Mixed plants	-	-	5625	5625	5625	5625	-
Pure pumped storage	18945	27395	25065	27235	27840	28040	0.2
Geothermal	531	951	1268	1325	1487	1502	3.1
Solar photovoltaic	2	359	4740	18897	30524	42821	37.5
Solar thermal	-	-	3	3	3	3	-
Tide, wave, ocean	-	-	2	256	256	256	-
Wind	-	160	5070	7071	7851	8474	30.3
Industrial waste	-	..	47	33	100	130	..
Municipal waste	-	1203	1049	1778	1851	1988	3.4
Solid biofuels	389	448	1820	1381	1488	1813	9.8
Biogases	19	107	380	380	424	431	9.7
Liquid biofuels	-	-	-	-	356	361	-
Solar collectors surface (1000 m ²)	-	7500	20888	23275	23771	25135	8.4
Cap. of solar collectors (MW _{th}) ⁶	-	5250	14622	16294	16641	17595	8.4

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	32.73	27.67 e	27.16	24.94	24.37	23.30	x
Hydro	30.15	25.67	22.75	22.14	22.39	21.85	22.09
<i>of which: <1MW</i>	21.88	26.67	41.87	52.75	48.87	57.41	50.97
<i>of which: 1-10MW</i>	57.45	52.45	42.22	43.58	45.11	43.64	44.10
<i>of which: 10+MW</i>	42.01	32.14	37.40	37.85	38.84	38.02	37.66
<i>of which: pure pumped storage²</i>	6.84	5.64	x	x	x	x	x
Geothermal	83.25	75.26	76.76	77.73	75.70	79.33	78.57
Solar photovoltaic	12.79	12.39 e	12.20 e	12.21 e	12.26 e	12.49 e	12.28
Solar thermal	-	-	13.74	11.42	14.49	18.77	13.21
Tide, wave and ocean	-	-	-	21.57	21.95	22.13	21.88
Wind	-	21.59	25.84	24.90	27.13	27.20	26.83
Industrial waste	-	..	x	x	x	x	x
Municipal waste	-	0.34 e	43.64 e	25.78 e	25.98 e	27.35 e	29.05
Solid biofuels	x	x	x	x	x	x	x
Biogases	84.07	60.81	54.45	74.95	70.07	63.43	67.35
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	17.21	39.00	28.11

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	154956	162633	195962	219728	244374	261956	266961	3.1
Hydro	140262	143611	135471	134656	137513	135070	134034	-0.4
<i>of which: pumped storage</i>	<i>11352</i>	<i>13539</i>	<i>11307</i>	<i>11027</i>	<i>10249</i>	<i>9811</i>	<i>11511</i>	<i>-1.0</i>
Geothermal	3872	6270	8527	9024	9861	10438	10100	3.0
Solar photovoltaic	2	390	5068	20208	32774	46850	57584	36.6
Solar thermal	-	-	4	3	4	5	6	-
Tide, wave, ocean	-	-	-	484	492	496	495	-
Wind	-	303	11476	15425	18656	20191	21317	30.5
Industrial waste	-	95	1621	2740	2826	2804	2199	21.7
Municipal waste renew.	-	22	2023	1971	2070	2332	2550	34.6
Municipal waste non-renew.	-	14	1990	2044	2143	2431	2638	38.7
Solid biofuels	10680	11359	27968	30677	34895	37711	32646	6.8
Biogases	140	569	1814	2496	2603	2395	2434	9.5
Liquid biofuels	-	-	-	-	537	1233	958	-
of which:								
Electricity only plants	153676	160910	193166	216599	240974	258767	..	-
Hydro	140262	143611	135471	134656	137513	135070	..	-
<i>of which: pumped storage</i>	<i>11352</i>	<i>13539</i>	<i>11307</i>	<i>11027</i>	<i>10249</i>	<i>9811</i>	..	-
Geothermal	3815	6228	8473	8956	9790	10367	..	-
Solar photovoltaic	2	390	5068	20208	32774	46850	..	-
Solar thermal	-	-	4	3	4	5	..	-
Tide, wave, ocean	-	-	-	484	492	496	..	-
Wind	-	303	11476	15425	18656	20191	..	-
Industrial waste	-	95	1620	2621	2718	2746	..	-
Municipal waste renew.	-	-	1903	1865	1976	2269	..	-
Municipal waste non-renew.	-	-	1903	1886	2002	2336	..	-
Solid biofuels	9570	10196	25998	28784	32726	35487	..	-
Biogases	27	87	1250	1711	1786	1717	..	-
Liquid biofuels	-	-	-	-	537	1233	..	-
CHP plants	1280	1723	2796	3129	3400	3189	..	-
Geothermal	57	42	54	68	71	71	..	-
Industrial waste	-	-	1	119	108	58	..	-
Municipal waste renew.	-	22	120	106	94	63	..	-
Municipal waste non-renew.	-	14	87	158	141	95	..	-
Solid biofuels	1110	1163	1970	1893	2169	2224	..	-
Biogases	113	482	564	785	817	678	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	3501	20126	36817	34920	22199	23933	12.8
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	148	2090	17286	10756	5123	4737	24.2
Municipal waste renew.	-	2012	9553	6725	6713	5139	5363	6.3
Municipal waste non-renew.	-	1341	6891	10086	10069	7708	8043	11.8
Solid biofuels	-	-	1077	2170	6805	3861	5421	-
Biogases	-	-	515	550	577	368	369	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	..	-	3896	4387	5660	5463	..	-
Geothermal	..	-	-	-	-	-	-	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	-	9	831	941	439	..	-
Municipal waste renew.	..	-	1331	639	743	568	..	-
Municipal waste non-renew.	..	-	964	957	1115	851	..	-
Solid biofuels	..	-	1077	1606	2313	3237	..	-
Biogases	..	-	515	354	548	368	..	-
Liquid biofuels	..	-	-	-	-	-	-	-
Heat only plants	..	3501	16230	32430	29260	16736	..	-
Geothermal	..	-	-	-	-	-	-	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	148	2081	16455	9815	4684	..	-
Municipal waste renew.	..	2012	8222	6086	5970	4571	..	-
Municipal waste non-renew.	..	1341	5927	9129	8954	6857	..	-
Solid biofuels	..	-	-	564	4492	624	..	-
Biogases	..	-	-	196	29	-	-	-
Liquid biofuels	..	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	7708	7005	5591	5564	5377	5377	-2.2
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	7708	7005	5591	5564	5377	5377	-2.2

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	10772	1736	43	4029	7393	1082	3885	814
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	10772	1736	43	4029	7393	1082	3885	814
Statistical differences	-	-	-	-	-	-	-22	-
Main activity electricity plants	-9354	-1298	-43	-307	-6701	-1	-149	-83
Autoproducer electricity plants	-1418	-439	-	-3722	-170	-	-400	-377
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-41	-	-20	-36
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-141	-123
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-114	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	481	1081	3040	195
Industry	-	-	-	-	100	1	2961	16
Iron and steel	-	-	-	-	-	-	56	-
Chemical and petrochemical	-	-	-	-	-	-	487	-
Non-ferrous metals	-	-	-	-	-	-	32	-
Non-metallc minerals	-	-	-	-	-	-	1361	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	16	-
Paper, pulp and print	-	-	-	-	97	-	633	2
Wood and wood products	-	-	-	-	-	-	6	-
Construction	-	-	-	-	-	-	4	9
Textile and leather	-	-	-	-	-	-	46	1
Non-specified	-	-	-	-	4	1	319	4
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	381	1080	79	179
Residential	-	-	-	-	29	1030	-	-
Commercial and public services	-	-	-	-	239	50	79	178
Agriculture/forestry	-	-	-	-	113	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	125259	20191	496	46850	10438	5	2804	2332
<i>Electricity plants</i>	125259	20191	496	46850	10367	5	2746	2269
<i>CHP plants</i>	-	-	-	-	71	-	58	63
Heat generated - TJ	-	-	-	-	-	-	5123	5139
<i>CHP plants</i>	-	-	-	-	-	-	439	568
<i>Heat plants</i>	-	-	-	-	-	-	4684	4571

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
1009	16339	-	735	128	539	279	48783	10.0%
-	-	4	-	-	10	-	14	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	16	-	16	x
1009	16339	4	735	128	566	279	48814	5.6%
-	24	-	-	-	392	-	394	x
-83	-2497	-	-341	-	-	-279	-21136	x
-394	-4320	-	-108	-	-	-	-11348	x
-	-21	-	-24	-	-	-	-45	x
-55	-580	-	-155	-	-	-	-887	x
-	-	-	-	-	-	-	-	-
-185	-25	-	-	-	-	-	-474	x
-	-21	8	-	-	-	-	-13	x
-	-	-	-	-	-	-	-114	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
292	8899	13	108	128	539	-	14776	2.6%
24	6506	-	60	-	-	-	9668	6.0%
-	-	-	-	-	-	-	56	0.2%
-	23	-	9	-	-	-	519	1.8%
-	48	-	-	-	-	-	80	0.7%
-	45	-	5	-	-	-	1411	8.2%
-	3	-	-	-	-	-	3	0.1%
-	1	-	-	-	-	-	1	0.0%
-	-	-	-	-	-	-	-	-
-	2253	-	39	-	-	-	2308	18.6%
3	2726	-	2	-	-	-	3463	31.0%
-	1327	-	-	-	-	-	1333	56.9%
13	-	-	-	-	-	-	26	0.6%
2	17	-	1	-	-	-	67	1.8%
5	63	-	4	-	-	-	400	4.5%
-	-	-	-	128	539	-	667	0.5%
-	-	-	-	128	539	-	667	0.5%
-	-	-	-	-	-	-	-	-
268	2393	13	48	-	-	-	4441	2.6%
-	1464	8	-	-	-	-	2531	3.3%
268	864	-	48	-	-	-	1726	2.1%
1	65	-	-	-	-	-	179	3.3%
-	-	-	-	-	-	-	-	-
-	-	4	-	-	-	-	4	0.1%
2431	37711	-	2395	-	-	1233	252145	13.0%
2336	35487	-	1717	-	-	1233	248956	13.2%
95	2224	-	678	-	-	-	3189	4.9%
7708	3861	-	368	-	-	-	22199	9.7%
851	3237	-	368	-	-	-	5463	3.0%
6857	624	-	-	-	-	-	16736	38.0%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	127797	211413	256343	279321	301009	309588	289896	2.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	127797	211413	256343	279321	301009	309588	289896	2.6
Statistical differences	1	1	1	1	2	1	..	..
Transformation processes	117393	194038	238268	260646	281894	289432	..	2.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	10405	17376	18076	18676	19117	20157	..	1.0
<i>Industry</i>	4632	5712	5787	4285	4052	4207	..	-2.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	5773	11664	12289	14391	15065	15950	..	2.1
Solar thermal (TJ)								
Production	76637	68032	79085	45229	44810	45318	41947	-2.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	76637	68032	79085	45229	44810	45318	41947	-2.7
Statistical differences	1	-	-	-1	-	-	..	..
Transformation processes	-	-	39	33	42	54	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	76638	68032	79046	45195	44768	45264	..	-2.7
<i>Industry</i>	-	-	18	26	-	47	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	76638	68032	79028	45169	44768	45217	..	-2.7
Industrial waste (TJ)								
Production	19510	54098	106341	167329	150047	162689	148741	7.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	19510	54098	106341	167329	150047	162689	148741	7.6
Statistical differences	-72	-184	-976	-234	-465	-914	..	..
Transformation processes	80	986	16396	47609	40198	34490	..	26.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	19358	52928	88969	119486	109384	127285	..	6.0
<i>Industry</i>	19193	52707	82780	109998	107509	123979	..	5.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	165	221	6189	9488	1875	3306	..	19.8
Municipal waste - renewables (TJ)								
Production	160	4579	33716	30220	31041	34092	33444	14.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	160	4579	33716	30220	31041	34092	33444	14.3
Statistical differences	-	504	2054	120	-1	1	..	..
Transformation processes	-	2721	30689	24885	26762	25946	..	16.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	160	2362	5081	5455	4278	8147	..	8.6
<i>Industry</i>	-	-	-	153	50	661	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	160	2362	5081	5302	4228	7486	..	8.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	107	3053	32796	37489	38432	42234	41940	19.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	107	3053	32796	37489	38432	42234	41940	19.1
Statistical differences	-	335	1482	-	-1	1	..	..
Transformation processes	-	1814	26662	29486	32013	30013	..	20.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	107	1574	7616	8003	6418	12222	..	14.6
<i>Industry</i>	-	-	-	224	76	991	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	107	1574	7616	7779	6342	11231	..	14.0
Solid Biofuel excluding charcoal (TJ)								
Production	393991	441791	587454	623139	674616	684229	626314	3.0
Net imports ¹	972	1153	743	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	394963	442944	588197	623139	674616	684229	626314	2.9
Statistical differences	1517	1086	-14064	-6845	-8066	988	..	..
Transformation processes	116080	115601	257470	281519	292373	312567	..	6.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	280400	328429	316663	334775	374177	372650	..	0.8
<i>Industry</i>	178756	237130	251014	264640	279568	272453	..	0.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	101644	91299	65649	70135	94609	100197	..	0.6
Charcoal (kt)								
Production	35	25	14	12	12	12	10	-4.8
Net imports ¹	-	6	6	6	6	6	6	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	35	31	20	18	18	18	16	-3.6
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	35	31	20	18	18	18	..	-3.6
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	35	31	20	18	18	18	..	-3.6
Biogases (TJ)								
Production	2822	8647	24366	27238	29269	30783	33067	8.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2822	8647	24366	27238	29269	30783	33067	8.8
Statistical differences	1	-	107	245	-	-	..	..
Transformation processes	2009	7113	19813	20863	22898	26246	..	9.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	814	1534	4660	6620	6371	4537	..	7.5
<i>Industry</i>	540	860	603	1534	2023	2517	..	7.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	274	674	4057	5086	4348	2020	..	7.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	180	246	220	199	182	-
Net imports ¹	-	-	2	1	2	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	182	247	222	199	182	-
Statistical differences	-	-	-	-	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	182	247	221	199	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	182	247	221	199	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	391	448	499	551	539	-
Net imports ¹	-	-	-	-	-	10	-	-
Stock changes	-	-	-	3	-16	-397	-3	-
Gross consumption	-	-	391	451	483	577	536	-
Statistical differences	-	-	-	-	16	387	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	391	451	499	551	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	391	451	499	551	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	192	317	246	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	192	317	246	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	192	317	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

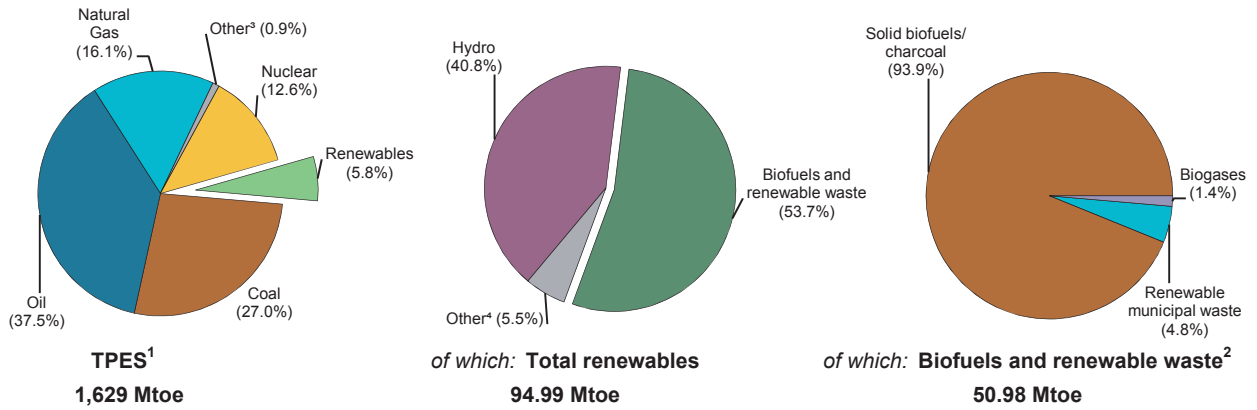


Figure 2. Contribution of renewables in 2016 provisional

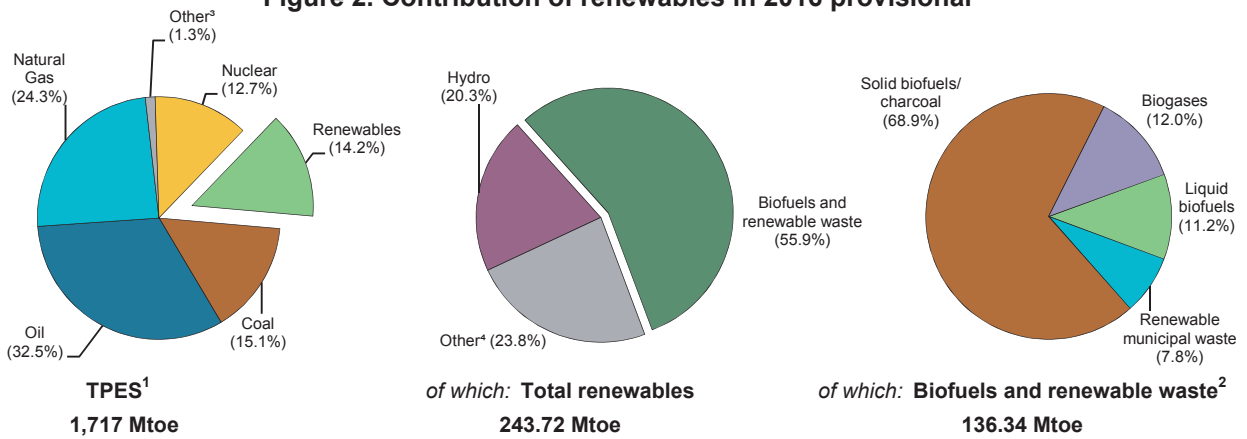
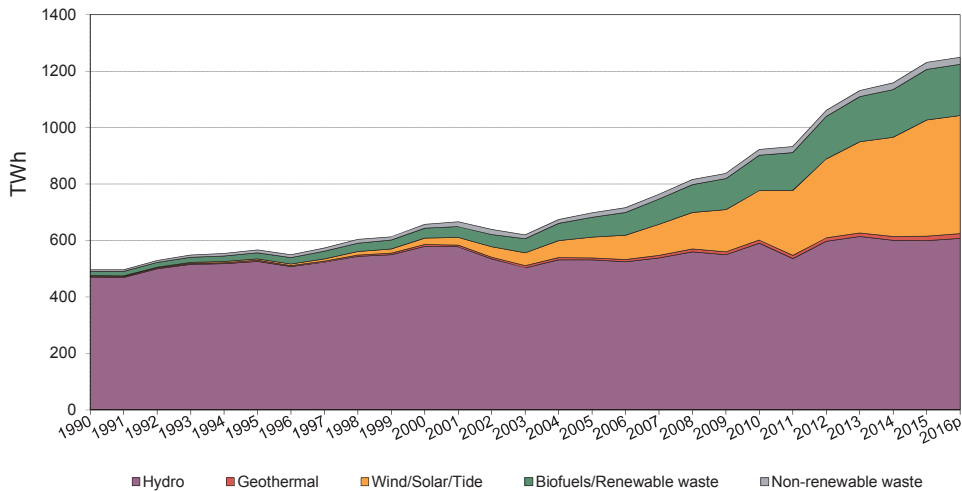


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	1629.04	1752.19	1826.04	1743.42	1679.85	1706.12	1716.66	-0.1
of which: Renewables (Mtoe) ¹	94.99	121.86	197.36	225.29	227.40	239.02	243.72	4.4
Renewables/TPES(%)	5.8	7.0	10.8	12.9	13.5	14.0	14.2	4.6
GDP (billion 2010 US dollars)	12674.04	15911.09	18423.05	18902.69	19253.81	19702.79	20068.53	1.5
TPES/GDP ²	0.13	0.11	0.10	0.09	0.09	0.09	0.09	-1.6
TPES/GDP (year 2010 = 100)	130	111	100	93	88	87	86	-1.6
Population (millions)	503.04	523.79	553.32	560.50	562.82	565.47	568.49	0.5
TPES/population (toe per capita)	3.24	3.35	3.30	3.11	2.98	3.02	3.02	-0.6
Electricity generation (TWh) ³	2668.4	3226.8	3618.6	3572.0	3504.9	3558.9	3578.0	0.6
of which: Renewables (TWh) ^{1,3}	470.78	612.98	871.19	1077.82	1102.77	1175.29	1191.22	4.2
Renew./Total Elec.(%) ^{1,4}	17.6	19.0	24.1	30.2	31.5	33.0	33.3	3.6
Road energy consumption (Mtoe)	244.3	292.8	309.8	299.2	304.3	312.6	..	..
of which: Liquid biofuels (Mtoe)	0.01	0.71	13.08	13.24	14.14	14.04	..	..
Liq. biofuels/road tr.(%) ⁵	0.0	0.2	4.2	4.4	4.6	4.5	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	167755	206009	342943	442898	464842	492769	6.0
Hydro	161593	181648	195889	206357	207995	212408	1.0
Hydro <1MW	966	2502	3170	3482	3488	3549	2.4
Hydro 1-10MW	4129	9366	11612	12793	13077	13764	2.6
Hydro 10+MW	66707	125429	135057	143405	144414	146804	1.1
Mixed plants	19791	21479	23519	24006	24200	24625	0.9
Pure pumped storage	18345	21187	22531	22671	22816	23666	0.7
Geothermal	563	794	1431	1757	1890	2111	6.7
Solar photovoltaic	13	201	29629	78295	85450	93885	50.6
Solar thermal	-	-	734	2302	2302	2302	-
Tide, wave, ocean	240	241	241	243	244	244	0.1
Wind	454	12746	85182	117573	128884	142072	17.4
Industrial waste	459	1153	1857	1854	1938	1891	3.4
Municipal waste	1142	2788	6560	7574	7568	8316	7.6
Solid biofuels	3028	5133	14303	16090	16902	17455	8.5
Biogases	263	1305	6049	8989	9903	10216	14.7
Liquid biofuels	-	-	1068	1864	1766	1869	-
Solar collectors surface (1000 m ²)	3963	19177	47556	63180	65553	67617	8.8
Cap. of solar collectors (MW _{th}) ⁶	2776	13425	33291	44229	45888	47334	8.8

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	33.78 e	36.42 e	30.72 e	29.16 e	28.45 e	28.52 e	x
Hydro	33.26 e	36.44 e	34.43	33.97	33.00	32.26	32.76
<i>of which: <1MW</i>	18.21 e	41.53	41.02	39.82	41.09	36.99	37.62
<i>of which: 1-10MW</i>	16.84 e	43.31	42.00	41.81	40.83	35.62	37.41
<i>of which: 10+MW</i>	65.01 e	45.81	42.72	41.66	40.27	40.02	40.54
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	73.12	88.91	85.64	81.50	83.49	80.85	82.86
Solar photovoltaic	12.18	7.35 e	8.70 e	11.59 e	12.03 e	12.15 e	11.38
Solar thermal	-	-	11.84	23.65	27.05	27.74	23.88
Tide, wave and ocean	23.91	24.03 e	22.65	19.71	22.59	22.90	21.91
Wind	19.58	19.97 e	20.34	23.21	22.57	24.57	22.97
Industrial waste	73.50 e	54.56 e	22.68	20.24	21.01	22.74	21.74
Municipal waste	55.74 e	63.80 e	60.42 e	57.52 e	61.63 e	58.78 e	60.95
Solid biofuels	41.99 e	46.12 e	55.90	57.17	56.94	58.83	56.20
Biogases	43.15 e	57.71 e	61.02	69.42	67.87	69.21	66.23
Biodiesels	-	-	-	16.29	16.25	19.95	19.28
Other liquid biofuels	-	-	53.15	26.32	31.51	33.78	29.41

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	496357	657337	923000	1131390	1158327	1231019	1249549	4.1
Hydro	470793	579792	590881	614131	601189	600242	607940	0.3
<i>of which: pumped storage</i>	<i>19894</i>	<i>31255</i>	<i>31378</i>	<i>31832</i>	<i>32004</i>	<i>31108</i>	<i>33133</i>	<i>0.4</i>
Geothermal	3606	6184	10735	12545	13822	14951	16387	6.3
Solar photovoltaic	13	129	22577	79505	90051	99927	104568	52.0
Solar thermal	-	-	761	4770	5455	5593	5506	-
Tide, wave, ocean	503	507	478	420	483	489	500	-0.1
Wind	778	22292	151808	239035	254871	305815	308371	17.8
Industrial waste	2955	5512	3688	3286	3563	3767	4026	-1.9
Municipal waste renew.	2846	7997	17982	19718	20875	21969	21707	6.4
Municipal waste non-renew.	2730	7588	16743	18452	19989	20854	21170	6.6
Solid biofuels	11138	20738	70042	80582	84306	89959	89380	9.6
Biogases	995	6598	32332	54662	58874	61940	64671	15.3
Liquid biofuels	-	-	4973	4284	4849	5513	5323	-
of which:								
Electricity only plants	484043	631685	834604	1020008	1039989	1110235	..	-
Hydro	470793	579792	590881	614131	601189	600242	..	-
<i>of which: pumped storage</i>	<i>19894</i>	<i>31255</i>	<i>31378</i>	<i>31832</i>	<i>32004</i>	<i>31108</i>	..	-
Geothermal	3606	5335	9265	7783	9054	10435	..	-
Solar photovoltaic	13	129	22577	79505	90051	99927	..	-
Solar thermal	-	-	761	4770	5455	5593	..	-
Tide, wave, ocean	503	507	478	420	483	489	..	-
Wind	778	22292	151808	239035	254871	305815	..	-
Industrial waste	2654	4477	1717	1451	1651	1858	..	-
Municipal waste renew.	1873	5187	8856	8445	8976	9936	..	-
Municipal waste non-renew.	1891	4939	8725	8572	9316	10121	..	-
Solid biofuels	1487	3614	23137	30927	33448	40090	..	-
Biogases	445	5413	14017	22096	22392	22246	..	-
Liquid biofuels	-	-	2382	2873	3103	3483	..	-
CHP plants	12314	25652	88396	111382	118338	120784	..	-
Geothermal	-	849	1470	4762	4768	4516	..	-
Industrial waste	301	1035	1971	1835	1912	1909	..	-
Municipal waste renew.	973	2810	9126	11273	11899	12033	..	-
Municipal waste non-renew.	839	2649	8018	9880	10673	10733	..	-
Solid biofuels	9651	17124	46905	49655	50858	49869	..	-
Biogases	550	1185	18315	32566	36482	39694	..	-
Liquid biofuels	-	-	2591	1411	1746	2030	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	267482	549019	648077	656764	693866	715660	6.3
Geothermal	-	18314	26006	28328	29225	33745	41006	5.2
Solar thermal	-	24	192	536	783	929	1352	28.7
Industrial waste	-	6110	13617	12247	12329	13968	14509	5.6
Municipal waste renew.	-	52694	92148	110958	115898	125393	126335	5.6
Municipal waste non-renew.	-	51829	84146	99949	103606	112531	113547	5.0
Solid biofuels	-	135732	316029	368968	365154	374787	386969	6.8
Biogases	-	2740	7183	20788	25132	28022	29089	15.9
Liquid biofuels	-	39	9698	6303	4637	4491	2853	30.8
<i>of which:</i>								
CHP plants	..	164323	354727	446636	457529	478635	..	-
Geothermal	..	5046	5750	6073	5835	6869	..	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	3062	9378	9753	10057	11027	..	-
Municipal waste renew.	..	38639	69198	90081	96443	103351	..	-
Municipal waste non-renew.	..	37428	61944	79529	84578	91320	..	-
Solid biofuels	..	78452	200254	240667	236704	239989	..	-
Biogases	..	1696	5420	17931	21741	23784	..	-
Liquid biofuels	..	-	2783	2602	2171	2295	..	-
Heat only plants	..	103159	194292	201441	199235	215231	..	-
Geothermal	..	13268	20256	22255	23390	26876	..	-
Solar thermal	..	24	192	536	783	929	..	-
Industrial waste	..	3048	4239	2494	2272	2941	..	-
Municipal waste renew.	..	14055	22950	20877	19455	22042	..	-
Municipal waste non-renew.	..	14401	22202	20420	19028	21211	..	-
Solid biofuels	..	57280	115775	128301	128450	134798	..	-
Biogases	..	1044	1763	2857	3391	4238	..	-
Liquid biofuels	..	39	6915	3701	2466	2196	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	19666	26339	30839	31212	34521	37209	4.1
Heat pumps ²	-	21781	18941	17083	18677	20517	14651	-2.4
(-) Input to heat pumps	-	6561	5411	4924	6041	7614	3994	-3.1
Other sources ³	-	4446	12808	18679	18576	21618	26552	11.8

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	48946	26300	42	8594	15295	5030	4041	10242
Imports	-	-	-	-	-	-	60	233
Exports	-	-	-	-	-	-	-	-35
Stock changes	-	-	-	-	-	-	-	-
TPES	48946	26300	42	8594	15295	5030	4101	10440
Statistical differences	-	-	-	-	-24	-	-	-
Main activity electricity plants	-47721	-25461	-42	-7127	-8910	-2196	-282	-1857
Autoproducer electricity plants	-1225	-839	-	-1467	-	-	-320	-1188
Main activity CHP plants	-	-	-	-	-2649	-	-520	-3205
Autoproducer CHP plants	-	-	-	-	-	-	-232	-2552
Main heat plants	-	-	-	-	-920	-22	-97	-630
Autoproducer heat plants	-	-	-	-	-43	-	-26	-167
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-74	-37
Losses	-	-	-	-	-9	-	-	-
TFC	-	-	-	-	2742	2812	2549	804
Industry	-	-	-	-	42	298	2521	547
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	501	25
Non-ferrous metals	-	-	-	-	-	-	10	-
Non-metallurgical minerals	-	-	-	-	-	-	1871	414
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	4	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	1	3	1
Paper, pulp and print	-	-	-	-	-	-	63	88
Wood and wood products	-	-	-	-	-	-	36	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	41	296	32	19
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	2700	2513	28	257
Residential	-	-	-	-	1677	2205	-	6
Commercial and public services	-	-	-	-	273	249	28	251
Agriculture/forestry	-	-	-	-	709	8	-	-
Fishing	-	-	-	-	40	-	-	-
Non-specified	-	-	-	-	-	51	-	-
Electricity generated - GWh	569135	305816	489	99927	14951	5593	3767	21969
<i>Electricity plants</i>	569135	305816	489	99927	10435	5593	1858	9936
<i>CHP plants</i>	-	-	-	-	4516	-	1909	12033
Heat generated - TJ	-	-	-	-	33745	929	13968	125393
<i>CHP plants</i>	-	-	-	-	6869	-	11027	103351
<i>Heat plants</i>	-	-	-	-	26876	929	2941	22042

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
9948	88667	-	15925	2173	10859	402	246464	25.1%
230	7247	170	-	1457	5249	802	15448	1.0%
-28	-2827	-40	-	-963	-4755	-	-8648	1.2%
-	-115	-1	-	17	107	-	8	x
10150	92972	128	15925	2684	11460	1204	253271	14.8%
-1	7	-	1	-1	40	-	22	x
-1929	-7716	-	-3336	-	-3	-620	-107200	x
-1215	-1611	-	-2298	-	-	-38	-10201	x
-2839	-10238	-	-5318	-	-3	-366	-25138	x
-2326	-4651	-	-1477	-	-1	-25	-11264	x
-612	-3703	-	-149	-	-	-59	-6192	x
-165	-164	-	-9	-	-	-1	-575	x
-	-182	49	-	-	-	-	-133	x
-	-	-	-98	-	-	-	-98	x
-50	-29	-	-524	-	-	-37	-751	x
-	-1	-	-36	-	-	-	-46	x
1014	64686	177	2680	2683	11495	60	91702	7.6%
725	20221	8	350	-	68	21	24801	8.9%
-	27	-	1	-	-	-	28	0.1%
25	287	-	67	-	1	8	914	1.7%
-	1	-	1	-	-	-	12	0.1%
540	997	-	10	-	3	4	3839	10.1%
-	16	-	-	-	1	1	18	0.2%
-	118	-	10	-	1	3	136	0.7%
-	57	-	7	-	7	-	71	1.8%
-	775	7	121	-	4	1	913	3.0%
69	11768	-	100	-	-	4	12092	35.3%
-	4508	-	1	-	-	-	4545	56.5%
-	120	-	-	-	50	-	170	2.3%
-	13	1	1	-	-	-	15	0.2%
90	1533	-	32	-	1	-	2044	8.7%
-	-	-	139	2676	11247	14	14076	4.2%
-	-	-	138	2674	11215	14	14041	4.5%
-	-	-	-	2	32	-	34	0.2%
290	44465	169	2191	7	181	24	52825	10.9%
6	40482	142	53	-	1	-	44572	15.3%
283	2403	27	1788	1	142	24	5469	3.4%
-	1567	-	349	1	30	-	2664	10.0%
-	-	-	-	1	5	-	46	2.4%
-	13	-	1	4	2	-	71	1.9%
20854	89959	-	61939	-	28	5484	1199911	33.7%
10121	40090	-	22247	-	3	3478	1079128	37.4%
10733	49869	-	39692	-	25	2006	120783	18.0%
112531	374787	-	28022	-	31	4460	693866	29.3%
91320	239989	-	23784	-	31	2264	478635	28.4%
21211	134798	-	4238	-	-	2196	215231	31.5%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	207033	302822	476526	542488	587142	640504	725851	5.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	207033	302822	476526	542488	587142	640504	725851	5.1
Statistical differences	-1145	-635	92	-1786	-1283	-990	..	..
Transformation processes	167709	250020	386949	443839	489496	524346	..	5.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	232	311	363	360	361	359	..	..
Final energy consumption	37947	51856	89306	96503	96002	114809	..	5.4
<i>Industry</i>	558	743	1418	1613	1664	1764	..	5.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	37389	51113	87888	94890	94338	113045	..	5.4
Solar thermal (TJ)								
Production	7219	27855	91059	185965	202658	210638	211633	14.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	7219	27855	91059	185965	202658	210638	211633	14.4
Statistical differences	-	-	-	-	-	-1	..	..
Transformation processes	6	24	12713	78964	90476	92898	..	73.5
Energy industry own use	-	-	4	4	3	3	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	7213	27831	78342	106997	112179	117736	..	10.1
<i>Industry</i>	338	4078	5827	12158	12324	12480	..	7.7
<i>Transport</i>	-	-	-	3	3	3	..	-
<i>Other</i>	6875	23753	72515	94836	99852	105253	..	10.4
Industrial waste (TJ)								
Production	82342	107477	154535	148923	163422	169224	180969	3.1
Net imports ¹	-	-	41	917	1257	2492	2414	-
Stock changes	-	-29	-3	117	-10	4	-70	-
Gross consumption	82342	107448	154573	149957	164669	171720	183313	3.2
Statistical differences	-	-471	-	-	1	4	..	..
Transformation processes	32940	67489	57332	50411	57987	61856	..	-0.6
Energy industry own use	5222	229	2328	2828	2705	3109	..	19.0
Losses	-	-	53	30	7	-	..	..
Final energy consumption	44180	39259	94860	96688	103971	106759	..	6.9
<i>Industry</i>	42272	36980	94274	95401	103027	105567	..	7.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1908	2279	586	1287	944	1192	..	-4.2
Municipal waste - renewables (TJ)								
Production	101526	179409	357123	394681	409149	428876	438552	6.0
Net imports ¹	-	-	-	8925	9317	8293	8422	-
Stock changes	-	4	-7	5	-	-	-	-
Gross consumption	101526	179413	357116	403611	418466	437169	446974	6.1
Statistical differences	2	-3400	169	-	2	-	..	..
Transformation processes	99611	163561	336441	370420	384490	401954	..	6.2
Energy industry own use	34	4	426	1011	1796	1540	..	48.7
Losses	-	-	-	-	-	-	..	..
Final energy consumption	1883	12448	20418	32180	32182	33675	..	6.9
<i>Industry</i>	16	1201	7365	21024	21057	22912	..	21.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1867	11247	13053	11156	11125	10763	..	-0.3

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

OECD EUROPE

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	98536	173648	346122	385148	401811	416570	433246	6.0
Net imports ¹	-	-	761	8907	9735	8446	7778	-
Stock changes	-	4	-19	-108	160	14	135	-
Gross consumption	98536	173652	346864	393947	411706	425030	441159	6.1
Statistical differences	-	-3400	139	-8	-22	-29	..	-
Transformation processes	97207	158970	318870	350016	366010	380439	..	6.0
Energy industry own use	34	4	426	1618	2492	2083	..	51.7
Losses	-	-	4	-	-	-	..	-
Final energy consumption	1295	11278	27703	42305	43182	42479	..	9.2
<i>Industry</i>	13	643	14289	30442	30056	30340	..	29.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1282	10635	13414	11863	13126	12139	..	0.9
Solid Biofuel excluding charcoal (TJ)								
Production	1988844	2395546	3589098	3702000	3553669	3713004	3721802	3.0
Net imports ¹	6540	12816	120857	145277	183809	185090	211707	19.5
Stock changes	7938	-417	1948	3062	-5720	-4806	-2110	-
Gross consumption	2003322	2407945	3711903	3850339	3731758	3893288	3931399	3.3
Statistical differences	-	-1	20	75	66	314	..	-
Transformation processes	124827	305983	972153	1123089	1153367	1183582	..	9.4
Energy industry own use	6	136	10889	11985	11693	1197	..	15.6
Losses	80	12	127	6	11	28	..	-
Final energy consumption	1878409	2101813	2728754	2715334	2566753	2708795	..	1.7
<i>Industry</i>	555718	667893	784849	782176	807838	846764	..	1.6
<i>Transport</i>	1	-	-	-	-	-	..	-
<i>Other</i>	1322690	1433920	1943905	1933158	1758915	1862031	..	1.8
Charcoal (kt)								
Production	46	84	63	77	69	67	79	-1.5
Net imports ¹	11	52	139	165	170	178	163	8.5
Stock changes	-	-	1	-	-	-2	-	-
Gross consumption	57	136	203	242	239	243	242	3.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	57	136	203	242	239	243	..	3.9
<i>Industry</i>	-	28	10	11	11	11	..	-6.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	57	108	193	231	228	232	..	5.2
Biogases (TJ)								
Production	29462	95286	363150	595506	638858	666870	685889	13.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	29462	95286	363150	595506	638858	666870	685889	13.9
Statistical differences	-	-23	-63	-118	81	61	..	-
Transformation processes	14627	75955	281144	475328	510229	531246	..	13.8
Energy industry own use	-	68	19847	23266	22792	21928	..	47.0
Losses	-	-	1440	1294	1149	1528	..	-
Final energy consumption	14835	19240	60656	95500	104769	112229	..	12.5
<i>Industry</i>	8614	8853	13072	12879	14368	14654	..	3.4
<i>Transport</i>	-	7	1498	5177	5747	5804	..	56.5
<i>Other</i>	6221	10380	46086	77444	84654	91771	..	15.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

OECD EUROPE

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	93	2960	3935	3548	3397	3436	27.1
Net imports ¹	-	-	1260	197	534	762	758	-
Stock changes	-	-2	13	-24	51	26	-12	
Gross consumption	-	91	4233	4108	4133	4185	4182	29.1
Statistical differences	-	-	-12	-13	1	-1	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	91	4221	4095	4134	4184	..	29.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	91	4216	4085	4124	4174	..	29.1
<i>Other</i>	-	-	5	10	10	10	..	-
Biodiesel (kt)								
Production	7	717	9879	10616	12420	12165	11812	20.8
Net imports ¹	-	11	1940	1604	700	556	949	29.9
Stock changes	-	-5	32	-208	-107	123	122	
Gross consumption	7	723	11851	12012	13013	12842	12883	21.1
Statistical differences	1	-	-69	-30	-7	45	..	
Transformation processes	-	-	-	5	6	7	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	8	723	11782	11977	13000	12882	..	21.2
<i>Industry</i>	-	-	35	60	70	76	..	-
<i>Transport</i>	7	721	11561	11718	12725	12604	..	21.0
<i>Other</i>	1	2	186	199	205	202	..	36.0
Other liquid biofuels (kt)								
Production	-	17	1211	492	432	506	453	25.4
Net imports ¹	-	-	644	725	866	917	913	-
Stock changes	-	-	-	-	-	-	1	
Gross consumption	-	17	1855	1217	1298	1423	1367	34.3
Statistical differences	-	-	3	-3	-1	-	..	
Transformation processes	-	1	1446	1105	1172	1301	..	61.3
Energy industry own use	-	-	16	29	33	32	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	16	396	80	92	90	..	12.2
<i>Industry</i>	-	-	131	40	39	33	..	-
<i>Transport</i>	-	16	67	8	15	17	..	0.4
<i>Other</i>	-	-	198	32	38	40	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

IEA TOTAL

Figure 1. Contribution of renewables in 1990

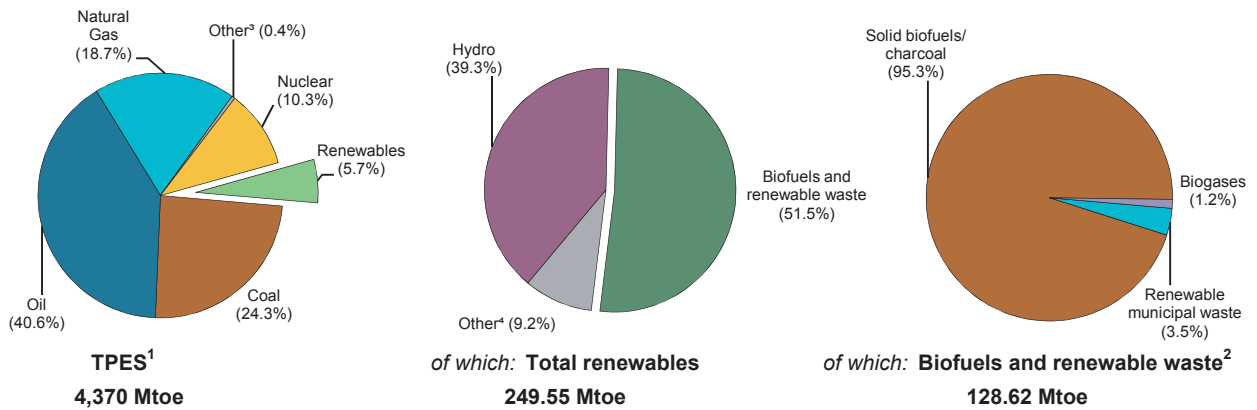


Figure 2. Contribution of renewables in 2016 provisional

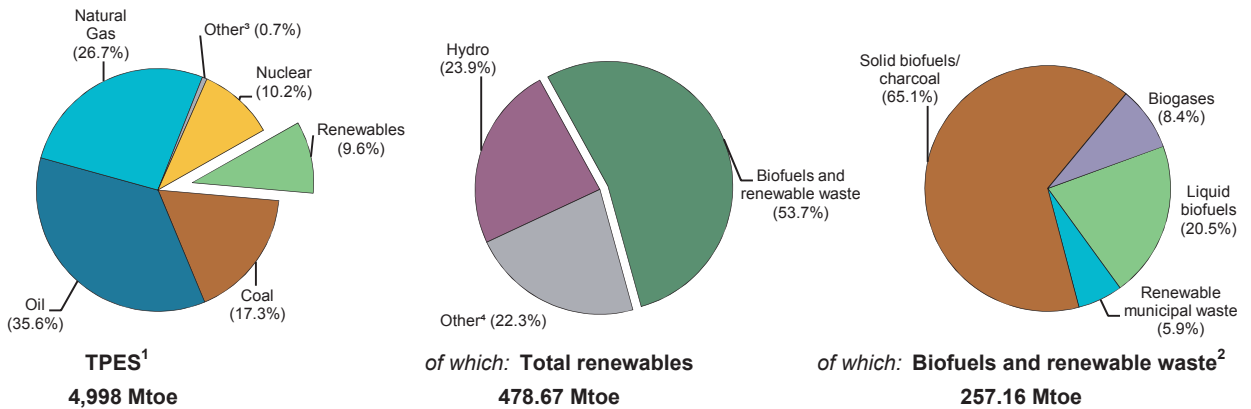
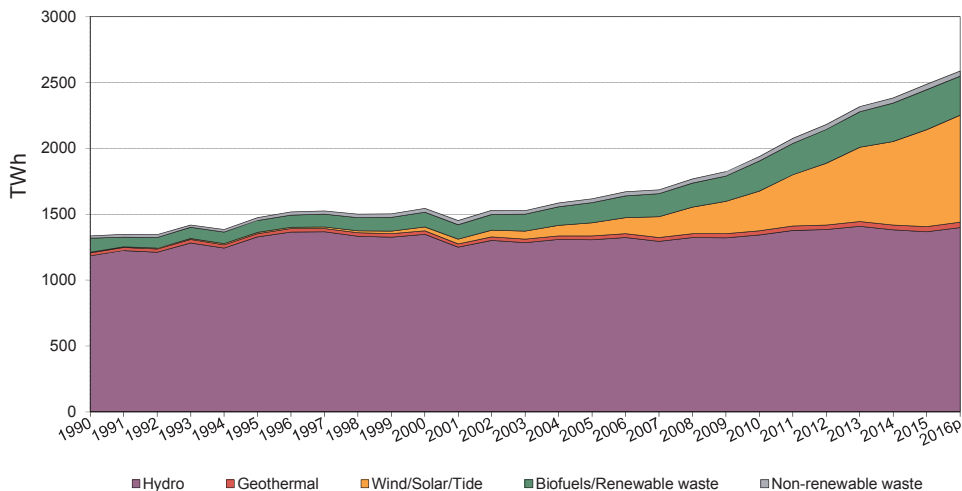


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

IEA TOTAL

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	4370.22	5092.06	5183.83	5040.72	5012.02	4996.58	4997.53	-0.1
of which: Renewables (Mtoe) ¹	249.55	292.22	394.17	449.51	459.49	470.89	478.67	3.1
Renewables/TPES(%)	5.7	5.7	7.6	8.9	9.2	9.4	9.6	3.3
GDP (billion 2010 US dollars)	28515.65	37028.67	43150.82	45009.89	45876.51	46909.50	47705.39	1.6
TPES/GDP ²	0.15	0.14	0.12	0.11	0.11	0.11	0.10	-1.7
TPES/GDP (year 2010 = 100)	128	114	100	93	91	89	87	-1.7
Population (millions)	963.01	1029.12	1096.71	1113.41	1118.96	1124.94	1131.20	0.6
TPES/population (toe per capita)	4.54	4.95	4.73	4.53	4.48	4.44	4.42	-0.7
Electricity generation (TWh) ³	7494.1	9458.5	10471.2	10374.6	10343.5	10368.5	10393.1	0.6
of which: Renewables (TWh) ^{1,3}	1274.04	1444.89	1838.05	2217.30	2282.65	2386.14	2481.32	3.4
Renew./Total Elec.(%) ^{1,4}	17.0	15.3	17.6	21.4	22.1	23.0	23.9	2.8
Road energy consumption (Mtoe)	758.5	943.3	995.2	989.0	1003.7	1023.5	..	..
of which: Liquid biofuels (Mtoe)	0.01	4.03	38.87	46.12	47.55	49.30	..	..
Liq. biofuels/road tr.(%) ⁵	0.0	0.4	3.9	4.7	4.7	4.8	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	387202	453284	658674	814377	861304	924646	4.9
Hydro	363446	408383	435242	448037	450941	459765	0.8
Hydro <1MW	967	3032	3119	3418	3418	3480	0.9
Hydro 1-10MW	5556	16568	19996	21254	21538	22238	2.0
Hydro 10+MW	91998	230108	304570	312817	314395	320893	2.2
Mixed plants	19791	21479	41452	41962	42164	42589	4.7
Pure pumped storage	37476	68281	66104	68586	69426	70566	0.2
Geothermal	3717	4366	4529	5024	5226	5490	1.5
Solar photovoltaic	..	743	37417	109493	131791	159927	..
Solar thermal	339	419	1210	3591	3972	4063	16.4
Tide, wave, ocean	260	261	263	519	520	520	4.7
Wind	2366	15373	133318	192339	210579	234250	19.9
Industrial waste	..	1791	2415	2463	2621	2212	..
Municipal waste	..	6632	9864	11657	11726	12629	..
Solid biofuels	..	12922	24999	27571	28922	30386	..
Biogases	..	2394	8166	11665	12730	13020	..
Liquid biofuels	-	-	1251	2018	2276	2384	-
Solar collectors surface (1000 m ²)	22493	42572	90690	112125	115650	120177	7.2
Cap. of solar collectors (MW _{th}) ⁶	15747	29802	63484	78493	80957	84127	7.2

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

IEA TOTAL

Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	39.37 e	38.92 e	33.62 e	32.48 e	31.60 e	30.71 e	x
Hydro	37.23 e	37.71 e	35.23	35.93	34.97	33.95	35.24
<i>of which: <1MW</i>	18.17 e	42.57	42.20	41.17	41.92	37.87	38.77
<i>of which: 1-10MW</i>	27.08 e	37.79	41.06	40.48	39.94	36.20	38.07
<i>of which: 10+MW</i>	57.93 e	41.06	44.72	46.00	44.70	43.56	45.25
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	71.22	67.33	81.60	78.95	81.16	81.33	81.04
Solar photovoltaic	14.55	11.03 e	9.42 e	12.03 e	12.63 e	12.88 e	11.88
Solar thermal	22.33	14.33	15.50	18.39	23.41	25.69	21.87
Tide, wave and ocean	23.21	23.59 e	21.97	20.20	21.75	21.93	21.40
Wind	18.55	21.17 e	22.87	26.23	26.01	26.57	25.55
Industrial waste	87.77 e	81.43 e	41.85	42.45	40.09	45.76	45.00
Municipal waste	58.96 e	55.94 e	64.30 e	57.72 e	60.29 e	58.19 e	60.83
Solid biofuels	87.50 e	72.43 e	68.43	68.42	70.54	70.04	68.48
Biogases	67.66 e	62.44 e	62.30	68.89	67.70	68.73	66.36
Biodiesels	-	-	-	16.60	14.60	18.16	18.30
Other liquid biofuels	-	-	46.24	25.38	28.14	33.44	27.64

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

IEA TOTAL

Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	1335269	1545370	1939700	2317068	2384350	2487341	2588126	3.3
Hydro	1185210	1348969	1343300	1410035	1381564	1367403	1399616	0.2
<i>of which: pumped storage</i>	<i>47165</i>	<i>71687</i>	<i>66678</i>	<i>61933</i>	<i>62144</i>	<i>60858</i>	<i>66919</i>	<i>-0.4</i>
Geothermal	23190	25752	32374	34746	37154	39113	40666	2.9
Solar photovoltaic	18	718	30879	115361	145763	180374	213333	42.7
Solar thermal	663	526	1644	5787	8147	9142	11045	21.0
Tide, wave, ocean	529	539	506	919	991	998	1008	4.0
Wind	3844	28505	267099	442003	479798	545273	586597	20.8
Industrial waste	7665	12777	8851	9160	9203	8866	7881	-3.0
Municipal waste renew.	8228	16482	29451	30268	31578	32900	32790	4.4
Municipal waste non-renew.	8078	16019	26122	28673	30355	31474	32002	4.4
Solid biofuels	94192	81990	149850	165240	178713	186443	176142	4.9
Biogases	3652	13093	44557	70400	75494	78390	80550	12.0
Liquid biofuels	-	-	5067	4476	5590	6965	6496	-
of which:								
Electricity only plants	1259671	1476949	1812930	2169869	2229394	2330625	..	-
Hydro	1185210	1348969	1343300	1410035	1381564	1367403	..	-
<i>of which: pumped storage</i>	<i>47165</i>	<i>71687</i>	<i>66678</i>	<i>61933</i>	<i>62144</i>	<i>60858</i>	..	-
Geothermal	23133	25710	32320	34678	37083	39042	..	-
Solar photovoltaic	18	718	30879	115361	145763	180374	..	-
Solar thermal	663	526	1644	5787	8147	9142	..	-
Tide, wave, ocean	529	539	506	919	991	998	..	-
Wind	3844	28505	267099	442003	479798	545273	..	-
Industrial waste	3403	5495	4159	4923	5157	5340	..	-
Municipal waste renew.	6719	12473	19158	18032	18617	19822	..	-
Municipal waste non-renew.	6738	12214	17214	17845	18645	19738	..	-
Solid biofuels	26425	31687	69739	81391	92850	101768	..	-
Biogases	2989	10113	24521	35982	37089	36945	..	-
Liquid biofuels	-	-	2391	2913	3690	4780	..	-
CHP plants	75598	68421	126770	147199	154956	156716	..	-
Geothermal	57	42	54	68	71	71	..	-
Industrial waste	4262	7282	4692	4237	4046	3526	..	-
Municipal waste renew.	1509	4009	10293	12236	12961	13078	..	-
Municipal waste non-renew.	1340	3805	8908	10828	11710	11736	..	-
Solid biofuels	67767	50303	80111	83849	85863	84675	..	-
Biogases	663	2980	20036	34418	38405	41445	..	-
Liquid biofuels	-	-	2676	1563	1900	2185	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

IEA TOTAL

Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	278504	591699	701448	711108	728302	743623	6.3
Geothermal	-	716	5119	6245	6763	7851	8023	16.3
Solar thermal	-	24	192	536	783	929	1352	28.7
Industrial waste	-	6431	19514	34331	27893	23271	24436	8.7
Municipal waste renew.	-	63618	109423	124017	129995	137974	139271	5.0
Municipal waste non-renew.	-	61478	96761	115291	119940	126560	128071	4.7
Solid biofuels	-	141267	339076	391341	393380	396517	406843	6.8
Biogases	-	4931	11919	23387	27729	30722	32783	12.6
Liquid biofuels	-	39	9695	6300	4625	4478	2844	30.7
<i>of which:</i>								
CHP plants	..	187028	396430	483508	499173	515373	..	-
Geothermal	..	-	-	-	-	-	-	-
Solar thermal	..	-	-	-	-	-	-	-
Industrial waste	..	3249	13194	15382	15806	15646	..	-
Municipal waste renew.	..	46676	77348	95554	103070	109861	..	-
Municipal waste non-renew.	..	45275	68152	84935	91151	97685	..	-
Solid biofuels	..	87941	227344	266696	264670	265407	..	-
Biogases	..	3887	7612	18342	22317	24492	..	-
Liquid biofuels	..	-	2780	2599	2159	2282	..	-
Heat only plants	..	91476	195269	217940	211935	212929	..	-
Geothermal	..	716	5119	6245	6763	7851	..	-
Solar thermal	..	24	192	536	783	929	..	-
Industrial waste	..	3182	6320	18949	12087	7625	..	-
Municipal waste renew.	..	16942	32075	28463	26925	28113	..	-
Municipal waste non-renew.	..	16203	28609	30356	28789	28875	..	-
Solid biofuels	..	53326	111732	124645	128710	131110	..	-
Biogases	..	1044	4307	5045	5412	6230	..	-
Liquid biofuels	..	39	6915	3701	2466	2196	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	27374	33337	36417	36776	39898	42586	2.8
Heat pumps ²	-	21781	18941	17083	18677	20517	14651	-2.4
(-) Input to heat pumps	-	6561	5411	4924	6041	7614	3994	-3.1
Other sources ³	-	12154	19806	24257	24140	26995	31929	6.2

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

IEA TOTAL

Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	112363	46894	86	15512	27907	8795	9230	14758
Imports	-	-	-	-	-	-	54	233
Exports	-	-	-	-	-	-	-	-35
Stock changes	-	-	-	-	-	-	-	-
TPES	112363	46894	86	15512	27907	8795	9284	14956
Statistical differences	-	-	-	-	-	-	-22	-
Main activity electricity plants	-106939	-45567	-86	-9532	-23984	-2917	-614	-4545
Autoproducer electricity plants	-5424	-1326	-	-5980	-170	-	-928	-1950
Main activity CHP plants	-	-	-	-	-	-	-748	-3506
Autoproducer CHP plants	-	-	-	-	-41	-	-426	-2661
Main heat plants	-	-	-	-	-300	-22	-97	-696
Autoproducer heat plants	-	-	-	-	-43	-	-166	-290
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-114	-
Energy Industry own use	-	-	-	-	-	-	-74	-37
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	3369	5856	6096	1272
Industry	-	-	-	-	128	299	5988	603
Iron and steel	-	-	-	-	-	-	56	-
Chemical and petrochemical	-	-	-	-	-	-	1126	25
Non-ferrous metals	-	-	-	-	-	-	42	-
Non-metallc minerals	-	-	-	-	-	-	3330	414
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	4	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	1	25	1
Paper, pulp and print	-	-	-	-	97	-	961	90
Wood and wood products	-	-	-	-	-	-	43	-
Construction	-	-	-	-	-	-	5	9
Textile and leather	-	-	-	-	-	-	46	1
Non-specified	-	-	-	-	31	297	351	63
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	3241	5557	107	669
Residential	-	-	-	-	1935	3090	-	6
Commercial and public services	-	-	-	-	463	2366	107	662
Agriculture/forestry	-	-	-	-	813	8	-	-
Fishing	-	-	-	-	29	-	-	-
Non-specified	-	-	-	-	-	93	-	-
Electricity generated - GWh	1306545	545274	998	180374	39113	9142	8866	32900
<i>Electricity plants</i>	<i>1306545</i>	<i>545274</i>	<i>998</i>	<i>180374</i>	<i>39042</i>	<i>9142</i>	<i>5340</i>	<i>19822</i>
<i>CHP plants</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>71</i>	<i>-</i>	<i>3526</i>	<i>13078</i>
Heat generated - TJ	-	-	-	-	7851	929	23271	137974
<i>CHP plants</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>15646</i>	<i>109861</i>
<i>Heat plants</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>-</i>	<i>7851</i>	<i>929</i>	<i>7625</i>	<i>28113</i>

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

IEA TOTAL

Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
14458	166579	-	21176	35774	13189	971	487692	12.4%
189	7269	167	-	2223	7568	802	18505	0.6%
-28	-2652	-32	-	-2846	-5200	-	-10793	0.6%
-	-71	-	-	-255	-121	-	-447	x
14618	171124	135	21176	34896	15269	1773	494788	9.9%
-1	31	-	1	1	405	1	416	x
-4501	-15265	-	-7023	-	-26	-910	-221909	x
-1979	-8619	-	-2707	-	-	-38	-29121	x
-3118	-11338	-	-5446	-	-3	-366	-24525	x
-2451	-9841	-	-1813	-	-2	-77	-17312	x
-647	-3587	-	-201	-	-	-59	-5609	x
-350	-159	-	-45	-	-	-1	-1054	x
-	-186	49	-	-	-	-	-137	x
-	-	-	-98	-	-	-	-212	x
-50	-31	-	-526	-	-95	-37	-850	x
-	-1	-	-36	-	-	-	-37	x
1521	122128	184	3283	34897	15132	286	194024	5.6%
739	60308	8	858	-	271	248	69450	9.4%
-	27	-	2	-	2	-	87	0.1%
25	337	-	77	-	27	11	1628	1.1%
-	49	-	1	-	-	-	92	0.2%
493	1472	-	14	-	9	5	5737	7.6%
-	19	-	2	-	2	1	24	0.1%
-	115	-	10	-	7	3	139	0.3%
-	57	-	7	-	45	-	109	0.5%
-	3614	7	162	-	10	1	3821	5.2%
72	45985	-	543	-	3	227	47978	47.2%
-	6773	-	1	-	8	-	6825	42.6%
13	119	-	-	-	151	-	297	1.1%
2	28	1	1	-	-	-	79	0.6%
134	1712	-	38	-	7	-	2633	4.2%
-	-	-	137	34890	14520	14	49561	4.3%
-	-	-	137	34888	14263	14	49302	4.8%
-	-	-	-	2	256	-	258	0.2%
782	61821	176	2288	7	342	24	75014	6.1%
6	54578	149	53	-	1	-	59818	9.1%
775	4660	27	1890	1	142	24	11117	2.3%
1	2570	-	345	1	191	-	3929	6.6%
-	-	-	-	1	5	-	35	1.0%
-	13	-	1	4	2	-	113	0.5%
31474	186443	-	78389	-	24	6940	2426482	23.4%
19738	101768	-	36946	-	3	4775	2269767	24.4%
11736	84675	-	41443	-	21	2165	156715	14.8%
126560	396517	-	30722	-	18	4460	728302	24.4%
97685	265407	-	24492	-	18	2264	515373	22.7%
28875	131110	-	6230	-	-	2196	212929	30.2%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

IEA TOTAL

Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	872639	984208	930041	1015619	1090250	1168622	1220983	1.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	872639	984208	930041	1015619	1090250	1168622	1220983	1.2
Statistical differences	1	1	1	-2	1	-	..	..
Transformation processes	812965	896626	817215	894984	969183	1027531	..	0.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	3	27	4	4	9	9	..	..
Final energy consumption	59672	87556	112823	120629	121059	141082	..	3.2
<i>Industry</i>	4838	10663	6736	5429	5122	5377	..	-4.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	54834	76893	106087	115200	115937	135705	..	3.9
Solar thermal (TJ)								
Production	71247	136809	211565	316995	349839	368318	371023	6.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	71247	136809	211565	316995	349839	368318	371023	6.8
Statistical differences	4847	-	1	-1	-	-1	..	..
Transformation processes	7239	5593	20471	87743	113789	123093	..	22.9
Energy industry own use	-	-	4	4	3	3	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	68855	131216	191091	229247	236047	245221	..	4.3
<i>Industry</i>	338	4078	5845	12184	12324	12527	..	7.8
<i>Transport</i>	-	-	-	3	3	3	..	-
<i>Other</i>	68517	127138	185246	217060	223720	232691	..	4.1
Industrial waste (TJ)								
Production	184136	336915	345133	379940	375618	386496	363838	0.9
Net imports ¹	-	-	41	609	1061	2268	2329	-
Stock changes	-	-29	-3	117	-10	4	..	..
Gross consumption	184136	336886	345171	380666	376669	388768	366167	1.0
Statistical differences	-72	-655	-977	-234	-464	-910	..	..
Transformation processes	113741	137867	115448	135574	136431	129491	..	-0.4
Energy industry own use	5222	229	2328	2828	2705	3109	..	19.0
Losses	-	-	53	30	7	-	..	..
Final energy consumption	65101	198135	226365	242000	237062	255258	..	1.7
<i>Industry</i>	63028	194980	219452	231225	234243	250760	..	1.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2073	3155	6913	10775	2819	4498	..	2.4
Municipal waste - renewables (TJ)								
Production	191125	358681	557053	580989	595690	618015	630845	3.7
Net imports ¹	-	-	-	8925	9317	8293	8422	-
Stock changes	-	4	-7	5	-	-	-	-
Gross consumption	191125	358685	557046	589919	605007	626308	639267	3.8
Statistical differences	2	-2896	2222	119	1	2	..	..
Transformation processes	189050	298200	521846	540344	556085	571494	..	4.4
Energy industry own use	34	4	426	1011	1796	1540	..	48.7
Losses	-	-	-	-	-	-	..	..
Final energy consumption	2043	57585	36996	48683	47127	53276	..	-0.5
<i>Industry</i>	16	25051	8505	22673	22708	25252	..	0.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2027	32534	28491	26010	24419	28024	..	-1.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

IEA TOTAL

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	186916	349902	508330	570490	587400	605441	626609	3.7
Net imports ¹	-	-	-	7100	7689	6724	6831	-
Stock changes	-	4	-	-40	7	-3	..	-
Gross consumption	186916	349906	508330	577550	595096	612162	633440	3.8
Statistical differences	-	-3065	1622	-8	-23	-28	..	-
Transformation processes	185480	291210	466245	516824	535102	546340	..	4.3
Energy industry own use	34	4	426	1618	2492	2083	..	51.7
Losses	-	-	4	-	-	-	..	-
Final energy consumption	1402	55627	43277	59100	57479	63711	..	0.9
<i>Industry</i>	13	24493	14109	30280	29300	30950	..	1.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1389	31134	29168	28820	28179	32761	..	0.3
Solid Biofuel excluding charcoal (TJ)								
Production	5116607	5635126	6780652	7024683	6997646	6975652	6790285	1.4
Net imports ¹	5737	19293	125424	147741	189659	193333	214719	16.6
Stock changes	8628	-413	930	-1999	-3938	-2983	-2404	-
Gross consumption	5130972	5654006	6907006	7170425	7183367	7166002	7002600	1.6
Statistical differences	1517	1085	-14046	-6771	-7999	1303	..	-
Transformation processes	1651476	988625	1708750	1915795	2024519	2051746	..	5.0
Energy industry own use	6	136	10889	12115	11783	1287	..	16.2
Losses	-	12	127	6	11	28	..	-
Final energy consumption	3481007	4666318	5173194	5235738	5139055	5114244	..	0.6
<i>Industry</i>	1347532	2521188	2426212	2479115	2512180	2525440	..	0.0
<i>Transport</i>	1	-	-	-	-	-	..	-
<i>Other</i>	2133474	2145130	2746982	2756623	2626875	2588804	..	1.3
Charcoal (kt)								
Production	81	109	68	79	68	68	77	-3.1
Net imports ¹	11	52	147	172	180	185	173	8.8
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	92	161	215	251	248	253	250	3.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	92	161	215	251	248	253	..	3.1
<i>Industry</i>	-	28	10	11	11	11	..	-6.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	92	133	205	240	237	242	..	4.1
Biogases (TJ)								
Production	63234	235534	516234	794157	863079	886786	909695	9.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	63234	235534	516234	794157	863079	886786	909695	9.2
Statistical differences	1	-23	43	128	82	61	..	-
Transformation processes	47586	154053	426325	651644	704787	725829	..	10.9
Energy industry own use	-	68	19885	23344	22870	22006	..	47.0
Losses	-	-	1440	1294	1149	1528	..	-
Final energy consumption	15649	81390	68627	118003	134355	137484	..	3.6
<i>Industry</i>	9154	67112	15321	28921	37866	35920	..	-4.1
<i>Transport</i>	-	7	1476	5106	5676	5735	..	56.4
<i>Other</i>	6495	14271	51830	83976	90813	95829	..	13.5

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

IEA TOTAL

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	4735	42262	44013	46746	47584	48975	16.6
Net imports ¹	-	79	500	354	-805	-559	-1451	-
Stock changes	-	77	-308	460	-328	-330	235	
Gross consumption	-	4891	42454	44827	45613	46695	47759	16.2
Statistical differences	-	365	-173	-13	-1	1	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	142	153	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	5256	42281	44672	45459	46696	..	15.7
<i>Industry</i>	-	-	-	35	37	-	..	-
<i>Transport</i>	-	5256	42276	44117	44910	46686	..	15.7
<i>Other</i>	-	-	5	520	512	10	..	-
Biodiesel (kt)								
Production	7	738	11623	12985	15004	14420	13497	21.9
Net imports ¹	-	11	1789	3202	1681	2325	3728	42.9
Stock changes	-	-5	39	-544	15	-501	-502	
Gross consumption	7	744	13451	15608	16623	16500	16723	22.9
Statistical differences	1	-	-68	-30	9	408	..	
Transformation processes	-	-	-	17	22	30	..	-
Energy industry own use	-	-	-	109	123	88	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	8	744	13383	15452	16487	16379	..	22.9
<i>Industry</i>	-	-	35	286	322	265	..	-
<i>Transport</i>	7	742	13162	14797	15782	15762	..	22.6
<i>Other</i>	1	2	186	369	383	352	..	41.2
Other liquid biofuels (kt)								
Production	-	17	1405	1028	1149	1386	1209	34.1
Net imports ¹	-	-	644	725	866	917	913	-
Stock changes	-	-	-	-	-	-	1	
Gross consumption	-	17	2049	1753	2015	2303	2123	38.7
Statistical differences	-	-	3	-3	-	1	..	
Transformation processes	-	1	1475	1216	1480	1742	..	64.5
Energy industry own use	-	-	16	29	33	32	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	16	561	505	502	530	..	26.3
<i>Industry</i>	-	-	296	465	449	473	..	-
<i>Transport</i>	-	16	67	8	15	17	..	0.4
<i>Other</i>	-	-	198	32	38	40	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

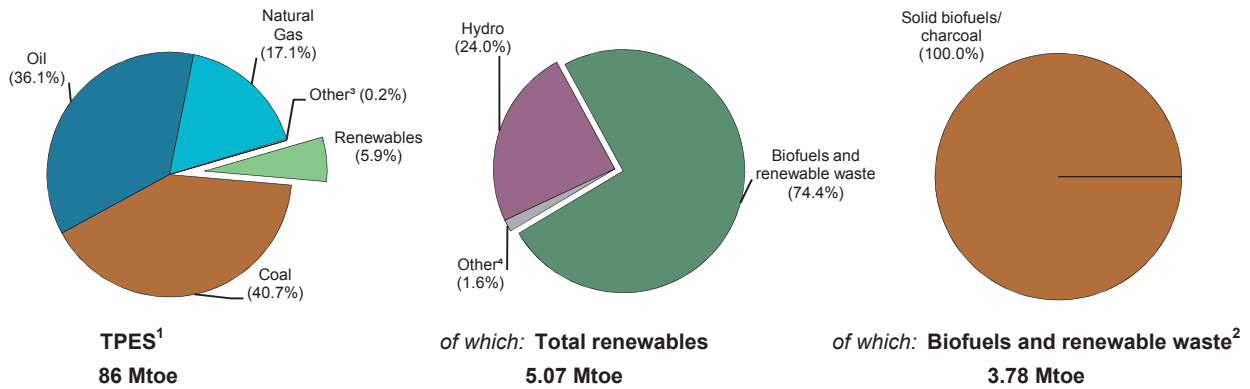


Figure 2. Contribution of renewables in 2016 provisional

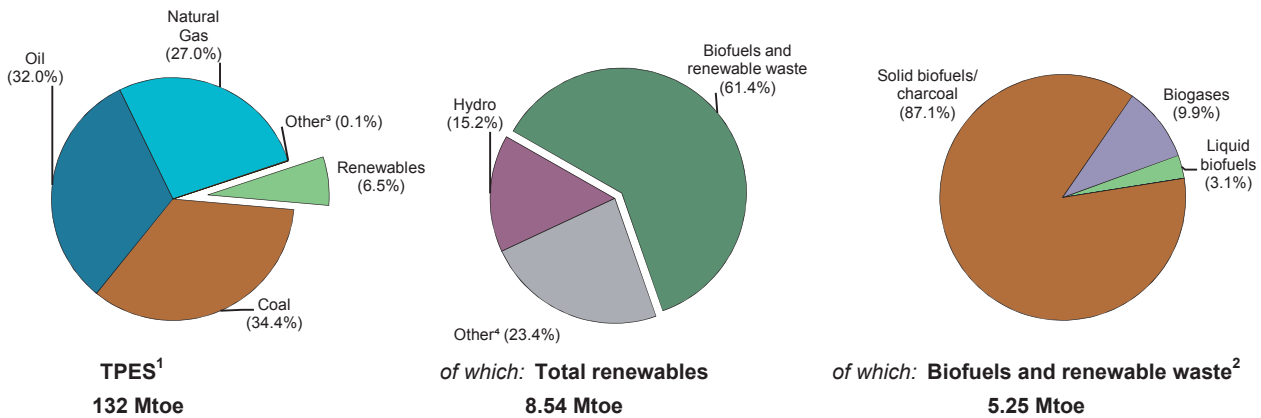
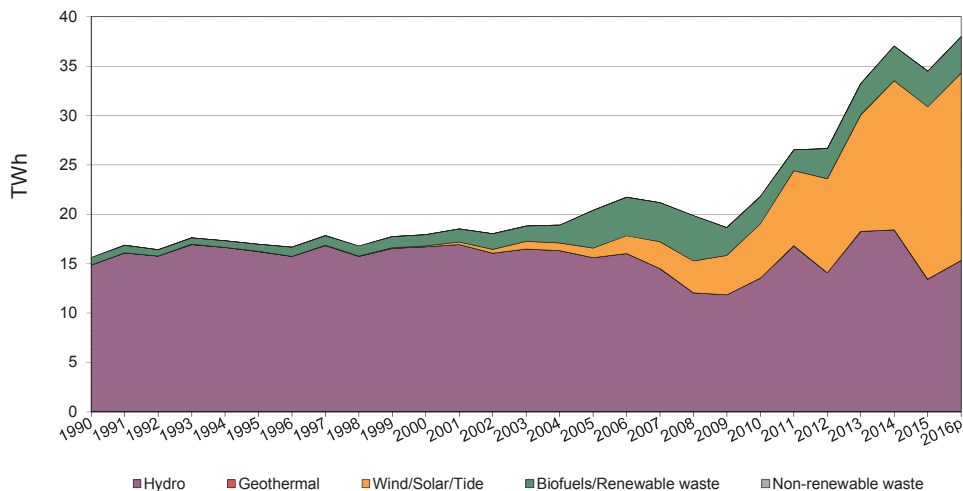


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	86.38	103.10	127.63	126.49	125.25	125.30	132.32	1.6
<i>of which: Renewables (Mtoe)</i> ¹	5.07	6.35	7.02	7.88	8.20	8.20	8.54	1.9
<i>Renewables/TPES(%)</i>	5.9	6.2	5.5	6.2	6.5	6.5	6.5	0.3
GDP (billion 2010 US dollars)	673.55	954.72	1293.79	1411.16	1445.33	1485.31	1521.60	3.0
TPES/GDP ²	0.13	0.11	0.10	0.09	0.09	0.08	0.09	-1.3
TPES/GDP (year 2010 = 100)	130	109	100	91	88	86	88	-1.3
Population (millions)	17.17	19.18	22.22	23.34	23.66	24.07	24.37	1.5
TPES/population (toe per capita)	5.03	5.37	5.74	5.42	5.29	5.21	5.43	0.1
Electricity generation (TWh) ³	154.3	209.9	252.7	249.6	248.3	252.3	257.5	1.3
<i>of which: Renewables (TWh)</i> ^{1,3}	14.90	17.59	21.76	33.11	37.01	34.41	37.73	4.9
<i>Renew./Total Elec.(%)</i> ^{1,4}	9.7	8.4	8.6	13.3	14.9	13.6	14.7	3.6
Road energy consumption (Mtoe)	18.7	22.3	25.3	26.5	26.5	27.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.17	0.24	0.25	0.25	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	0.7	0.9	1.0	0.9	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	8653	9681	12541	16010	17353	18145	4.3
Hydro	8321	9201	9449	8713	8724	8724	-0.4
<i>Hydro <1MW</i>	1	3	8	7	7	7	5.8
<i>Hydro 1-10MW</i>	49	49	172	157	157	157	8.1
<i>Hydro 10+MW</i>	7331	7659	7853	7133	7144	7144	-0.5
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	940	1490	1416	1416	1416	1416	-0.3
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	25	399	3255	4004	4357	41.1
Solar thermal	-	-	3	3	3	3	-
Tide, wave, ocean	-	-	1	1	1	1	-
Wind	-	33	1864	3221	3797	4234	38.2
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	332	332	597	597	598	598	4.0
Biogases	-	90	228	220	226	228	6.4
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	2743	8892	10885	10957	12292	10.5
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	1920	6224	7620	7670	8604	10.5

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	20.62	21.17	19.85	23.68	24.37	21.70	x
Hydro	20.41	20.74	16.37	23.94	24.10	17.59	20.58
<i>of which: <1MW</i>	21.88	24.22	19.15	29.46	29.80	21.66	24.92
<i>of which: 1-10MW</i>	21.88	24.22	19.26	28.40	28.74	20.88	24.29
<i>of which: 10+MW</i>	21.88	24.22	19.19	28.43	28.72	20.87	24.34
<i>of which: pure pumped storage²</i>	8.89	2.76	0.38	0.80	0.28	0.68	0.53
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	17.22	12.05	13.41	13.84	15.62	13.47
Solar thermal	-	-	13.74	11.42	14.49	18.77	13.21
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	20.06	30.94	28.21	30.82	30.92	30.74
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	25.79	23.55	33.69	29.64	35.83	40.42	30.72
Biogases	-	56.95	50.85	83.04	82.57	74.64	74.39
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	15630	17950	21805	33209	37043	34489	37974	4.8
Hydro	14880	16720	13549	18270	18421	13445	15333	-0.5
<i>of which: pumped storage</i>	732	360	47	99	35	84	242	-2.5
Geothermal	-	-	1	1	1	1	-	-
Solar photovoltaic	-	38	422	3823	4854	5963	6832	38.3
Solar thermal	-	-	4	3	4	5	6	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	58	5052	7960	10252	11467	12098	39.6
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	750	685	1761	1551	1876	2117	2220	7.6
Biogases	-	449	1016	1601	1635	1491	1485	7.8
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	14880	16816	19834	31201	34730	32249	..	-
Hydro	14880	16720	13549	18270	18421	13445	..	-
<i>of which: pumped storage</i>	732	360	47	99	35	84	..	-
Geothermal	-	-	1	1	1	1	..	-
Solar photovoltaic	-	38	422	3823	4854	5963	..	-
Solar thermal	-	-	4	3	4	5	..	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	58	5052	7960	10252	11467	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	182	161	194	378	..	-
Biogases	-	-	624	983	1004	990	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	750	1134	1971	2008	2313	2240	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	750	685	1579	1390	1682	1739	..	-
Biogases	-	449	392	618	631	501	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	1149	986	-	513	1	356	96	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	1149	986	-	513	1	356	96	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-1149	-986	-	-7	-1	-1	-	-
Autoproducer electricity plants	-	-	-	-506	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	354	96	-
Industry	-	-	-	-	-	-	96	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	91	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	5	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	354	-	-
Residential	-	-	-	-	-	345	-	-
Commercial and public services	-	-	-	-	-	10	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	13361	11467	-	5963	1	5	-	-
<i>Electricity plants</i>	13361	11467	-	5963	1	5	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	4482	-	464	125	121	-	8293	2.2%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	4482	-	464	125	121	-	8293	6.6%
-	-41	-	-	-	-	-	-41	x
-	-88	-	-268	-	-	-	-2500	x
-	-	-	-	-	-	-	-506	x
-	-	-	-	-	-	-	-	-
-	-403	-	-136	-	-	-	-539	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	3951	-	60	125	121	-	4707	5.8%
-	2754	-	21	-	-	-	2871	12.0%
-	-	-	-	-	-	-	-	-
-	12	-	-	-	-	-	103	4.3%
-	48	-	-	-	-	-	48	0.6%
-	41	-	5	-	-	-	46	2.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	2177	-	15	-	-	-	2197	57.3%
-	168	-	1	-	-	-	169	17.8%
-	307	-	-	-	-	-	307	69.9%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	125	121	-	246	0.8%
-	-	-	-	125	121	-	246	0.9%
-	-	-	-	-	-	-	-	-
-	1197	-	40	-	-	-	1591	7.7%
-	1190	-	-	-	-	-	1535	14.6%
-	7	-	40	-	-	-	57	0.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	2117	-	1491	-	-	-	34405	13.6%
-	378	-	990	-	-	-	32165	13.5%
-	1739	-	501	-	-	-	2240	16.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	18	18	18	23	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	18	18	18	23	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	18	18	18	23	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	3405	3418	10525	13165	13260	14897	15585	10.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	3405	3418	10525	13165	13260	14897	15585	10.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	39	33	42	54	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	3405	3418	10486	13132	13218	14843	..	10.3
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	3405	3418	10486	13132	13218	14843	..	10.3
Industrial waste (TJ)								
Production	7767	7490	4099	4022	4298	4035	4841	-4.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	7767	7490	4099	4022	4298	4035	4841	-4.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	7767	7490	4099	4022	4298	4035	..	-4.0
<i>Industry</i>	7767	7490	4099	4022	4298	4035	..	-4.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	158108	197572	194997	184622	182505	187707	191278	-0.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	158108	197572	194997	184622	182505	187707	191278	-0.3
Statistical differences	-	-	-14961	-9023	-8694	-1717	..	-
Transformation processes	29683 e	23310	18812	11415	16711	20555	..	-0.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	128425	174262	161224	164184	157100	165435	..	-0.3
<i>Industry</i>	54325	95543	105349	111088	105043	115318	..	1.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	74100	78719	55875	53096	52057	50117	..	-3.0
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	5780	12915	13992	16366	19417	21681	8.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	5780	12915	13992	16366	19417	21681	8.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	5780	11912	11743	14005	16894	..	7.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1003	2249	2361	2523	..	-
<i>Industry</i>	-	-	323	614	580	861	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	680	1635	1781	1662	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	178	242	217	195	178	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	178	242	217	195	178	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	178	242	217	195	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	178	242	217	195	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	61	100	129	138	54	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	61	100	129	138	54	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	61	100	129	138	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	61	100	129	138	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

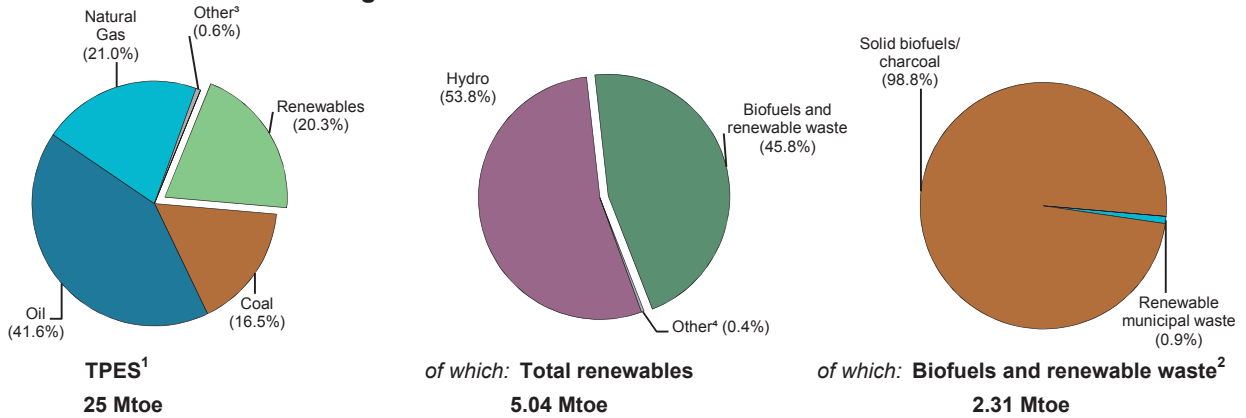


Figure 2. Contribution of renewables in 2016 provisional

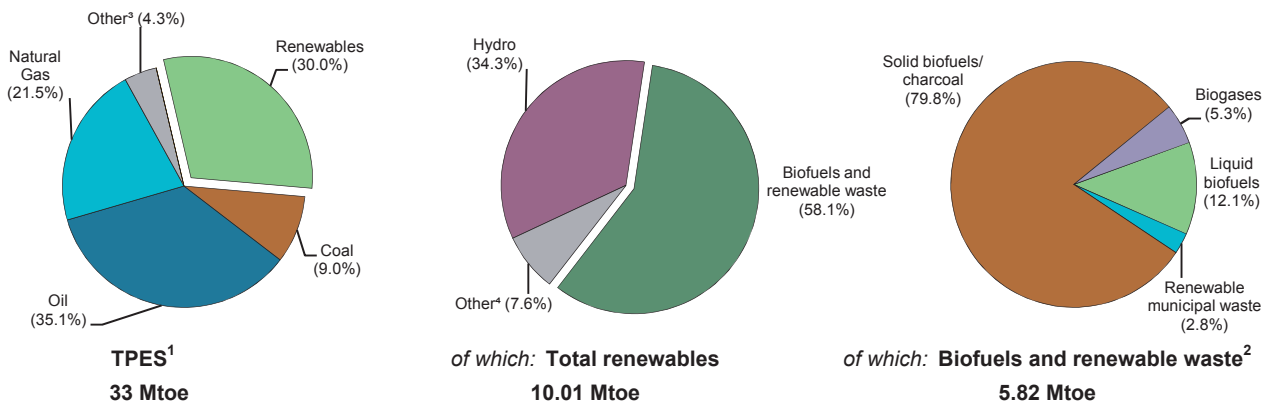
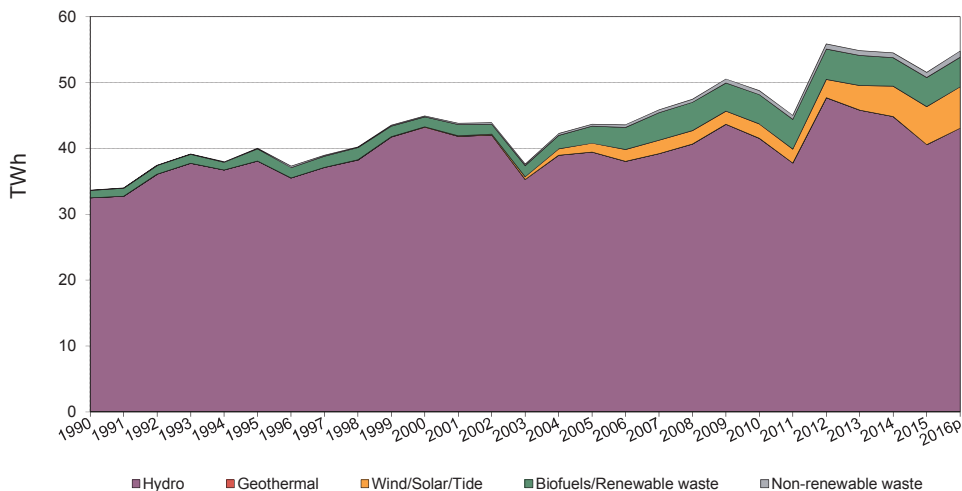


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	24.88	28.61	33.82	33.25	32.01	32.79	33.30	1.0
<i>of which: Renewables (Mtoe)</i> ¹	5.04	6.57	9.11	9.95	9.60	9.65	10.01	2.7
<i>Renewables/TPES(%)</i>	20.3	23.0	26.9	29.9	30.0	29.4	30.0	1.7
GDP (billion 2010 US dollars)	259.41	336.02	390.21	404.66	407.27	411.20	417.28	1.4
TPES/GDP ²	0.10	0.09	0.09	0.08	0.08	0.08	0.08	-0.4
TPES/GDP (year 2010 = 100)	111	98	100	95	91	92	92	-0.4
Population (millions)	7.68	8.01	8.36	8.48	8.54	8.63	8.74	0.5
TPES/population (toe per capita)	3.24	3.57	4.05	3.92	3.75	3.80	3.81	0.4
Electricity generation (TWh) ³	49.3	59.9	67.9	64.6	61.6	61.8	65.3	0.5
<i>of which: Renewables (TWh)</i> ^{1,3}	32.64	43.44	44.98	50.37	49.94	47.24	50.70	1.0
<i>Renew./Total Elec.(%)</i> ^{1,4}	66.2	72.5	66.2	78.0	81.1	76.5	77.7	0.4
Road energy consumption (Mtoe)	4.4	5.9	7.6	7.7	7.6	7.8	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	0.01	0.02	0.49	0.49	0.59	0.64	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	0.1	0.3	6.5	6.4	7.7	8.2	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	11392	12555	16557	17761	18301	19016	2.8
Hydro	10947	11613	12706	13149	13293	13351	0.9
<i>Hydro <1MW</i>	-	265	357	401	408	353	1.9
<i>Hydro 1-10MW</i>	-	542	762	808	902	927	3.6
<i>Hydro 10+MW</i>	-	6869	6794	6829	6772	6840	-0.0
<i>Mixed plants</i>	3919	3937	4793	5111	5211	5231	1.9
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	1	1	1	1	-
Solar photovoltaic	-	5	154	626	785	937	41.7
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	50	981	1645	2110	2489	29.8
Industrial waste	39	71	302	369	436	480	13.6
Municipal waste	6	12	479	483	524	570	29.4
Solid biofuels	400	780	1589	1289	959	993	1.6
Biogases	-	24	330	194	192	194	14.9
Liquid biofuels	-	-	15	5	1	1	-
Solar collectors surface (1000 m ²)	461	2202	4441	5058	5059	5059	5.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	323	1541	3109	3541	3541	3541	5.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	33.76	40.86	33.63	35.25	34.00	30.95	x
Hydro	33.90	42.48	37.34	39.77	38.50	34.71	37.57
<i>of which: <1MW</i>	-	40.89	51.94	56.17	56.28	56.30	54.33
<i>of which: 1-10MW</i>	-	62.21	50.12	53.88	53.33	45.47	50.95
<i>of which: 10+MW</i>	-	62.01	56.11	60.61	58.64	52.78	57.13
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	15.96	3.49	4.38	0.70	5.66
Solar photovoltaic	-	7.37	6.58	10.62	11.42	11.42	10.07
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	15.24	24.02	21.88	20.81	22.20	21.34
Industrial waste	11.16	10.94	11.51	11.43	7.51	8.36	11.37
Municipal waste	50.48	86.51	12.31	14.36	15.16	14.38	14.23
Solid biofuels	31.84	21.00	25.66	32.79	40.95	40.20	33.02
Biogases	-	29.01	22.35	37.09	36.76	36.72	29.82
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	23.13	0.60	1.53	1.61	2.63

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	33687	44946	48782	54849	54510	51559	54789	1.2
Hydro	32507	43219	41558	45805	44836	40592	43070	-0.0
<i>of which: pumped storage</i>	998	1383	3195	3762	3826	3536	3140	5.3
Geothermal	-	-	1	-	-	-	-	-
Solar photovoltaic	-	3	89	582	785	937	1037	44.1
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	67	2064	3153	3846	4840	5241	31.3
Industrial waste	38	69	304	370	288	351	557	13.9
Municipal waste renew.	10	32	214	255	244	289	243	13.5
Municipal waste non-renew.	16	59	303	352	452	429	391	12.5
Solid biofuels	1116	1436	3572	3702	3441	3497	3611	5.9
Biogases	-	61	647	630	618	624	639	15.8
Liquid biofuels	-	-	30	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	33040	43784	45942	51839	51809	48845	..	-
Hydro	32507	43219	41558	45805	44836	40592	..	-
<i>of which: pumped storage</i>	998	1383	3195	3762	3826	3536	..	-
Geothermal	-	-	1	-	-	-	-	-
Solar photovoltaic	-	3	89	582	785	937	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	67	2064	3153	3846	4840	..	-
Industrial waste	-	41	76	105	76	76	..	-
Municipal waste renew.	-	17	155	219	199	239	..	-
Municipal waste non-renew.	-	28	207	296	394	349	..	-
Solid biofuels	533	363	1187	1109	1109	1232	..	-
Biogases	-	46	595	570	564	580	..	-
Liquid biofuels	-	-	10	-	-	-	-	-
CHP plants	647	1162	2840	3010	2701	2714	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	38	28	228	265	212	275	..	-
Municipal waste renew.	10	15	59	36	45	50	..	-
Municipal waste non-renew.	16	31	96	56	58	80	..	-
Solid biofuels	583	1073	2385	2593	2332	2265	..	-
Biogases	-	15	52	60	54	44	..	-
Liquid biofuels	-	-	20	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	3939	10204	41672	44866	41595	43879	46364	9.9
Geothermal	-	416	538	593	519	578	504	1.2
Solar thermal	-	-	43	57	69	69	70	-
Industrial waste	749	642	1448	2770	2168	2277	2921	9.9
Municipal waste renew.	679	1048	2034	1949	2557	2381	2371	5.2
Municipal waste non-renew.	1107	1723	3266	3038	2990	3800	3834	5.1
Solid biofuels	1404	6375	33865	36183	33063	34606	36440	11.5
Biogases	-	-	307	265	209	145	224	-
Liquid biofuels	-	-	171	11	20	23	-	-
<i>of which:</i>								
CHP plants	2094	3166	21873	22103	20081	21804	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	749	642	1093	2649	2051	2148	..	-
Municipal waste renew.	511	606	1474	1348	1948	1811	..	-
Municipal waste non-renew.	834	989	2352	2057	1997	2871	..	-
Solid biofuels	-	929	16548	15863	13946	14897	..	-
Biogases	-	-	235	186	139	77	..	-
Liquid biofuels	-	-	171	-	-	-	-	-
Heat only plants	1845	7038	19799	22763	21514	22075	..	-
Geothermal	-	416	538	593	519	578	..	-
Solar thermal	-	-	43	57	69	69	..	-
Industrial waste	-	-	355	121	117	129	..	-
Municipal waste renew.	168	442	560	601	609	570	..	-
Municipal waste non-renew.	273	734	914	981	993	929	..	-
Solid biofuels	1404	5446	17317	20320	19117	19709	..	-
Biogases	-	-	72	79	70	68	..	-
Liquid biofuels	-	-	-	11	20	23	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	3187	416	-	81	35	185	445	182
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	3187	416	-	81	35	185	445	182
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-3146	-416	-	-81	-	-	-18	-47
Autoproducer electricity plants	-41	-	-	-	-	-	-16	-56
Main activity CHP plants	-	-	-	-	-	-	-68	-29
Autoproducer CHP plants	-	-	-	-	-	-	-35	-31
Main heat plants	-	-	-	-	-25	-2	-	-19
Autoproducer heat plants	-	-	-	-	-3	-	-4	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-45	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	7	183	260	-
Industry	-	-	-	-	-	-	259	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	43	-
Non-ferrous metals	-	-	-	-	-	-	4	-
Non-metallurgical minerals	-	-	-	-	-	-	172	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	4	-
Wood and wood products	-	-	-	-	-	-	36	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	7	183	1	-
Residential	-	-	-	-	-	138	-	-
Commercial and public services	-	-	-	-	7	43	1	-
Agriculture/forestry	-	-	-	-	-	3	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	37056	4840	-	937	-	-	351	289
<i>Electricity plants</i>	37056	4840	-	937	-	-	76	239
<i>CHP plants</i>	-	-	-	-	-	-	275	50
Heat generated - TJ	-	-	-	-	578	69	2277	2381
<i>CHP plants</i>	-	-	-	-	-	-	2148	1811
<i>Heat plants</i>	-	-	-	-	578	69	129	570

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
280	4473	-	300	140	304	1	10029	83.9%
-	410	11	-	37	491	-	949	3.2%
-	-249	-1	-	-117	-175	-	-542	5.8%
-	-62	-	-	-	4	-	-58	x
280	4573	10	300	60	623	1	10378	31.7%
-	-	-	-	-	-	-	-	-
-75	-205	-	-237	-	-	-	-4225	x
-78	-187	-	-8	-	-	-	-386	x
-47	-420	-	-4	-	-	-	-568	x
-49	-289	-	-4	-	-	-	-408	x
-31	-565	-	-2	-	-	-1	-645	x
-	-1	-	-	-	-	-	-8	x
-	-3	1	-	-	-	-	-2	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-45	x
-	-	-	-	-	-	-	-	-
-	2901	11	46	60	623	-	4091	15.2%
-	1076	-	35	-	20	-	1390	18.6%
-	-	-	1	-	-	-	1	0.1%
-	51	-	7	-	-	-	101	10.1%
-	1	-	-	-	-	-	5	2.4%
-	108	-	1	-	-	-	281	32.0%
-	1	-	-	-	-	-	1	0.8%
-	21	-	1	-	-	-	22	3.6%
-	1	-	-	-	-	-	1	0.7%
-	9	-	7	-	-	-	16	2.5%
-	585	-	17	-	-	-	606	37.3%
-	252	-	-	-	-	-	288	50.9%
-	21	-	-	-	20	-	41	8.5%
-	1	-	-	-	-	-	1	1.3%
-	26	-	-	-	-	-	26	10.8%
-	-	-	1	60	586	-	647	7.7%
-	-	-	-	60	583	-	643	8.2%
-	-	-	-	-	3	-	3	0.5%
-	1825	11	10	-	17	-	2054	22.2%
-	1573	6	2	-	-	-	1719	28.7%
-	62	4	8	-	2	-	127	4.7%
-	191	-	-	-	15	-	209	38.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
429	3497	-	624	-	-	-	48023	77.8%
349	1232	-	580	-	-	-	45309	85.9%
80	2265	-	44	-	-	-	2714	30.2%
3800	34606	-	145	-	-	23	43879	52.3%
2871	14897	-	77	-	-	-	21804	43.8%
929	19709	-	68	-	-	23	22075	64.8%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	151	1037	1446	1527	1320	1459	1319	2.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	151	1037	1446	1527	1320	1459	1319	2.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	831	1125	1198	1053	1158	..	2.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	151	206	321	329	267	301	..	2.6
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	151	206	321	329	267	301	..	2.6
Solar thermal (TJ)								
Production	621	2611	6903	7447	7636	7742	7825	7.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	621	2611	6903	7447	7636	7742	7825	7.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	48	63	77	77	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	621	2611	6855	7384	7559	7665	..	7.4
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	621	2611	6855	7384	7559	7665	..	7.4
Industrial waste (TJ)								
Production	6576	7630	20872	17915	17651	18655	23637	6.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	6576	7630	20872	17915	17651	18655	23637	6.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	2542	1455	5910	6664	5473	5908	..	9.8
Energy industry own use	-	-	2326	1795	2007	1865	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	4034	6175	12636	9456	10171	10882	..	3.8
<i>Industry</i>	2924	5614	12577	9432	10149	10858	..	4.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1110	561	59	24	22	24	..	-19.0
Municipal waste - renewables (TJ)								
Production	917	1765	5759	6367	7324	7627	6714	10.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	917	1765	5759	6367	7324	7627	6714	10.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	917	1765	5759	6367	7324	7627	..	10.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	1497	2879	8622	9355	11381	11719	10841	9.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1497	2879	8622	9355	11381	11719	10841	9.8
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	1497	2879	8622	9355	11381	11719	..	9.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	93544	118395	185058	197518	176970	187295	192669	3.1
Net imports ¹	2325	-1746	6773	10848	9321	6764	3710	-
Stock changes	-545	-	-	-2769	-3686	-2578	-2410	-
Gross consumption	95324	116649	191831	205597	182605	191481	193969	3.4
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	8446	20199	67105	70992	65791	69999	..	8.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	86878	96450	124726	134605	116814	121482	..	1.6
<i>Industry</i>	22631	29009	50511	51396	47208	45057	..	3.0
<i>Transport</i>	1	-	-	-	-	-	..	-
<i>Other</i>	64246	67441	74215	83209	69606	76425	..	0.8
Charcoal (kt)								
Production	-	-	1	1	1	1	1	-
Net imports ¹	7	10	11	11	11	14	11	2.3
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	7	10	12	12	12	15	12	2.7
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	7	10	12	12	12	15	..	2.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	7	10	12	12	12	15	..	2.7
Biogases (TJ)								
Production	-	1275	6418	8442	12418	12563	12926	16.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1275	6418	8442	12418	12563	12926	16.5
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	771	5750	6549	10397	10637	..	19.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	504	668	1893	2021	1926	..	9.3
<i>Industry</i>	-	504	638	1755	1619	1483	..	7.5
<i>Transport</i>	-	-	1	6	34	35	..	-
<i>Other</i>	-	-	29	132	368	408	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	82	100	207	210	212	-
Net imports ¹	-	-	22	-13	-122	-120	-128	-
Stock changes	-	-	3	2	4	-	-1	-
Gross consumption	-	-	107	89	89	90	83	-
Statistical differences	-	-	-	1	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	107	90	88	90	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	107	90	88	90	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	7	20	277	175	262	343	445	20.9
Net imports ¹	-	-	238	342	373	356	295	-
Stock changes	-	-	4	5	-3	4	-6	-
Gross consumption	7	20	519	522	632	703	734	26.8
Statistical differences	1	-	-	-1	1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	8	20	519	521	633	703	..	26.8
<i>Industry</i>	-	-	21	21	22	23	..	-
<i>Transport</i>	7	18	477	481	592	661	..	27.2
<i>Other</i>	1	2	21	19	19	19	..	16.2
Other liquid biofuels (kt)								
Production	-	-	15	-	1	1	1	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	15	-	1	1	1	-
Statistical differences	-	-	1	-	-	-	..	-
Transformation processes	-	-	16	-	1	1	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

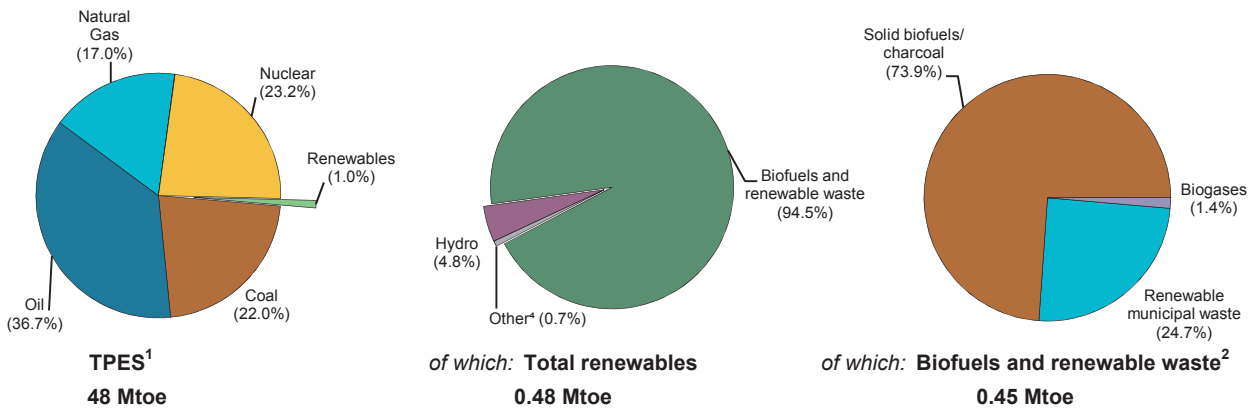


Figure 2. Contribution of renewables in 2016 provisional

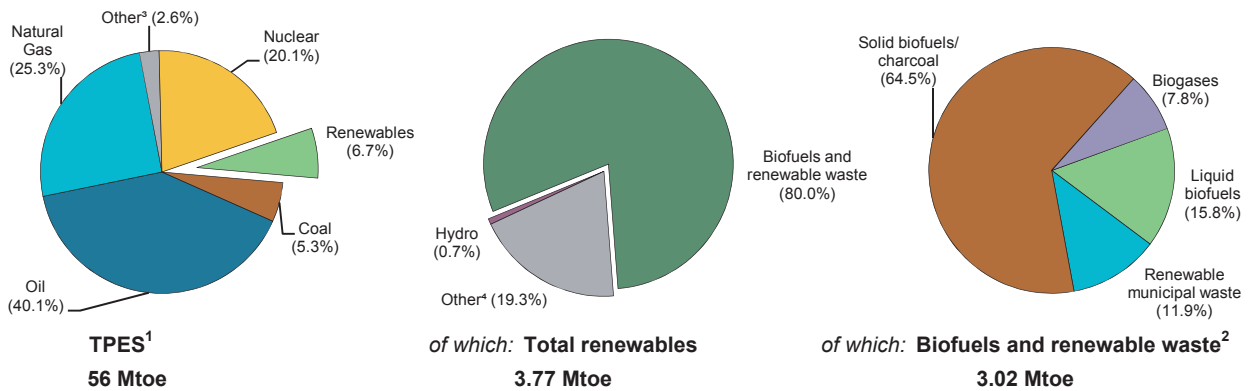
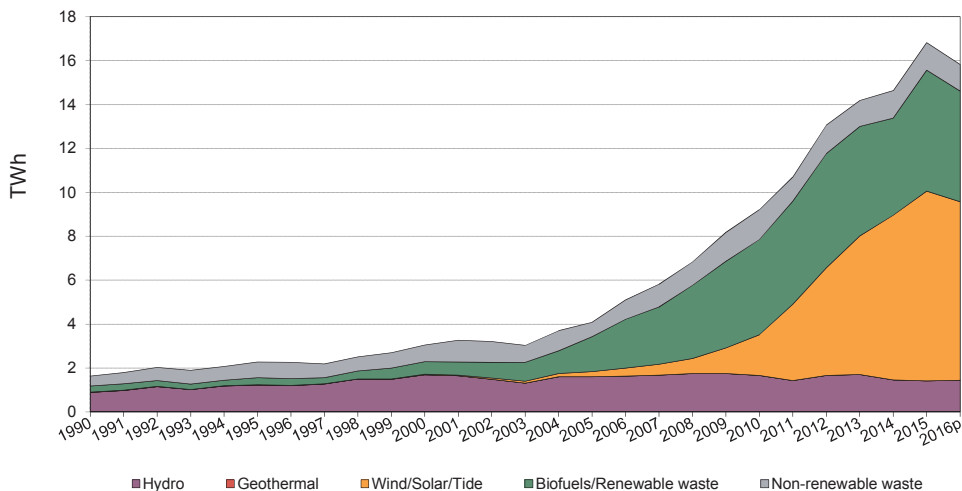


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	47.94	58.09	60.11	55.86	52.95	53.27	56.47	-0.2
<i>of which: Renewables (Mtoe)</i> ¹	0.48	0.64	2.83	3.50	3.40	3.63	3.77	11.7
<i>Renewables/TPES(%)</i>	1.0	1.1	4.7	6.3	6.4	6.8	6.7	11.9
GDP (billion 2010 US dollars)	330.54	412.51	483.55	492.60	500.71	508.10	514.17	1.4
TPES/GDP ²	0.15	0.14	0.12	0.11	0.11	0.10	0.11	-1.5
TPES/GDP (year 2010 = 100)	117	113	100	91	85	84	88	-1.5
Population (millions)	9.97	10.25	10.88	11.11	11.16	11.21	11.27	0.6
TPES/population (toe per capita)	4.81	5.67	5.52	5.03	4.75	4.75	5.01	-0.8
Electricity generation (TWh) ³	70.3	82.8	93.8	82.2	71.5	69.5	82.0	-0.1
<i>of which: Renewables (TWh)</i> ^{1,3}	0.56	1.04	6.49	11.68	12.21	14.47	13.50	17.3
<i>Renew./Total Elec.(%)</i> ^{1,4}	0.8	1.3	6.9	14.2	17.1	20.8	16.5	17.4
Road energy consumption (Mtoe)	6.5	7.7	8.5	8.0	8.2	8.6	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.37	0.35	0.42	0.26	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	4.3	4.4	5.1	3.0	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	1605 e	1730 e	4482	7295	7498	7860	10.6
Hydro	1401	1413	1425	1429	1431	1422	0.0
<i>Hydro <1MW</i>	6	6	9	9	11	11	4.1
<i>Hydro 1-10MW</i>	49	54	54	55	55	55	0.1
<i>Hydro 10+MW</i>	39	43	55	55	55	46	0.5
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	1307	1310	1307	1310	1310	1310	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	904	2922	3027	3122	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	5	14	912	1780	1944	2176	40.0
Industrial waste	120 e	139	111	76	74	71	-4.4
Municipal waste	52 e	97	253	247	247	248	6.5
Solid biofuels	26 e	47	640	640	553	588	18.3
Biogases	1 e	20 e	115	151	172	183	15.9
Liquid biofuels	-	-	122	50	50	50	-
Solar collectors surface (1000 m ²)	34	41	371	570	615	661	20.4
<i>Cap. of solar collectors (MW_{th})</i> ⁶	24	29	260	399	431	463	20.3

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	11.57 e	20.13 e	23.46	22.19	22.28	24.43	x
Hydro	7.31	13.73	13.36	13.61	11.66	11.39	12.26
<i>of which: <1MW</i>	-	36.15	28.37	32.88	24.38	27.65	26.79
<i>of which: 1-10MW</i>	-	49.89	34.35	43.06	35.04	32.92	34.15
<i>of which: 10+MW</i>	-	54.42	26.30	30.49	20.73	33.03	26.16
<i>of which: pure pumped storage²</i>	5.51	10.80	11.85	11.53	10.19	9.59	10.68
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	7.08	10.33	10.87	11.21	10.30
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	15.98	13.05	16.18	23.51	27.10	29.24	25.49
Industrial waste	21.97 e	31.62	52.43	65.26	63.34	66.66	59.74
Municipal waste	76.84 e	81.09	65.00	68.27	77.30	78.61	72.78
Solid biofuels	59.27 e	39.83	51.79	59.85	54.32	69.00	59.22
Biogases	79.91 e	55.94 e	56.31	58.50	57.86	59.54	55.26
Biodiesels	-	-	-	15.08	11.29	14.13	16.54
Other liquid biofuels	-	-	25.14	33.04	23.30	34.14	31.55

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	1627	3051	9209	14181	14633	16820	15830	10.8
Hydro	897	1699	1668	1704	1462	1418	1447	-1.0
<i>of which: pumped storage</i>	631	1239	1356	1324	1170	1100	1119	-0.6
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	560	2644	2883	3065	2940	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	7	16	1292	3665	4615	5574	5187	43.5
Industrial waste	231	385	509	434	410	415	423	0.6
Municipal waste renew.	140	306	591	729	833	869	515	3.3
Municipal waste non-renew.	210	383	850	748	840	839	788	4.6
Solid biofuels	135	164	2904	3356	2631	3554	3552	21.2
Biogases	7	98	566	775	871	955	933	15.1
Liquid biofuels	-	-	269	126	88	131	45	-
of which:								
Electricity only plants	1627	2533	7458	11124	11392	13408	..	-
Hydro	897	1699	1668	1704	1462	1418	..	-
<i>of which: pumped storage</i>	631	1239	1356	1324	1170	1100	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	560	2644	2883	3065	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	7	16	1292	3665	4615	5574	..	-
Industrial waste	231	72	417	-	-	-	-	-
Municipal waste renew.	140	290	581	269	368	396	..	-
Municipal waste non-renew.	210	367	839	477	546	569	..	-
Solid biofuels	135	11	1900	2218	1388	2298	..	-
Biogases	7	78	149	109	130	88	..	-
Liquid biofuels	-	-	52	38	-	-	-	-
CHP plants	-	518	1751	3057	3241	3412	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	313	92	434	410	415	..	-
Municipal waste renew.	-	16	10	460	465	473	..	-
Municipal waste non-renew.	-	16	11	271	294	270	..	-
Solid biofuels	-	153	1004	1138	1243	1256	..	-
Biogases	-	20	417	666	741	867	..	-
Liquid biofuels	-	-	217	88	88	131	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	411	885	3612	3553	4030	3680	3680	9.3
Geothermal	43	53	90	68	60	63	63	1.1
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	68	97	329	519	638	467	467	10.3
Municipal waste renew.	120 e	347	1223	1155	1366	1219	1219	8.2
Municipal waste non-renew.	180 e	347	1336	1147	1213	1179	1179	7.9
Solid biofuels	-	-	292	304	311	246	246	-
Biogases	-	41	273	218	317	388	388	15.1
Liquid biofuels	-	-	69	142	125	118	118	-
<i>of which:</i>								
CHP plants	-	389	3522	3192	3679	3617	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	78	329	519	638	467	..	-
Municipal waste renew.	-	135	1223	1015	1227	1219	..	-
Municipal waste non-renew.	-	135	1336	994	1061	1179	..	-
Solid biofuels	-	-	292	304	311	246	..	-
Biogases	-	41	273	218	317	388	..	-
Liquid biofuels	-	-	69	142	125	118	..	-
Heat only plants	411	496	90	361	351	63	..	-
Geothermal	43	53	90	68	60	63	..	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	68	19	-	-	-	-	-	-
Municipal waste renew.	120 e	212	-	140	139	-	-	-
Municipal waste non-renew.	180 e	212	-	153	152	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	27	479	-	264	3	22	322	373
Imports	-	-	-	-	-	-	-	2
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	27	479	-	264	3	22	322	375
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-27	-477	-	-	-	-	-	-155
Autoproducer electricity plants	-	-3	-	-263	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-117	-205
Autoproducer CHP plants	-	-	-	-	-	-	-31	-10
Main heat plants	-	-	-	-	-3	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-30	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	22	144	5
Industry	-	-	-	-	-	-	144	5
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	8	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	119	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	16	5
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	22	-	-
Residential	-	-	-	-	-	21	-	-
Commercial and public services	-	-	-	-	-	1	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	318	5574	-	3065	-	-	415	869
<i>Electricity plants</i>	318	5574	-	3065	-	-	-	396
<i>CHP plants</i>	-	-	-	-	-	-	415	473
Heat generated - TJ	-	-	-	-	63	-	467	1219
<i>CHP plants</i>	-	-	-	-	-	-	467	1219
<i>Heat plants</i>	-	-	-	-	63	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
353	1171	-	227	163	223	5	3632	34.0%
2	771	6	-	..	..	18	799	1.0%
-	-	-	-	-122	-	-	-122	0.4%
-	-	-	-	-	-	-	-	-
355	1942	6	227	41	223	23	4309	8.1%
-	-	-	-	-	1	1	2	x
-221	-529	-	-15	-	-	-	-1424	x
-	-	-	-9	-	-	-	-275	x
-134	-55	-	-40	-	-	-22	-573	x
-	-173	-	-71	-	-1	-1	-287	x
-	-	-	-	-	-	-	-3	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-30	x
-	-	-	-	-	-	-	-	-
-	1184	6	93	41	223	2	1720	4.1%
-	637	-	25	-	1	1	813	7.5%
-	-	-	-	-	-	-	-	-
-	1	-	5	-	1	-	15	0.4%
-	-	-	-	-	-	-	-	-
-	118	-	-	-	-	-	237	17.2%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	1	2	1.1%
-	-	-	-	-	-	-	-	-
-	56	-	17	-	-	-	73	5.0%
-	273	-	3	-	-	-	297	41.6%
-	165	-	-	-	-	-	165	72.9%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	22	-	2	-	-	-	24	4.3%
-	-	-	-	41	221	-	262	2.9%
-	-	-	-	41	221	-	262	3.1%
-	-	-	-	-	-	-	-	-
-	547	6	67	-	2	1	645	4.8%
-	519	6	-	-	-	-	546	6.7%
-	17	1	29	-	-	1	49	1.1%
-	11	-	38	-	2	-	51	7.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
839	3554	-	955	-	14	117	15720	22.6%
569	2298	-	88	-	-	-	12308	22.5%
270	1256	-	867	-	14	117	3412	22.9%
1179	246	-	388	-	-	118	3680	9.7%
1179	246	-	388	-	-	118	3617	9.6%
-	-	-	-	-	-	-	63	56.3%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	89	133	180	140	129	135	135	0.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	89	133	180	140	129	135	135	0.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	86	106	176	136	120	126	..	1.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	3	27	4	4	9	9	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	35	43	507	779	857	926	1020	22.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	35	43	507	779	857	926	1020	22.7
Statistical differences	-	-	-	-	-	-1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	35	43	507	779	857	925	..	22.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	35	43	507	779	857	925	..	22.7
Industrial waste (TJ)								
Production	5499	10911	13827	13607	13526	13479	13906	1.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	5499	10911	13827	13607	13526	13479	13906	1.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	3314 e	5705 e	8110	5581	6121	6221	..	0.6
Energy industry own use	-	-	-	1031	696	1242	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	2185	5206	5717	6995	6709	6016	..	1.0
<i>Industry</i>	2185	5206	5717	6995	6709	6016	..	1.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	4706 e	5896	13792	13816	15238	15625	15001	6.7
Net imports ¹	-	-	-	-	-	83	..	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	4706 e	5896	13792	13816	15238	15708	15001	6.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	4706 e	5896	13792	13545	15000	15488	..	6.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	271	238	220	..	-
<i>Industry</i>	-	-	-	271	238	220	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	7058 e	7633	17080	15013	14895	14769	14843	4.5
Net imports ¹	-	-	-	-	-	90	..	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	7058 e	7633	17080	15013	14895	14859	14843	4.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	7058 e	7633	17080	15013	14895	14859	..	4.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	14064	13347	50250	58134	46226	49036	48913	9.1
Net imports ¹	-	4373	21706	25663	24502	32276	32276	14.3
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	14064	17720	71956	83797	70728	81312	81189	10.7
Statistical differences	-	-	-	-	-	-16	..	-
Transformation processes	608	766	26137	30737	23516	31708	..	28.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	13456 e	16954	45819	53060	47212	49588	..	7.4
<i>Industry</i>	5696 e	10593	23625	26418	27216	26672	..	6.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	7760	6361	22194	26642	19996	22916	..	8.9
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	9	9	9	9	9	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	9	9	9	9	9	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	9	9	9	9	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	9	9	9	9	..	-
Biogases (TJ)								
Production	269	1207	5336	7913	8672	9492	9908	14.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	269	1207	5336	7913	8672	9492	9908	14.7
Statistical differences	-	-	-	-1	-	-	..	-
Transformation processes	146	1080	4126	4593	5201	5608	..	11.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	123	127	1210	3319	3471	3884	..	25.6
<i>Industry</i>	123	99	522	975	899	1065	..	17.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	28	688	2344	2572	2819	..	36.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	83	246	252	237	233	-
Net imports ¹	-	-	7	-167	-195	-178	-170	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	90	79	57	59	63	-
Statistical differences	-	-	-7	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	83	79	57	59	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	83	79	57	59	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	343	300	446	248	235	-
Net imports ¹	-	-	19	32	-20	..	218	..
Stock changes	-	-	-7	5	-	-	-	-
Gross consumption	-	-	355	337	426	248	453	-
Statistical differences	-	-	-12	-5	-2	1	..	-
Transformation processes	-	-	-	2	1	1	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	343	330	423	248	..	-
<i>Industry</i>	-	-	-	-	-	1	..	-
<i>Transport</i>	-	-	343	328	422	245	..	-
<i>Other</i>	-	-	-	2	1	2	..	-
Other liquid biofuels (kt)								
Production	-	-	48	25	2	6	7	-
Net imports ¹	-	-	28	1	15	20	20	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	76	26	17	26	27	-
Statistical differences	-	-	-	-1	-1	1	..	-
Transformation processes	-	-	55	24	15	25	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	21	1	1	2	..	-
<i>Industry</i>	-	-	13	1	1	1	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	8	-	-	1	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

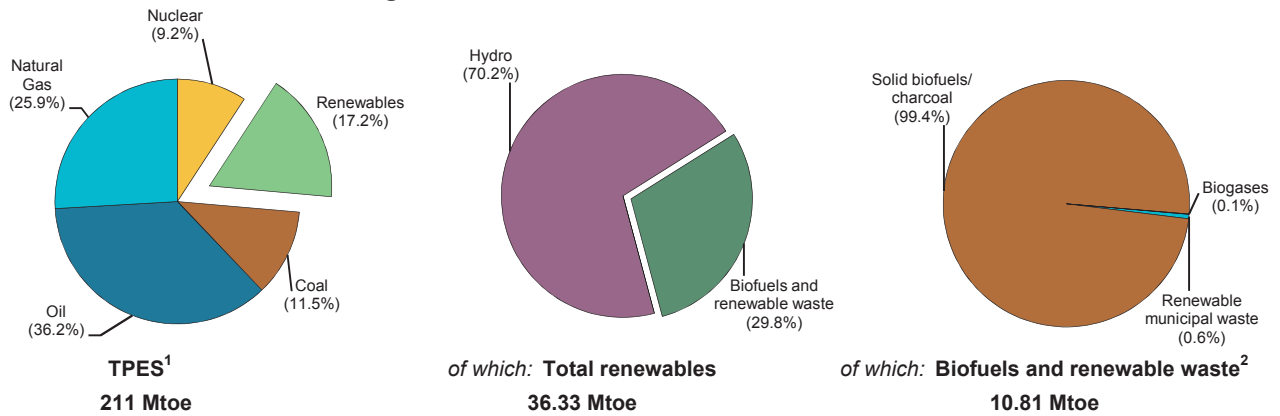


Figure 2. Contribution of renewables in 2016 provisional

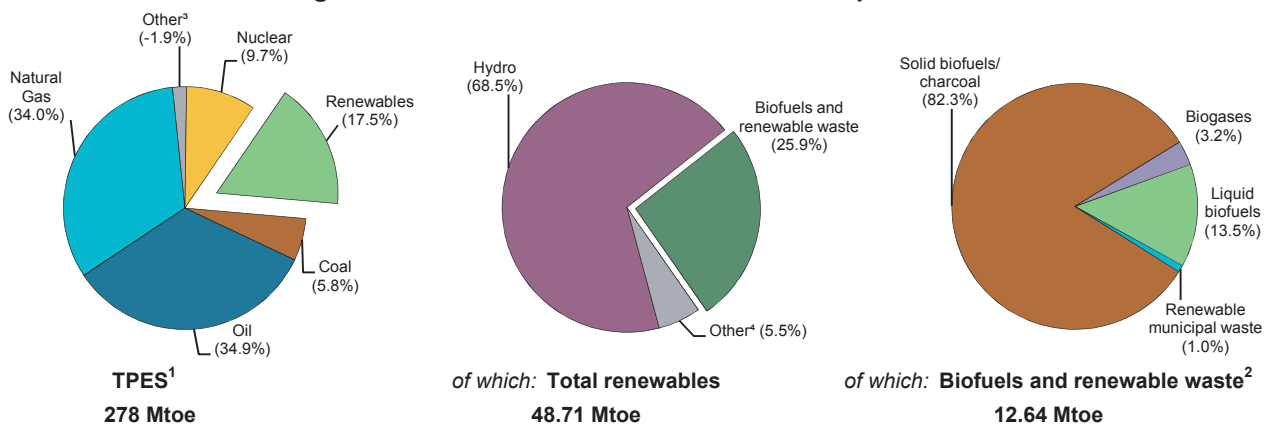
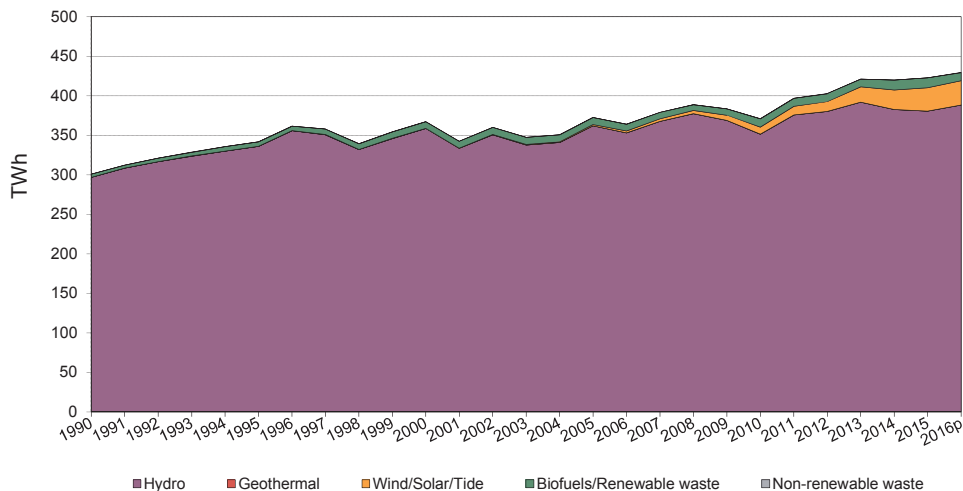


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	211.29	253.62	265.25	270.83	278.82	270.19	278.26	0.6
of which: Renewables (Mtoe) ¹	36.33	44.58	44.01	49.44	49.05	48.90	48.71	0.6
Renewables/TPES(%)	17.2	17.6	16.6	18.3	17.6	18.1	17.5	-0.0
GDP (billion 2010 US dollars)	1014.07	1342.74	1613.46	1735.10	1779.61	1796.37	1822.73	1.9
TPES/GDP ²	0.21	0.19	0.16	0.16	0.16	0.15	0.15	-1.3
TPES/GDP (year 2010 = 100)	127	115	100	95	95	91	93	-1.3
Population (millions)	27.69	30.69	34.01	35.16	35.54	35.85	36.20	1.0
TPES/population (toe per capita)	7.63	8.27	7.80	7.70	7.84	7.54	7.69	-0.5
Electricity generation (TWh) ³	482.0	605.6	603.9	665.2	668.0	670.7	653.1	0.5
of which: Renewables (TWh) ^{1,3}	300.69	366.99	370.75	421.09	419.68	422.64	429.26	1.0
Renew./Total Elec.(%) ^{1,4}	62.4	60.6	61.4	63.3	62.8	63.0	65.7	0.5
Road energy consumption (Mtoe)	33.1	39.3	48.2	49.6	49.2	49.1	..	..
of which: Liquid biofuels (Mtoe)	-	0.13	1.17	1.83	1.87	1.78	..	..
Liq. biofuels/road tr.(%) ⁵	-	0.3	2.4	3.7	3.8	3.6	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	60335	68871	81010	86202	89157	95258	2.2
Hydro	59381	67407 e	75078	75537	75537	79420	1.1
Hydro <1MW	-	-	27	27	27	30	-
Hydro 1-10MW	-	-	974	1086	1086	1056	-
Hydro 10+MW	-	-	73900	74250	74250	78160	-
Mixed plants	-	-	-	-	-	-	-
Pure pumped storage	186	177 e	177	174	174	174	-0.1
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	7	221	1210	1843	2517	48.0
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	20	20 e	20	20	20	20	-
Wind	1	92 e	3967	7801	9694	11214	37.7
Industrial waste	-	-	-	-	-	-	-
Municipal waste	14	14	35	77	77	77	12.0
Solid biofuels	914 e	1227 e	1553	1441	1870	1894	2.9
Biogases	5 e	104 e	136	116	116	116	0.7
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	1026	1250	1250	1365	-
Cap. of solar collectors (MW _{th}) ⁶	-	-	718	875	875	956	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	56.92	60.86	52.27	55.79	53.76	50.67	x
Hydro	57.07	60.73 e	53.44	59.22	57.82	54.72	57.20
of which: <1MW	-	-	-	-	-	-	-
of which: 1-10MW	-	-	-	-	-	-	-
of which: 10+MW	-	-	54.27	60.23	58.80	55.59	58.15
of which: pure pumped storage ²	6.81	7.16 e	7.16	7.28	7.28	7.28	7.26
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	26.09 e	13.13	14.14	13.13	13.13	13.33
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	14.84	18.26 e	15.96	8.55	8.93	7.39	11.11
Wind	-	32.76 e	25.10	26.29	26.54	26.92	24.53
Industrial waste	-	-	-	-	-	-	-
Municipal waste	94.93	124.28	69.07	36.37	39.30	39.30	43.58
Solid biofuels	47.82 e	68.52 e	69.55	69.55	69.55	69.55	69.55
Biogases	52.51 e	77.71 e	66.59	90.77	95.69	95.69	90.26
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	300843	367158	370933	421284	419885	422847	429448	1.0
Hydro	296848	358620	351461	391861	382581	380717	388200	0.5
<i>of which: pumped storage</i>	111	111	111	111	111	111	111	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	16	254	1499	2120	2895	3060	38.9
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	26	32	28	15	16	13	13	-5.5
Wind	-	264	8724	17963	22538	26446	27760	33.8
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	76	99	138	159	172	172	140	2.2
Municipal waste non-renew.	41	54	74	86	93	93	76	2.2
Solid biofuels	3829	7365	9462	8779	11393	11539	9407	1.5
Biogases	23	708	792	922	972	972	792	0.7
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	300726	367041	370764	421031	419632	422594	..	-
Hydro	296848	358620	351461	391861	382581	380717	..	-
<i>of which: pumped storage</i>	111	111	111	111	111	111	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	16	254	1499	2120	2895	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	26	32	28	15	16	13	..	-
Wind	-	264	8724	17963	22538	26446	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	23	56	76	89	89	..	-
Municipal waste non-renew.	-	13	30	41	48	48	..	-
Solid biofuels	3829	7365	9462	8779	11393	11539	..	-
Biogases	23	708	749	797	847	847	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	117	117	169	253	253	253	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	76	76	82	83	83	83	..	-
Municipal waste non-renew.	41	41	44	45	45	45	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	43	125	125	125	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	2014	2014	4694	5156	5156	5156	5156	6.1
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	1309	1309	1373	1961	1961	1961	1961	2.6
Municipal waste non-renew.	705	705	739	1055	1055	1055	1055	2.6
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	2582	2140	2140	2140	2140	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	633	633	739	857	857	857	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	411	411	456	461	461	461	..	-
Municipal waste non-renew.	222	222	245	248	248	248	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	38	148	148	148	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	1381	1381	3955	4299	4299	4299	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	898	898	917	1500	1500	1500	..	-
Municipal waste non-renew.	483	483	494	807	807	807	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	2544	1992	1992	1992	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	32732	2274	1	249	-	42	138	119
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	32732	2274	1	249	-	42	138	119
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-30062	-2241	-1	-249	-	-	-	-31
Autoproducer electricity plants	-2671	-33	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-21
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-66
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	42	138	-
Industry	-	-	-	-	-	-	138	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	138	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	42	-	-
Residential	-	-	-	-	-	-	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	42	-	-
Electricity generated - GWh	380606	26446	13	2895	-	-	-	172
<i>Electricity plants</i>	380606	26446	13	2895	-	-	-	89
<i>CHP plants</i>	-	-	-	-	-	-	-	83
Heat generated - TJ	-	-	-	-	-	-	-	1961
<i>CHP plants</i>	-	-	-	-	-	-	-	461
<i>Heat plants</i>	-	-	-	-	-	-	-	1500

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
64	11814	-	405	869	238	-	48945	10.4%
-	120	-	-	556	298	-	974	1.1%
-	-630	-	-	-	-185	-	-815	0.3%
-	-	-	-	-	-	-	-	-
64	11304	-	405	1424	352	-	49104	18.2%
-	-	-	-	-	-	-	-	-
-17	-	-	-176	-	-	-	-32777	x
-	-2645	-	-32	-	-	-	-5381	x
-12	-	-	-17	-	-	-	-50	x
-	-	-	-19	-	-	-	-19	x
-35	-	-	-52	-	-	-	-153	x
-	-	-	-36	-	-	-	-36	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-2	-	-	-	-2	x
-	-	-	-	-	-	-	-	-
-	8659	-	72	1424	352	-	10687	5.5%
-	5657	-	56	-	-	-	5851	13.8%
-	-	-	1	-	-	-	1	0.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	138	6.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	5657	-	55	-	-	-	5712	53.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	1424	352	-	1776	2.9%
-	-	-	-	1424	352	-	1776	3.6%
-	-	-	-	-	-	-	-	-
-	3001	-	15	-	-	-	3058	4.5%
-	3001	-	-	-	-	-	3001	8.8%
-	-	-	15	-	-	-	15	0.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	42	1.5%
93	11539	-	972	-	-	-	422736	63.0%
48	11539	-	847	-	-	-	422483	64.5%
45	-	-	125	-	-	-	253	1.6%
1055	-	-	2140	-	-	-	5156	19.4%
248	-	-	148	-	-	-	857	3.8%
807	-	-	1992	-	-	-	4299	99.7%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	1539	1630	1702	1760	1760 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1539	1630	1702	1760	1760 e	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1539	1630	1702	1760	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	1539	1630	1702	1760	..	-
Industrial waste (TJ)								
Production	1563 e	3162 e	4748	5429	5606	5783	5791	4.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1563 e	3162 e	4748	5429	5606	5783	5791	4.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	1563 e	3162 e	4748	5429	5606	5783	..	4.1
<i>Industry</i>	1563 e	3162 e	4748	5429	5606	5783	..	4.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	2524 e	3231 e	3422	4808	4963	4963	5098	2.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2524 e	3231 e	3422	4808	4963	4963	5098	2.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	2524 e	3231 e	3422	4808	4963	4963	..	2.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	1359 e	1740 e	1842	2591	2695	2695	2799	3.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1359 e	1740 e	1842	2591	2695	2695	2799	3.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	1359 e	1740 e	1842	2591	2695	2695	..	3.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	450315	561335	494905	512389	507853	494722	465205	-0.8
Net imports ¹	-515	-3127	-18311	-22768	-22014	-21359	-29656	13.7
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	449800	558208	476594	489621	485839	473363	435549	-1.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	36758	70704	90833	85805	109374	110778	..	3.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	413042	487504	385761	403816	376465	362585	..	-2.0
<i>Industry</i>	236646	327669	248881	264616	250785	236905	..	-2.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	176396	159835	136880	139200	125680	125680	..	-1.6
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	276 e	7787 e	14710	16664	16977	16977	16977	5.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	276 e	7787 e	14710	16664	16977	16977	16977	5.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	276 e	7787 e	12912	13581	13894	13894	..	3.9
Energy industry own use	-	-	38	78	78	78	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1760	3005	3005	3005	..	-
<i>Industry</i>	-	-	1356	2360	2360	2360	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	404	645	645	645	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	144 e	1093	1346	1396	1357	1341	16.1
Net imports ¹	-	64 e	386	852	899	868	869	19.0
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	208 e	1479	2198	2295	2225	2210	17.1
Statistical differences	-	-	-	-	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	208	1479	2198	2294	2225	..	17.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	208	1479	2198	2294	2225	..	17.1
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	123	110	267	271	380	-
Net imports ¹	-	-	127	374	192	129	-43	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	250	484	459	400	337	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	250	484	459	400	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	250	484	459	400	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

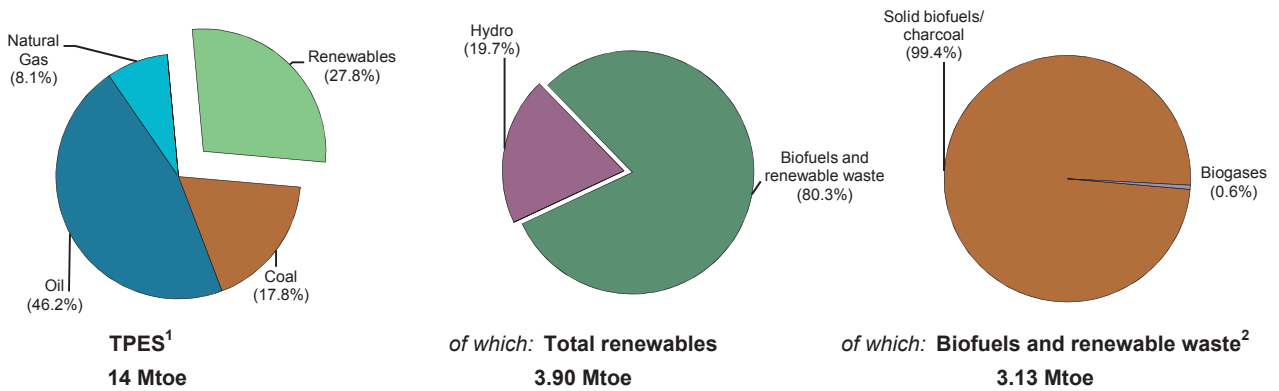


Figure 2. Contribution of renewables in 2016 provisional

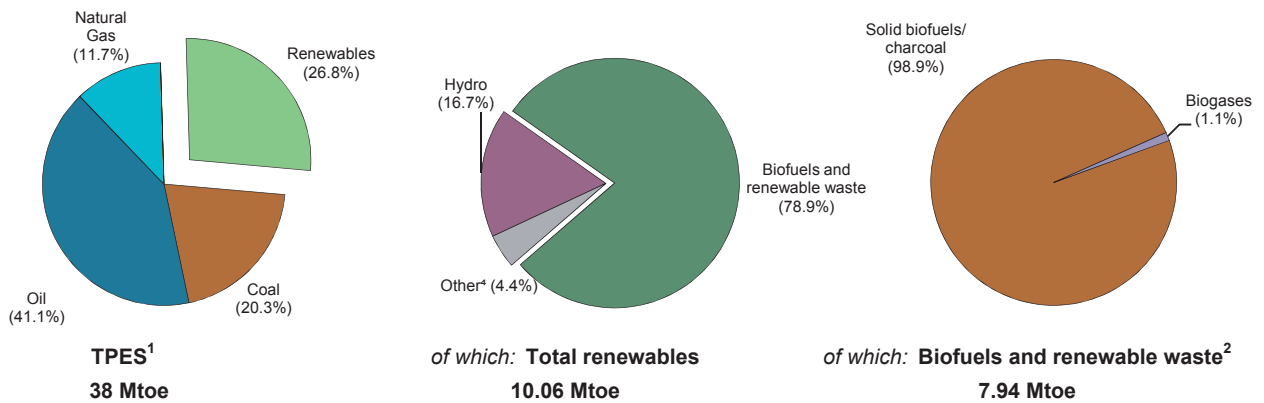
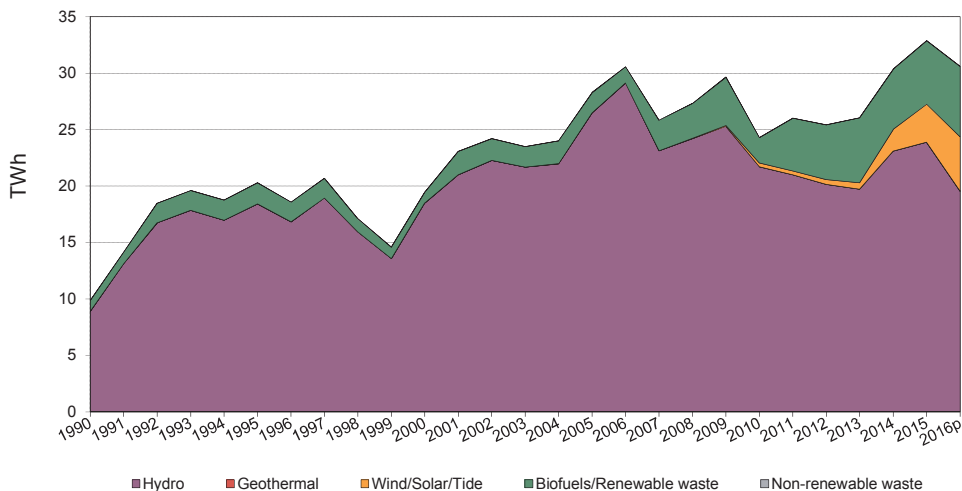


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	14.01	25.17	30.85	38.69	35.24	36.11	37.52	2.5
<i>of which: Renewables (Mtoe)</i> ¹	3.90	6.31	6.83	12.10	9.56	9.67	10.06	3.0
<i>Renewables/TPES(%)</i>	27.8	25.1	22.1	31.3	27.1	26.8	26.8	0.4
GDP (billion 2010 US dollars)	76.23	144.79	217.54	252.46	257.20	263.13	267.31	3.9
TPES/GDP ²	0.18	0.17	0.14	0.15	0.14	0.14	0.14	-1.3
TPES/GDP (year 2010 = 100)	130	123	100	108	97	97	99	-1.3
Population (millions)	13.18	15.40	17.09	17.64	17.84	18.05	18.20	1.0
TPES/population (toe per capita)	1.06	1.63	1.80	2.19	1.98	2.00	2.06	1.5
Electricity generation (TWh) ³	18.4	40.1	60.4	73.1	71.6	75.4	78.3	4.3
<i>of which: Renewables (TWh)</i> ^{1,3}	9.89	19.46	24.30	26.06	30.35	32.87	30.61	2.9
<i>Renew./Total Elec.(%)</i> ^{1,4}	53.8	48.5	40.2	35.7	42.4	43.6	39.1	-1.3
Road energy consumption (Mtoe)	2.6	5.1	6.3	7.4	7.1	7.5	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	-	-	-	-	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	-	-	-	-	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	2678	4452	6156	7677	8277	8489	4.4
Hydro	2678	4430	5467	6094	6378	6498	2.6
<i>Hydro <1MW</i>	1	1	4	9	10	15	19.8
<i>Hydro 1-10MW</i>	15	31	52	164	250	301	16.4
<i>Hydro 10+MW</i>	2662	4398	5411	5921	6118	6182	2.3
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	15	242	617	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	163	301	731	908	-
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	22	526	1240	884	417	21.7
Biogases	-	-	-	27	42	49	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	39	239	391	391	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	27	167	274	274	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	42.16	49.89	45.05	38.75	41.86	44.20	x
Hydro	38.06	47.71	45.35	36.97	41.34	41.95	39.80
<i>of which: <1MW</i>	-	1.63	44.63	36.59	12.77	12.89	24.39
<i>of which: 1-10MW</i>	-	26.30	60.57	37.22	15.81	16.31	32.22
<i>of which: 10+MW</i>	38.29	47.87	45.20	36.96	42.43	43.27	40.25
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	6.09	22.67	23.33	13.55
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	23.25	21.02	22.53	26.58	22.84
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	x	48.77	52.67	68.27	x	x
Biogases	-	-	-	16.88	10.87	2.80	10.18
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	9891	19457	24296	26060	30349	32872	30606	2.9
Hydro	8928	18516	21717	19737	23099	23881	19554	0.3
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	8	480	1261	2550	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	332	554	1443	2115	2278	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	963	941	2247	5721	5287	5603	6212	12.5
Biogases	-	-	-	40	40	12	12	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	8928	18516	22049	20299	25022	27257	..	-
Hydro	8928	18516	21717	19737	23099	23881	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	8	480	1261	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	332	554	1443	2115	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	963	941	2247	5761	5327	5615	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	963	941	2247	5721	5287	5603	..	-
Biogases	-	-	-	40	40	12	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	..
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	..
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2054	182	-	108	-	30 e	-	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2054	182	-	108	-	30	-	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-2050	-182	-	-108	-	-	-	-
Autoproducer electricity plants	-4	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	30	-	-
Industry	-	-	-	-	-	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	30	-	-
Residential	-	-	-	-	-	-	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	30 e	-	-
Electricity generated - GWh	23881	2115	-	1261	-	-	-	-
<i>Electricity plants</i>	23881	2115	-	1261	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	7212	-	88	-	-	-	9674	75.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	7212	-	88	-	-	-	9674	26.8%
-	77	-	-3	-	-	-	74	x
-	-	-	-	-	-	-	-2340	x
-	-	-	-	-	-	-	-4	x
-	-861	-	-67	-	-	-	-928	x
-	-2708	-	-	-	-	-	-2708	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-121 e	49	-	-	-	-	-72	x
-	-	-	-1	-	-	-	-1	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	3600	49	16	-	-	-	3695	14.7%
-	1943	-	-	-	-	-	1943	18.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	14	-	-	-	-	-	14	4.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	1	0.0%
-	-	-	-	-	-	-	-	-
-	1473	-	-	-	-	-	1473	68.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	455	-	-	-	-	-	455	14.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1657	49	16	-	-	-	1752	29.8%
-	1653	43	-	-	-	-	1696	43.3%
-	4	6	16	-	-	-	26	1.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	30	100.0%
-	5603	-	12	-	-	-	32872	43.6%
-	-	-	-	-	-	-	27257	39.1%
-	5603	-	12	-	-	-	5615	100.0%
-	..	-	..	-	-	-
-	..	-	..	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	124 e	761 e	1243 e	1243 e	1243 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	124 e	761 e	1243 e	1243 e	1243 e	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	124 e	761 e	1243 e	1243 e	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	124 e	761 e	1243 e	1243 e	..	-
Industrial waste (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	130456	197448	204914	428535	306708	302030	328686	2.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	2681	-	-	-	-
Gross consumption	130456	197448	204914	431216	306708	302030	328686	2.9
Statistical differences	2	1	-	-	6204	3237	..	-
Transformation processes	23051	33297	34469	195856	146757	154526	..	10.8
Energy industry own use	25	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	107382	164152	170445	235360	166155	150741	..	-0.6
<i>Industry</i>	28096	47276	45674	87737	91358	81345	..	3.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	79286	116876	124771	147623	74797	69396	..	-3.4
Charcoal (kt)								
Production	249 e	253 e	248 e	247 e	72	73	78	-8.0
Net imports ¹	-	-	37 e	40 e	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	249 e	253 e	285 e	287 e	72	73	78	-8.0
Statistical differences	-	-	-	-	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	249 e	253 e	285 e	287 e	71	73	..	-8.0
<i>Industry</i>	-	-	-	-	3	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	249 e	253 e	285 e	287 e	68	73	..	-8.0
Biogases (TJ)								
Production	737	214	362	559	2325	3671	3671	20.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	737	214	362	559	2325	3671	3671	20.9
Statistical differences	-	-	-	-2	84	-144	..	-
Transformation processes	737	214	362	557	2326	2841	..	18.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	83	686	..	-
<i>Industry</i>	-	-	-	-	79	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	4 e	686	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

CZECH REPUBLIC

Figure 1. Contribution of renewables in 1990

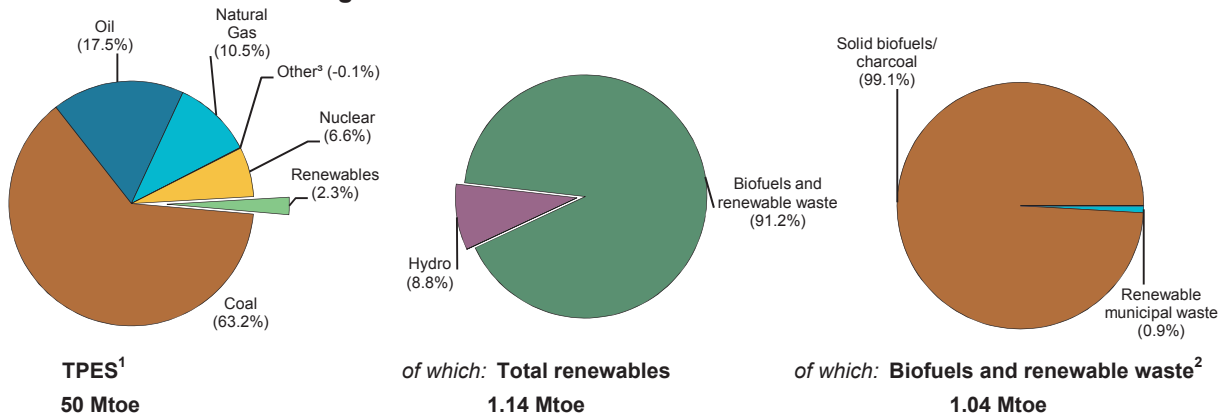


Figure 2. Contribution of renewables in 2016 provisional

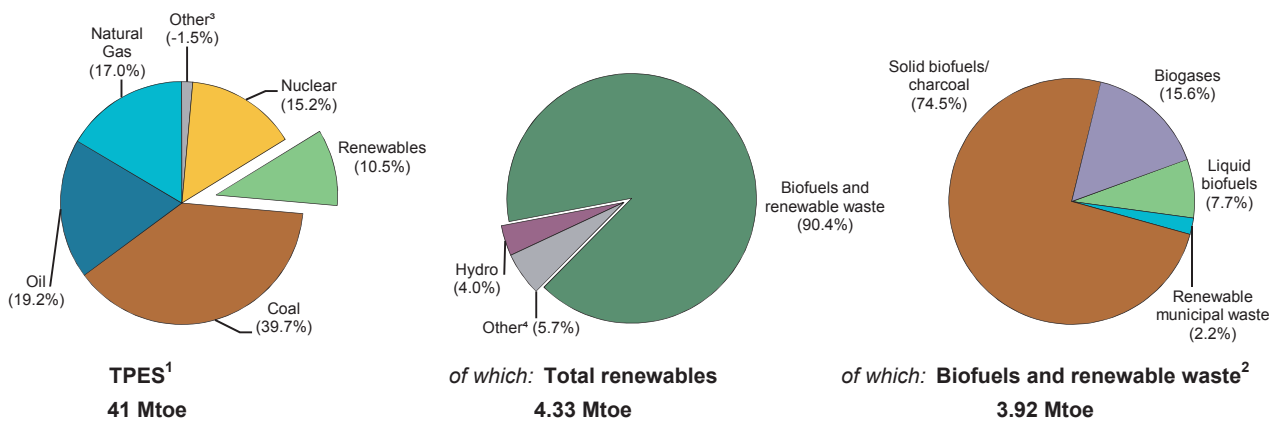
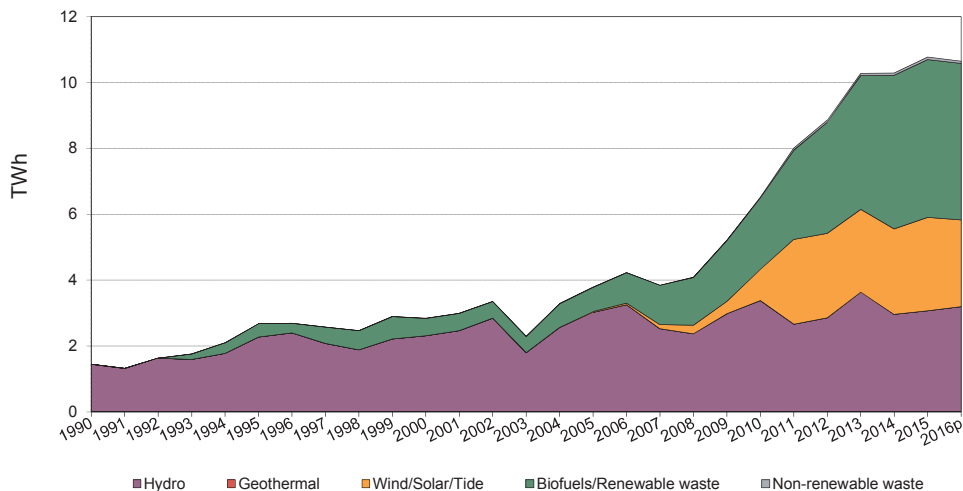


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	49.79	41.17	45.13	43.23	41.97	42.15	41.38	0.0
<i>of which: Renewables (Mtoe)</i> ¹	1.14	1.61	3.13	4.05	4.17	4.28	4.33	6.4
<i>Renewables/TPES(%)</i>	2.3	3.9	6.9	9.4	9.9	10.2	10.5	6.3
GDP (billion 2010 US dollars)	144.13	151.44	207.02	208.46	214.12	223.84	229.27	2.6
TPES/GDP ²	0.35	0.27	0.22	0.21	0.20	0.19	0.18	-2.5
TPES/GDP (year 2010 = 100)	158	125	100	95	90	86	83	-2.5
Population (millions)	10.36	10.27	10.52	10.51	10.53	10.54	10.56	0.2
TPES/population (toe per capita)	4.80	4.01	4.29	4.11	3.99	4.00	3.92	-0.1
Electricity generation (TWh) ³	62.3	72.9	85.3	86.0	85.1	82.6	82.1	0.7
<i>of which: Renewables (TWh)</i> ^{1,3}	1.16	2.28	5.90	9.31	9.17	9.42	9.38	9.2
<i>Renew./Total Elec.(%)</i> ^{1,4}	1.9	3.1	6.9	10.8	10.8	11.4	11.4	8.4
Road energy consumption (Mtoe)	2.3	3.9	5.5	5.4	5.6	5.9	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	0.06	0.23	0.28	0.32	0.30	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	1.6	4.2	5.1	5.6	5.1	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	1410 e	2101	4569	5291	5366	5412	6.5
Hydro	1410 e	2097	2196	2252	2252	2260	0.5
<i>Hydro <1MW</i>	..	52	141	155	150	154	7.5
<i>Hydro 1-10MW</i>	..	90	155	172	177	181	4.8
<i>Hydro 10+MW</i>	..	810	753	753	753	753	-0.5
<i>Mixed plants</i>	..	450	450	475	475	475	0.4
<i>Pure pumped storage</i>	..	695	697	697	697	697	0.0
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	1727	2064	2068	2075	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	1	213	262	278	281	45.6
Industrial waste	-	-	1	1	1	3	-
Municipal waste	-	3	43	45	45	45	19.8
Solid biofuels	-	..	271	306	355	380	..
Biogases	-	..	118	361	367	368	..
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	309	470	507	538	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	216	329	355	377	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	11.73 e	15.45	16.29	22.18	21.90	22.73	x
Hydro	11.73 e	12.59	17.57	18.45	15.01	15.51	15.51
<i>of which: <1MW</i>	..	53.78	44.91	35.26	35.42	33.05	33.13
<i>of which: 1-10MW</i>	..	32.72	44.47	40.80	35.23	35.06	36.91
<i>of which: 10+MW</i>	..	17.69	24.72	24.88	13.61	12.02	17.02
<i>of which: pure pumped storage²</i>	..	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	4.07	11.24	11.72	12.45	12.11
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	10.10	17.98	20.94	19.57	23.26	20.69
Industrial waste	-	-	38.52	102.52	119.70	75.16	90.15
Municipal waste	-	49.40	15.75	35.45	37.18	36.64	37.17
Solid biofuels	-	..	62.86	62.80	64.06	62.83	63.08
Biogases	-	..	61.40	72.53	80.36	80.99	69.93
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	1449	2845	6520	10278	10293	10777	10649	8.6
Hydro	1449	2313	3380	3639	2961	3071	3202	2.1
<i>of which: pumped storage</i>	288	555	591	905	1052	1276	1202	4.9
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	616	2033	2123	2264	2132	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	1	335	481	477	573	497	47.4
Industrial waste	-	-	3	9	10	20	15	-
Municipal waste renew.	-	8	35	84	88	87	82	15.7
Municipal waste non-renew.	-	6	24	55	59	58	55	14.9
Solid biofuels	-	382	1492	1683	1992	2092	2067	11.1
Biogases	-	135	635	2294	2583	2612	2599	20.3
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	1449	2476	4978	6223	5671	6008	..	-
Hydro	1449	2313	3380	3639	2961	3071	..	-
<i>of which: pumped storage</i>	288	555	591	905	1052	1276	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	616	2033	2123	2264	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	1	335	481	477	573	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	135	594	15	54	49	..	-
Biogases	-	27	53	55	56	51	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	369	1542	4055	4622	4769	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	3	9	10	20	..	-
Municipal waste renew.	-	8	35	84	88	87	..	-
Municipal waste non-renew.	-	6	24	55	59	58	..	-
Solid biofuels	-	247	898	1668	1938	2043	..	-
Biogases	-	108	582	2239	2527	2561	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	299	6159	4737	8258	9317	9991	10528	3.4
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	7	82	260	290	314	350	386	10.2
Municipal waste renew.	175	1485	1058	1487	1570	1562	1660	0.7
Municipal waste non-renew.	117	989	705	991	1047	1042	1107	0.7
Solid biofuels	-	3219	2458	5003	5821	6414	6670	4.7
Biogases	-	384	256	487	565	623	705	3.9
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	4498	3583	7022	8197	8527	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	9	65	98	141	..	-
Municipal waste renew.	-	753	1058	1487	1570	1562	..	-
Municipal waste non-renew.	-	501	705	991	1047	1042	..	-
Solid biofuels	-	2934	1555	3992	4917	5159	..	-
Biogases	-	310	256	487	565	623	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	299	1661	1154	1236	1120	1464	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	7	82	251	225	216	209	..	-
Municipal waste renew.	175	732	-	-	-	-	-	-
Municipal waste non-renew.	117	488	-	-	-	-	-	-
Solid biofuels	-	285	903	1011	904	1255	..	-
Biogases	-	74	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	1616	1668	1724	1750	1565	-
Heat pumps ²	-	-	94	69	77	68	54	-
(-) Input to heat pumps	-	-	29	22	22	22	22	-
Other sources ³	-	-	1551	1621	1669	1704	1533	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	154	49	-	195	-	18	224	80
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	154	49	-	195	-	18	224	80
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-106	-49	-	-195	-	-	-	-
Autoproducer electricity plants	-49	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-5	-14
Autoproducer CHP plants	-	-	-	-	-	-	-4	-43
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-10	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	18	206	23
Industry	-	-	-	-	-	-	189	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	3	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	186	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	18	17	23
Residential	-	-	-	-	-	14	-	-
Commercial and public services	-	-	-	-	-	4	17	23
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	1795	573	-	2264	-	-	20	87
<i>Electricity plants</i>	1795	573	-	2264	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	20	87
Heat generated - TJ	-	-	-	-	-	-	350	1562
<i>CHP plants</i>	-	-	-	-	-	-	141	1562
<i>Heat plants</i>	-	-	-	-	-	-	209	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
53	2954	-	613	68	148	-	4556	15.7%
-	144	-	-	29	194	-	367	1.7%
-	-224	-	-	-39	-109	-	-372	4.4%
-	-	-	-	6	-	-	6	x
53	2873	-	613	63	233	-	4555	10.8%
-	-	-	-	-	-	-	-	-
-	-1	-	-8	-	-	-	-359	x
-	-15	-	-6	-	-	-	-70	x
-9	-410	-	-19	-	-	-	-457	x
-29	-158	-	-441	-	-	-	-675	x
-	-23	-	-	-	-	-	-23	x
-	-15	-	-	-	-	-	-25	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
15	2251	-	140	63	233	-	2949	11.6%
-	474	-	5	-	-	-	668	10.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	3	0.3%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	187	17.8%
-	-	-	-	-	-	-	-	-
-	4	-	-	-	-	-	4	0.6%
-	-	-	-	-	-	-	-	-
-	11	-	2	-	-	-	13	2.2%
-	291	-	3	-	-	-	294	48.1%
-	157	-	-	-	-	-	157	69.8%
-	3	-	-	-	-	-	3	1.7%
-	-	-	-	-	-	-	-	-
-	5	-	-	-	-	-	5	1.1%
-	-	-	-	63	233	-	296	4.8%
-	-	-	-	63	233	-	296	5.1%
-	-	-	-	-	-	-	-	-
15	1777	-	135	-	-	-	1985	19.4%
-	1753	-	-	-	-	-	1767	26.4%
15	16	-	20	-	-	-	95	3.3%
-	9	-	115	-	-	-	124	20.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
58	2092	-	2611	-	-	-	9500	11.5%
-	49	-	51	-	-	-	4732	11.8%
58	2043	-	2560	-	-	-	4768	11.2%
1042	6414	-	623	-	-	-	9991	8.2%
1042	5159	-	623	-	-	-	8527	8.9%
-	1255	-	-	-	-	-	1464	5.7%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	366	630	691	742	790	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	366	630	691	742	790	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	366	630	691	742	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	366	630	691	742	..	-
Industrial waste (TJ)								
Production	283	2370	6659	6742	8194	9382	10543	9.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	283	2370	6659	6742	8194	9382	10543	9.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	9	109	498	524	554	753	..	13.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	274	2261	6161	6218	7640	8629	..	9.3
<i>Industry</i>	258	2031	5661	5647	7012	7918	..	9.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	16	230	500	571	628	711	..	7.8
Municipal waste - renewables (TJ)								
Production	394	1914	2625	3472	3453	3342	3581	3.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	394	1914	2625	3472	3453	3342	3581	3.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	327	1726	1744	2521	2551	2372	..	2.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	67	188	881	951	902	970	..	11.6
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	67	188	881	951	902	970	..	11.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	263	1275	1749	2314	2302	2228	2387	3.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	263	1275	1749	2314	2302	2228	2387	3.8
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	218	1150	1162	1680	1700	1581	..	2.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	45	125	587	634	602	647	..	11.6
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	45	125	587	634	602	647	..	11.6
Solid Biofuel excluding charcoal (TJ)								
Production	43184	55256	102385	115945	118981	123694	125680	5.5
Net imports ¹	-	-	-4883	-4996	-3298	-3375	-3500	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	43184	55256	97502	110949	115683	120319	122180	5.3
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	7974	16593	20897	23756	26065	..	8.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	43184	47282	80909	90052	91927	94254	..	4.7
<i>Industry</i>	-	5346	17004	18519	18763	19831	..	9.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	43184	41936	63905	71533	73164	74423	..	3.9
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	1509	7398	23910	25457	25681	25630	20.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1509	7398	23910	25457	25681	25630	20.8
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	1427	5114	18284	19693	19813	..	19.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	82	2284	5626	5764	5868	..	32.9
<i>Industry</i>	-	19	50	108	190	216	..	17.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	63	2234	5518	5574	5652	..	35.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	95	104	104	105	116	-
Net imports ¹	-	-	-2	-22	-1	-16	-32	-
Stock changes	-	-	-2	4	-1	9	-8	-
Gross consumption	-	-	91	86	102	98	76	-
Statistical differences	-	-	-1	-3	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	90	83	102	98	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	90	83	102	98	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	67	198	182	219	168	149	6.3
Net imports ¹	-	3	-1	65	72	96	133	26.0
Stock changes	-	-	-	7	-6	-	4	-
Gross consumption	-	70	197	254	285	264	286	9.3
Statistical differences	-	-	-1	-1	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	70	196	253	284	264	..	9.3
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	70	196	253	284	264	..	9.3
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

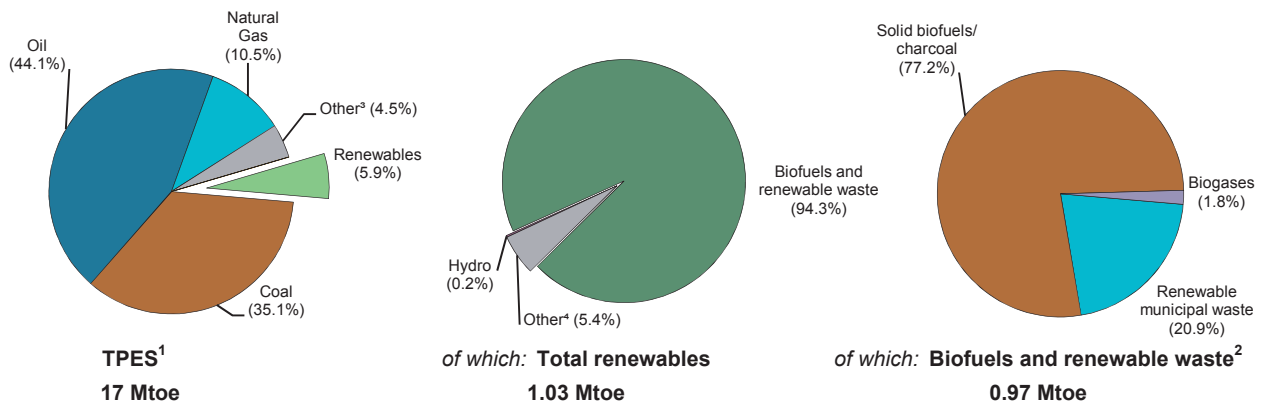


Figure 2. Contribution of renewables in 2016 provisional

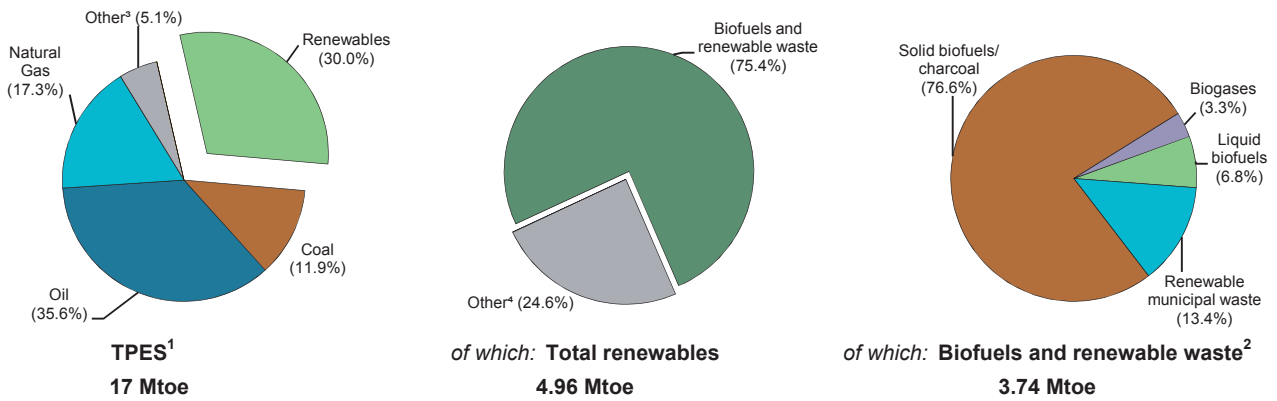
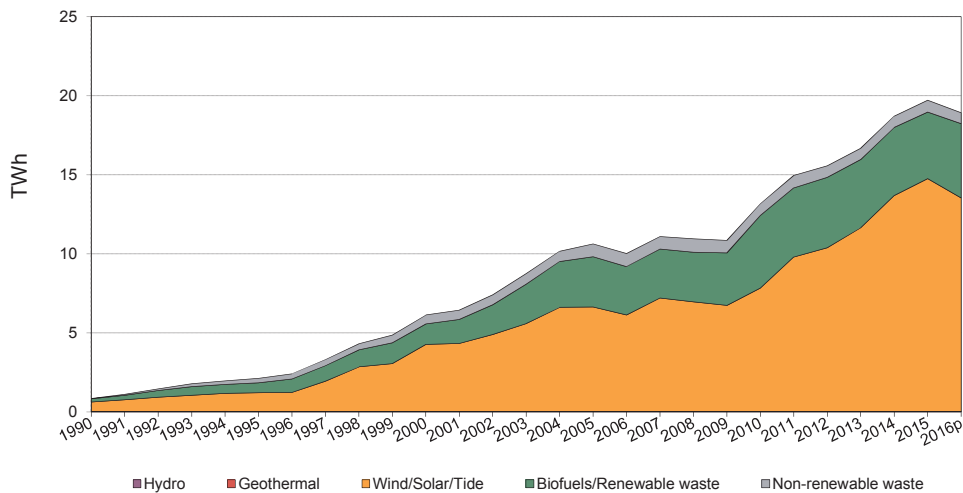


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	17.36	18.63	19.48	17.15	16.11	16.10	16.54	-0.7
<i>of which: Renewables (Mtoe)</i> ¹	1.03	1.80	3.92	4.32	4.47	4.76	4.96	6.5
<i>Renewables/TPES(%)</i>	5.9	9.6	20.1	25.2	27.7	29.6	30.0	7.3
GDP (billion 2010 US dollars)	229.13	298.22	322.00	330.09	335.62	341.01	345.40	0.9
TPES/GDP ²	0.08	0.06	0.06	0.05	0.05	0.05	0.05	-1.7
TPES/GDP (year 2010 = 100)	125	103	100	86	79	78	79	-1.7
Population (millions)	5.14	5.34	5.55	5.61	5.64	5.68	5.73	0.4
TPES/population (toe per capita)	3.38	3.49	3.51	3.05	2.85	2.83	2.89	-1.2
Electricity generation (TWh) ³	26.0	36.1	38.9	34.7	32.2	28.9	30.1	-1.1
<i>of which: Renewables (TWh)</i> ^{1,3}	0.83	5.57	12.43	15.97	17.99	18.96	18.25	7.7
<i>Renew./Total Elec.(%)</i> ^{1,4}	3.2	15.5	32.0	46.0	55.9	65.5	60.6	8.9
Road energy consumption (Mtoe)	3.1	3.7	4.0	3.6	3.7	3.8	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.03	0.23	0.23	0.23	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	0.7	6.3	6.3	6.2	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	396	2758	5065	6741	6911	7271	6.7
Hydro	10	10	9	9	9	7	-2.3
<i>Hydro <1MW</i>	6	6	5	5	5	3	-4.5
<i>Hydro 1-10MW</i>	4	4	4	4	4	4	-
<i>Hydro 10+MW</i>	-	-	-	-	-	-	-
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	1	7	571	607	782	55.9
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	326	2390	3802	4818	4886	5075	5.1
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	230	299	332	325	331	2.5
Solid biofuels	40	86	868	919	989	973	17.6
Biogases	20	41	80	85	95	102	6.3
Liquid biofuels	-	-	-	7	-	1	-
Solar collectors surface (1000 m ²)	57	243	480	712	810	957	9.6
<i>Cap. of solar collectors (MW_{th})</i> ⁶	40	170	336	498	567	670	9.6

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	24.44	25.37	29.70	28.25	30.91	30.95	x
Hydro	31.96	34.47	26.18	17.02	19.16	29.40	21.83
<i>of which: <1MW</i>	29.49	27.78	19.64	6.21	8.15	16.86	10.60
<i>of which: 1-10MW</i>	35.67	44.52	34.36	30.54	32.92	38.81	36.49
<i>of which: 10+MW</i>	-	-	-	-	-	-	-
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	13.70	9.83	10.35	11.20	8.82	8.67
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	21.37	20.26	23.45	26.35	30.56	31.79	29.02
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	61.33	63.37	54.64	56.52	57.60	60.32
Solid biofuels	30.82	54.62	43.71	37.98	34.15	32.88	34.91
Biogases	22.58	58.07	50.99	51.30	54.90	54.31	53.14
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	848	6128	13176	16683	18715	19713	18928	7.3
Hydro	28	30	21	13	15	18	19	-2.8
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	1	6	518	596	604	744	51.2
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	610	4241	7809	11123	13079	14133	12782	7.1
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	39	680	912	874	886	919	835	1.3
Municipal waste non-renew.	23	556	747	715	724	751	683	1.3
Solid biofuels	108	411	3324	3058	2958	2803	3373	14.1
Biogases	40	209	357	382	457	485	492	5.5
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	638	4275	7837	11655	13691	14756	..	-
Hydro	28	30	21	13	15	18	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	1	6	518	596	604	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	610	4241	7809	11123	13079	14133	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	3	1	1	1	1	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	210	1853	5339	5028	5024	4957	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	39	680	912	874	886	919	..	-
Municipal waste non-renew.	23	556	747	715	724	751	..	-
Solid biofuels	108	411	3324	3058	2958	2803	..	-
Biogases	40	206	356	381	456	484	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	19496	31109	63621	68562	70045	73559	76741	5.8
Geothermal	24	29	106	114	83	70	222	13.6
Solar thermal	6	24	143	475	700	848	1271	28.2
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	6814	10574	12989	13138	13928	14974	14933	2.2
Municipal waste non-renew.	5150	8651	10627	10748	11395	12251	12218	2.2
Solid biofuels	7373	10889	36923	42012	41453	42809	46362	9.5
Biogases	129	903	1148	1368	1808	2099	1506	3.2
Liquid biofuels	-	39	1685	707	678	508	229	11.7
<i>of which:</i>								
CHP plants	884	16997	42729	47677	49126	51098	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	261	7214	11593	11786	12558	13341	..	-
Municipal waste non-renew.	199	5903	9485	9642	10274	10915	..	-
Solid biofuels	319	3189	20651	24951	24782	25212	..	-
Biogases	105	691	1000	1298	1512	1630	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	18612	14112	20892	20885	20919	22461	..	-
Geothermal	24	29	106	114	83	70	..	-
Solar thermal	6	24	143	475	700	848	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	6553	3360	1396	1352	1370	1633	..	-
Municipal waste non-renew.	4951	2748	1142	1106	1121	1336	..	-
Solid biofuels	7054	7700	16272	17061	16671	17597	..	-
Biogases	24	212	148	70	296	469	..	-
Liquid biofuels	-	39	1685	707	678	508	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	3624	2481	2323	2581	2677	3383	-0.4
Heat pumps ²	-	78	38	107	109	158	129	3.2
(-) Input to heat pumps	-	76	36	36	47	47	47	-3.0
Other sources ³	-	3622	2479	2252	2519	2566	3301	-0.6

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2	1215	-	52	3	34	-	467
Imports	-	-	-	-	-	-	-	54
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2	1215	-	52	3	34	-	521
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-2	-1215	-	-	-	-	-	-
Autoproducer electricity plants	-	-	-	-52	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-113
Autoproducer CHP plants	-	-	-	-	-	-	-	-337
Main heat plants	-	-	-	-	-3	-20	-	-7
Autoproducer heat plants	-	-	-	-	-	-	-	-39
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	14	-	25
Industry	-	-	-	-	-	-	-	20
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	19
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	1
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	14	-	5
Residential	-	-	-	-	-	12	-	-
Commercial and public services	-	-	-	-	-	2	-	5
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	18	14133	-	604	-	-	-	919
<i>Electricity plants</i>	18	14133	-	604	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	919
Heat generated - TJ	-	-	-	-	70	848	-	14974
<i>CHP plants</i>	-	-	-	-	-	-	-	13341
<i>Heat plants</i>	-	-	-	-	70	848	-	1633

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
382	1590	-	152	-	c	13	3910	24.5%
45	941	-	-	c	263	-	1303	7.0%
-	-	-	-	c	-26	-	-26	0.2%
-	-	-	-	-	-	-	-	-
427	2531	-	152	-	237	13	5187	32.2%
-	-	-	-	-	-5	-	-5	x
-	-	-	-	-	-	-	-1217	x
-	-	-	-	-	-	-	-52	x
-93	-911	-	-76	-	-	-	-1193	x
-276	-40	-	-33	-	-	-	-686	x
-5	-415	-	-10	-	-	-12	-472	x
-32	-17	-	-2	-	-	-1	-91	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-2	-	-	-	-2	x
-	-	-	-	-	-	-	-	-
21	1149	-	28	-	232	-	1469	11.0%
16	109	-	13	-	-	-	158	7.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
15	2	-	-	-	-	-	36	8.2%
-	1	-	-	-	-	-	1	6.1%
-	17	-	-	-	-	-	17	7.6%
-	29	-	-	-	-	-	29	38.4%
-	-	-	13	-	-	-	14	2.4%
-	3	-	-	-	-	-	3	4.0%
-	46	-	-	-	-	-	46	64.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	11	-	-	-	-	-	11	10.3%
-	-	-	-	-	232	-	232	5.7%
-	-	-	-	c	232	-	232	6.2%
-	-	-	-	c	-	-	c	c
4	1040	-	15	-	-	-	1078	15.7%
-	961	-	6	-	-	-	979	23.0%
4	28	-	6	-	-	-	45	2.4%
-	52	-	3	-	-	-	55	8.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
751	2803	-	485	-	-	-	19713	68.1%
-	-	-	1	-	-	-	14756	99.9%
751	2803	-	484	-	-	-	4957	35.0%
12251	42809	-	2099	-	-	508	73559	57.4%
10915	25212	-	1630	-	-	-	51098	59.4%
1336	17597	-	469	-	-	508	22461	53.4%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	48	58	212	229	166	140	444	6.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	48	58	212	229	166	140	444	6.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	48	58	212	229	166	140	..	6.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	100	335	657	1027	1265	1429	1852	10.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	100	335	657	1027	1265	1429	1852	10.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	6	24	143	475	700	848	..	26.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	94	311	514	552	565	581	..	4.3
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	94	311	514	552	565	581	..	4.3
Industrial waste (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	8524	16715	20788	19283	19399	19550	18759	1.0
Net imports ¹	-	-	-	1323	1899	2281	2189	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	8524	16715	20788	20606	21298	21831	20948	1.8
Statistical differences	2	-	170	1	-	-	..	-
Transformation processes	8007	15850	19810	19517	20067	20781	..	1.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	519	865	1148	1090	1231	1050	..	1.3
<i>Industry</i>	16	87	926	812	822	822	..	16.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	503	778	222	278	409	228	..	-7.9

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	6975	13676	17008	15777	15872	15995	15348	1.0
Net imports ¹	-	-	-	1083	1554	1866	1791	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	6975	13676	17008	16860	17426	17861	17139	1.8
Statistical differences	-	-	140	-1	1	1	..	..
Transformation processes	6551	12969	16207	15967	16419	17003	..	1.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	424	707	941	892	1008	859	..	1.3
<i>Industry</i>	13	71	759	664	673	673	..	16.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	411	636	182	228	335	186	..	-7.9
Solid Biofuel excluding charcoal (TJ)								
Production	31472	37324	71309	59722	54763	66581	67376	3.9
Net imports ¹	-	2466	35480	42151	43683	39423	52433	20.3
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	31472	39790	106789	101873	98446	106004	119809	6.8
Statistical differences	-1	-1	-	-1	3	1	..	..
Transformation processes	9033	14583	57287	59402	58320	57903	..	9.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	22438	25206	49502	42470	40129	48102	..	4.4
<i>Industry</i>	4715	4450	6573	4207	3769	4553	..	0.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	17723	20756	42929	38263	36360	43549	..	5.1
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	752	2912	4362	4588	5519	6347	5147	5.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	752	2912	4362	4588	5519	6347	5147	5.3
Statistical differences	-	-23	-19	1	6	-1	..	..
Transformation processes	528	2443	3599	3776	4651	5075	..	5.0
Energy industry own use	-	41	-	-	58	104	..	6.4
Losses	-	-	-	-	-	-	..	..
Final energy consumption	224	405	744	813	816	1167	..	7.3
<i>Industry</i>	24	12	163	227	342	533	..	28.8
<i>Transport</i>	-	-	-	-	-	1	..	-
<i>Other</i>	200	393	581	586	474	633	..	3.2

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

DENMARK

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	42	c	c	c	c	..
Stock changes	-	-	-	c	c	c	c	..
Gross consumption	-	-	42	c	c	c	c	..
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	42	c	c	c	..	..
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	42	c	c	c	..	..
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	77	c	c	c	c	..
Net imports ¹	-	-	-76	257	269	265	272	-
Stock changes	-	-	-	-	5	-	-	-
Gross consumption	-	-	1	257	274	265	272	-
Statistical differences	-	-	1	-2	-16	-6	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	2	255	258	259	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	253	258	259	..	-
<i>Other</i>	-	-	2	2	-	-	..	-
Other liquid biofuels (kt)								
Production	-	1	52	22	21	15	10	19.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1	52	22	21	15	10	19.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	1	52	22	21	15	..	19.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

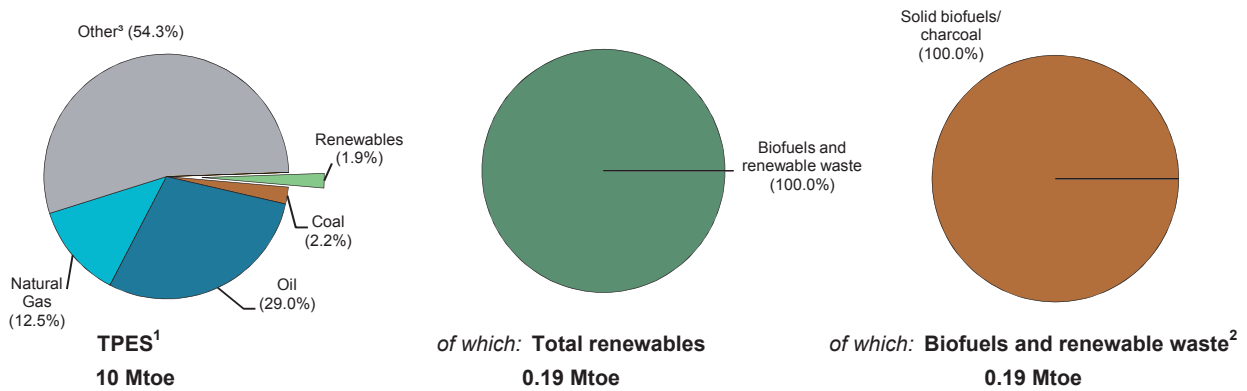


Figure 2. Contribution of renewables in 2016 provisional

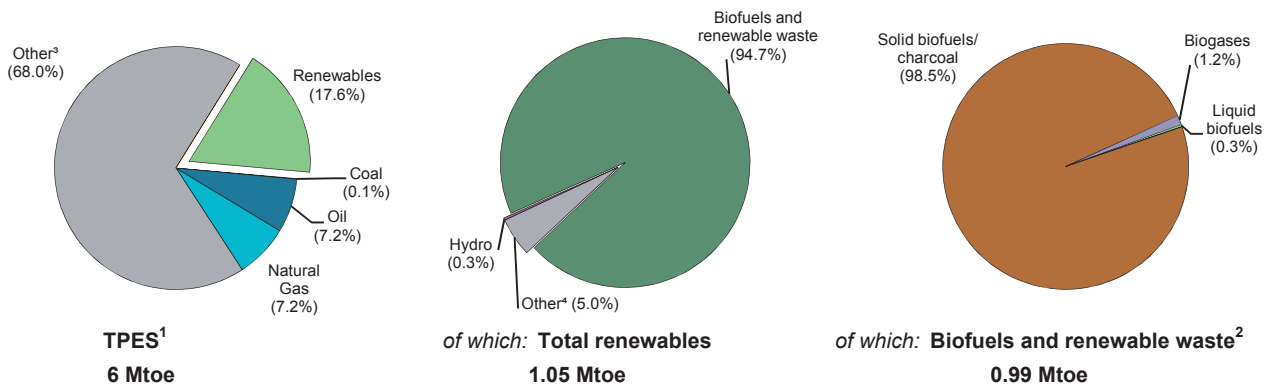
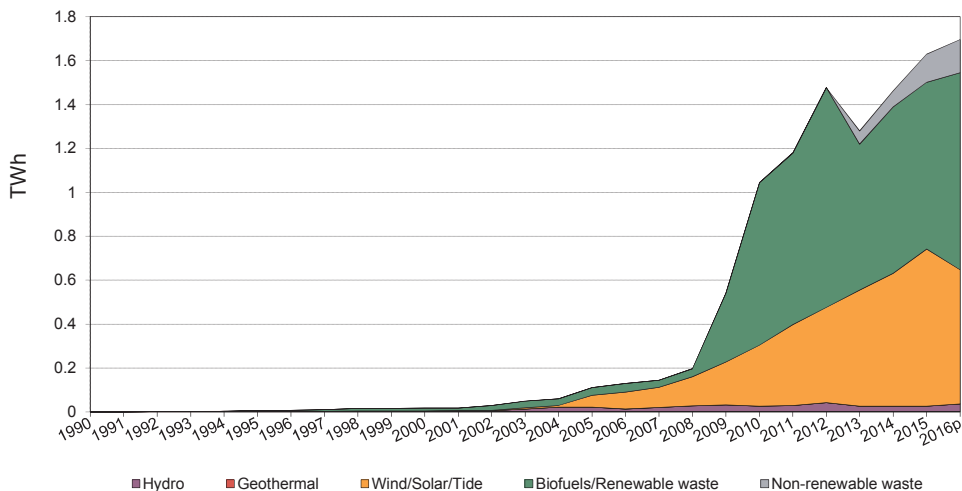


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	9.78	4.71	5.62	6.09	5.99	5.42	5.97	1.5
<i>of which: Renewables (Mtoe)</i> ¹	0.19	0.51	0.85	0.85	0.86	0.91	1.05	4.6
<i>Renewables/TPES(%)</i>	1.9	10.9	15.1	14.0	14.3	16.7	17.6	3.0
GDP (billion 2010 US dollars)	14.96	14.13	19.50	22.20	22.82	23.15	23.52	3.2
TPES/GDP ²	0.65	0.33	0.29	0.27	0.26	0.23	0.25	-1.7
TPES/GDP (year 2010 = 100)	227	116	100	95	91	81	88	-1.7
Population (millions)	1.59	1.40	1.33	1.32	1.32	1.31	1.32	-0.4
TPES/population (toe per capita)	6.16	3.37	4.22	4.62	4.55	4.13	4.54	1.9
Electricity generation (TWh) ³	17.2	8.5	13.0	13.3	12.4	10.4	12.1	2.2
<i>of which: Renewables (TWh)</i> ^{1,3}	-	0.02	1.04	1.22	1.39	1.50	1.55	32.1
<i>Renew./Total Elec.(%)</i> ^{1,4}	-	0.2	8.1	9.2	11.2	14.4	12.8	29.2
Road energy consumption (Mtoe)	0.7	0.5	0.7	0.7	0.7	0.7	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	-	0.00	0.01	0.00	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	-	0.5	0.8	0.4	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	-	2	256	622	663	692	47.7
Hydro	-	2	6	8	5	6	7.6
<i>Hydro <1MW</i>	-	2	6	8	5	6	7.6
<i>Hydro 1-10MW</i>	-	-	-	-	-	-	-
<i>Hydro 10+MW</i>	-	-	-	-	-	-	-
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	108	248	275	300	-
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	210	210	210	-
Solid biofuels	-	-	138	150	165	165	-
Biogases	-	-	4	6	8	11	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	-	-	-	-	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	-	-	-	-	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	-	104.17	46.55	23.48	25.17	26.88	x
Hydro	-	28.54	51.14	36.43	61.72	50.61	55.47
<i>of which: <1MW</i>	-	28.54	51.14	36.43	61.72	50.61	55.47
<i>of which: 1-10MW</i>	-	-	-	-	-	-	-
<i>of which: 10+MW</i>	-	-	-	-	-	-	-
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	29.28	24.35	25.06	27.21	23.72
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	3.26	3.97	6.96	4.73
Solid biofuels	-	-	60.37	49.09	50.57	49.12	55.61
Biogases	-	-	29.08	38.05	38.53	51.89	43.29
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	-	18	1044	1280	1462	1630	1696	32.9
Hydro	-	5	27	26	27	27	36	13.1
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	277	529	604	715	612	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	60	73	128	151	-
Solid biofuels	-	13	730	645	731	710	837	29.7
Biogases	-	-	10	20	27	50	60	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	-	5	535	585	692	811	..	-
Hydro	-	5	27	26	27	27	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	277	529	604	715	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	231	30	61	69	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	13	509	695	770	819	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	60	73	128	..	-
Solid biofuels	-	13	499	615	670	641	..	-
Biogases	-	-	10	20	27	50	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	2681	5956	8794	8565	10082	10727	9.1
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	654	893	970	1032	-
Solid biofuels	-	2620	5892	8075	7616	9000	9576	8.4
Biogases	-	61	64	65	56	112	119	4.3
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	3244	5711	6506	6948	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	654	893	970	..	-
Solid biofuels	-	-	3183	4992	5557	5866	..	-
Biogases	-	-	61	65	56	112	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	2681	2712	3083	2059	3134	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	2620	2709	3083	2059	3134	..	-
Biogases	-	61	3	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2	61	-	-	-	-	-	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2	61	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-2	-60	-	-	-	-	-	-
Autoproducer electricity plants	-	-1	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	-	-	-
Industry	-	-	-	-	-	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Residential	-	-	-	-	-	-	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	27	715	-	-	-	-	-	-
<i>Electricity plants</i>	27	715	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
67	1209	-	13	-	-	-	1352	24.4%
-	13	-	-	3	-	-	16	0.6%
-	-387	-	-	-	-	-	-387	18.9%
-	-10	-	-	-	-	-	-10	x
67	825	-	13	3	-	-	971	17.9%
-	-	-	-	-	-	-	-	-
-	-8	-	-	-	-	-	-70	x
-	-	-	-	-	-	-	-1	x
-42	-234	-	-8	-	-	-	-284	x
-	-2	-	-	-	-	-	-2	x
-	-84	-	-	-	-	-	-84	x
-	-18	-	-	-	-	-	-18	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-13	-2	-	-	-	-	-	-15	x
-	-	-	-	-	-	-	-	-
12	477	-	4	3	-	-	496	17.5%
12	102	-	2	-	-	-	116	22.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	12	16.3%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	1	2.9%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	1	1.6%
-	5	-	2	-	-	-	7	11.7%
-	84	-	-	-	-	-	84	64.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	11	-	-	-	-	-	11	32.1%
-	-	-	-	3	-	-	3	0.4%
-	-	-	-	3	-	-	3	0.4%
-	-	-	-	-	-	-	-	-
-	375	-	2	-	-	-	377	25.9%
-	361	-	-	-	-	-	361	42.1%
-	10	-	2	-	-	-	12	2.6%
-	4	-	-	-	-	-	4	3.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
128	710	-	50	-	-	-	1630	15.7%
-	69	-	-	-	-	-	811	8.8%
128	641	-	50	-	-	-	819	66.1%
970	9000	-	112	-	-	-	10082	47.6%
970	5866	-	112	-	-	-	6948	61.9%
-	3134	-	-	-	-	-	3134	31.4%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Industrial waste (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	4411	2851	2819	2870	-
Net imports ¹	-	-	-	-	-	-	..	-
Stock changes	-	-	-	-43	7	-3	..	-
Gross consumption	-	-	-	4368	2858	2816	2870	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	1336	1455	1760	..	-
Energy industry own use	-	-	-	607	696	543	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	2425	707	513	..	-
<i>Industry</i>	-	-	-	2425	707	513	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	7865	21343	40096	44686	46980	50632	40940	5.9
Net imports ¹	-	-190	-6439	-12270	-13525	-15668	..	34.2
Stock changes	-	225	535	787	-410	-407	..	-
Gross consumption	7865	21378	34192	33203	33045	34557	40940	3.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	3574	11141	13362	13210	14524	..	9.8
Energy industry own use	-	4	44	63	56	70	..	21.0
Losses	-	12	-	-	-	-	..	-
Final energy consumption	7865	17788	23007	19778	19779	19963	..	0.8
<i>Industry</i>	264	3318	4370	3529	3673	4260	..	1.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	7601	14470	18637	16249	16106	15703	..	0.5
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	76	155	302	403	550	504	14.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	76	155	302	403	550	504	14.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	76	115	200	191	367	..	11.1
Energy industry own use	-	-	-	12	12	9	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	40	90	200	174	..	-
<i>Industry</i>	-	-	-	-	62	90	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	40	90	138	84	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	5	9	5	5	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	5	9	5	5	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	5	9	5	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	5	9	5	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

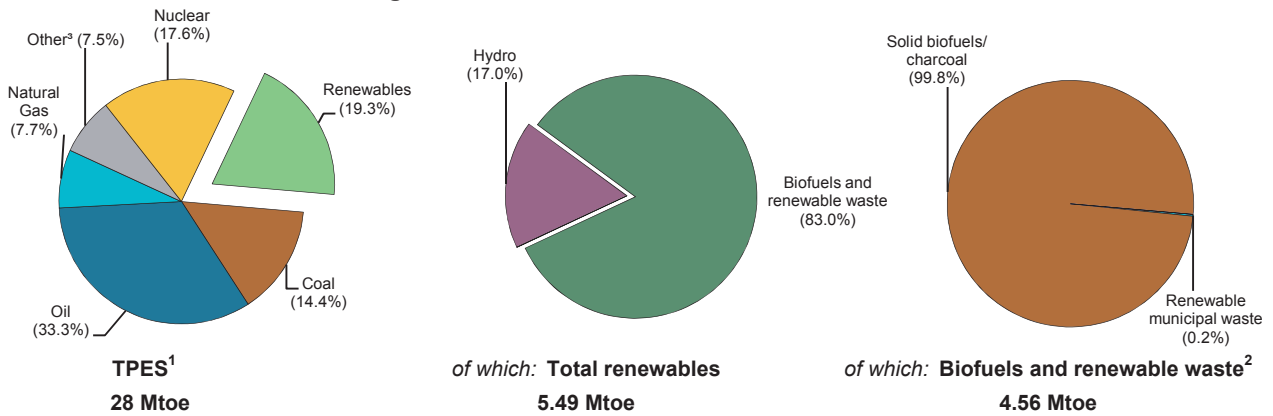


Figure 2. Contribution of renewables in 2016 provisional

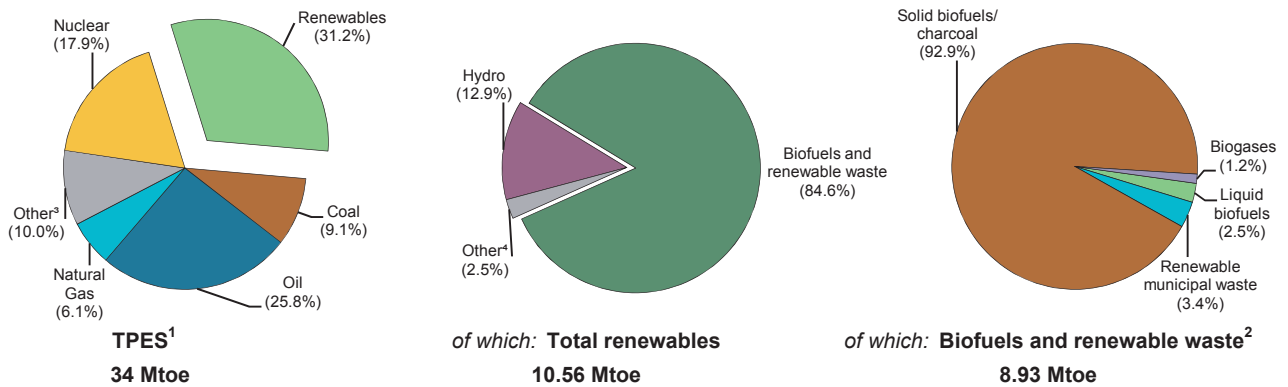
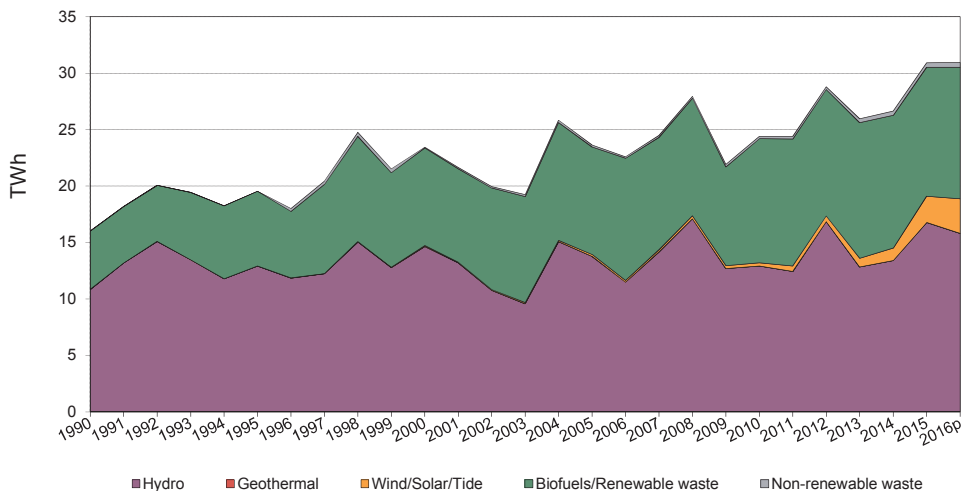


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	28.38	32.39	36.60	33.29	34.11	32.49	33.86	0.3
<i>of which: Renewables (Mtoe)</i> ¹	5.49	7.75	9.34	9.91	10.30	10.49	10.56	2.0
<i>Renewables/TPES(%)</i>	19.3	23.9	25.5	29.8	30.2	32.3	31.2	1.7
GDP (billion 2010 US dollars)	167.12	209.38	247.80	248.65	247.08	247.74	251.18	1.1
TPES/GDP ²	0.17	0.15	0.15	0.13	0.14	0.13	0.13	-0.9
TPES/GDP (year 2010 = 100)	115	105	100	91	93	89	91	-0.9
Population (millions)	4.99	5.18	5.36	5.44	5.46	5.48	5.50	0.4
TPES/population (toe per capita)	5.69	6.26	6.82	6.12	6.24	5.93	6.16	-0.1
Electricity generation (TWh) ³	54.4	70.0	80.7	71.3	68.1	68.6	68.6	-0.1
<i>of which: Renewables (TWh)</i> ^{1,3}	16.02	23.38	24.20	25.63	26.27	30.53	30.54	1.7
<i>Renew./Total Elec.(%)</i> ^{1,4}	29.5	33.4	30.0	36.0	38.6	44.5	44.5	1.8
Road energy consumption (Mtoe)	3.6	3.6	4.0	3.9	3.8	3.9	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.13	0.22	0.50	0.50	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	3.3	5.7	12.9	12.8	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	3605	4422	5055	5474	5680	6063	2.1
Hydro	2621	2882	3155	3224	3248	3249	0.8
<i>Hydro <1MW</i>	-	29	32	33	33	33	0.9
<i>Hydro 1-10MW</i>	-	279	285	274	273	273	-0.1
<i>Hydro 10+MW</i>	-	2574	2838	2917	2942	2943	0.9
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	1	2	7	9	11	15	14.4
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	38	197	447	627	1005	24.4
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	983	1500	1696	1794	1794	1794	1.2
Biogases	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	6	10	31	41	45	50	11.3
<i>Cap. of solar collectors (MW_{th})</i> ⁶	4	7	22	29	32	35	11.3

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	50.71	60.54	55.12	54.16	53.56	58.20	x
Hydro	47.30	58.07	46.75	45.46	47.09	58.92	51.23
<i>of which: <1MW</i>	-	52.75	40.97	40.64	39.26	49.03	57.71
<i>of which: 1-10MW</i>	-	43.29	33.41	39.99	36.89	47.91	44.31
<i>of which: 10+MW</i>	-	59.73	48.16	46.03	48.12	60.05	51.81
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	5.19	9.00	7.73	8.18	8.04	7.25	8.06
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	23.43	17.05	19.76	20.16	26.44	23.19
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	59.88 e	64.70	71.14	71.95	69.79	67.38	69.34
Biogases	-	-	-	-	-	-	-
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	16015	23452	24409	25968	26649	30910	30955	1.8
Hydro	10859	14660	12922	12838	13397	16769	15806	0.5
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	2	5	6	8	9	14	12.9
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	78	294	774	1107	2327	3068	25.8
Industrial waste	-	31	29	73	76	59	60	4.2
Municipal waste renew.	-	107	299	395	441	471	530	10.5
Municipal waste non-renew.	-	42	185	267	302	326	360	14.4
Solid biofuels	5156	8501	10569	11307	10968	10589	10755	1.5
Biogases	-	31	106	308	350	358	360	16.6
Liquid biofuels	-	-	-	-	-	2	2	-
of which:								
Electricity only plants	11348	15397	14986	15300	15929	20599	..	-
Hydro	10859	14660	12922	12838	13397	16769	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	2	5	6	8	9	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	78	294	774	1107	2327	..	-
Industrial waste	-	2	5	13	14	13	..	-
Municipal waste renew.	-	9	90	58	57	35	..	-
Municipal waste non-renew.	-	4	68	39	40	24	..	-
Solid biofuels	489	642	1551	1366	1074	1217	..	-
Biogases	-	-	51	206	232	204	..	-
Liquid biofuels	-	-	-	-	-	1	..	-
CHP plants	4667	8055	9423	10668	10720	10311	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	29	24	60	62	46	..	-
Municipal waste renew.	-	98	209	337	384	436	..	-
Municipal waste non-renew.	-	38	117	228	262	302	..	-
Solid biofuels	4667	7859	9018	9941	9894	9372	..	-
Biogases	-	31	55	102	118	154	..	-
Liquid biofuels	-	-	-	-	-	1	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	5025 e	35741	68824	80410	80572	79051	85130	5.6
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	425	884	450	454	399	400	-0.4
Municipal waste renew.	423 e	774	2211	4132	5024	6051	7230	15.0
Municipal waste non-renew.	282 e	412	1581	3092	3892	4566	5400	17.4
Solid biofuels	4320 e	33964	63779	72203	70538	67252	71300	4.7
Biogases	-	166	369	533	660	763	780	10.2
Liquid biofuels	-	-	-	-	4	20	20	-
<i>of which:</i>								
CHP plants	1275 e	25106	46863	56839	52697	52488	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	408	384	424	429	374	..	-
Municipal waste renew.	-	480	1751	3887	4401	5247	..	-
Municipal waste non-renew.	-	225	1130	2872	3368	3996	..	-
Solid biofuels	1275 e	23972	43564	49437	44158	42383	..	-
Biogases	-	21	34	219	339	478	..	-
Liquid biofuels	-	-	-	-	2	10	..	-
Heat only plants	3750 e	10635	21961	23571	27875	26563	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	17	500	26	25	25	..	-
Municipal waste renew.	423 e	294	460	245	623	804	..	-
Municipal waste non-renew.	282 e	187	451	220	524	570	..	-
Solid biofuels	3045 e	9992	20215	22766	26380	24869	..	-
Biogases	-	145	335	314	321	285	..	-
Liquid biofuels	-	-	-	-	2	10	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	155	1515	2181	2387	3572	4076	22.7
Heat pumps ²	-	38	1246	1714	2154	3760	4500	34.8
(-) Input to heat pumps	-	18	443	576	727	1184	1404	31.3
Other sources ³	-	135	712	1043	960	996	980	13.2

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	1442	200	-	1	-	1	43	273
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	1442	200	-	1	-	1	43	273
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-1349	-200	-	-	-	-	-	-7
Autoproducer electricity plants	-93	-	-	-1	-	-	-4	-3
Main activity CHP plants	-	-	-	-	-	-	-	-146
Autoproducer CHP plants	-	-	-	-	-	-	-18	-49
Main heat plants	-	-	-	-	-	-	-1	-24
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	1	20	44
Industry	-	-	-	-	-	-	20	44
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	12	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	-	17
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	7	26
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	1
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	1	-	-
Residential	-	-	-	-	-	1	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	16769	2327	-	9	-	-	59	471
<i>Electricity plants</i>	16769	2327	-	9	-	-	13	35
<i>CHP plants</i>	-	-	-	-	-	-	46	436
Heat generated - TJ	-	-	-	-	-	-	399	6051
<i>CHP plants</i>	-	-	-	-	-	-	374	5247
<i>Heat plants</i>	-	-	-	-	-	-	25	804

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
196	7899	-	103	c	432	41	10631	59.9%
-	67	-	-	70	c	-	137	0.6%
-	-42	-	-	-	c	-	-42	0.6%
-	-	-	-	-	c	-	c	x
196	7925	-	103	70	432	41	10727	33.0%
-	-	-	-	-	-	-	-	-
-4	-156	-	-27	-	-	-	-1743	x
-3	-133	-	-14	-	-	-	-251	x
-97	-1301	-	-17	-	-	-1	-1562	x
-47	-840	-	-14	-	-	-	-968	x
-17	-641	-	-5	-	-	-1	-689	x
-	-28	-	-3	-	-	-	-31	x
-	-	-	-	-	-	-	-	-
-	-	-	-6	-	-	-	-6	x
-	-	-	-	-	-	-37	-37	x
-	-	-	-	-	-	-	-	-
29	4826	-	17	70	432	1	5440	22.3%
29	3411	-	4	-	-	1	3509	34.1%
-	-	-	-	-	-	-	-	-
-	6	-	-	-	-	-	18	1.8%
-	-	-	-	-	-	-	-	-
15	3	-	2	-	-	-	37	13.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	1	0.6%
-	9	-	-	-	-	-	9	2.3%
12	3189	-	-	-	-	1	3235	55.0%
-	201	-	-	-	-	-	201	41.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
1	2	-	1	-	-	-	5	2.2%
-	-	-	-	65	432	-	497	12.0%
-	-	-	-	63	432	-	495	12.8%
-	-	-	-	2	-	-	2	0.7%
-	1415	-	12	5	-	-	1433	16.5%
-	1195	-	-	-	-	-	1196	24.4%
-	66	-	12	-	-	-	78	2.9%
-	154	-	1	1	-	-	156	22.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	4	-	-	4	1.1%
326	10589	-	358	-	-	2	30910	45.1%
24	1217	-	204	-	-	1	20599	44.0%
302	9372	-	154	-	-	1	10311	47.4%
4566	67252	-	763	-	-	20	79051	44.5%
3996	42383	-	478	-	-	10	52488	44.7%
570	24869	-	285	-	-	10	26563	44.2%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	16	16	39	52	57	62	69	9.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	16	16	39	52	57	62	69	9.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	16	16	39	52	57	62	..	9.5
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	16	16	39	52	57	62	..	9.5
Industrial waste (TJ)								
Production	-	1738	1784	2120	2219	1792	1800	0.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1738	1784	2120	2219	1792	1800	0.2
Statistical differences	-	-	-	-	-	4	..	-
Transformation processes	-	1180	1368	1103	1111	954	..	-1.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	558	416	1017	1108	842	..	2.8
<i>Industry</i>	-	558	416	1017	1108	842	..	2.8
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	470 e	2278	6089	9295	10326	11420	12900	11.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	470 e	2278	6089	9295	10326	11420	12900	11.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	470 e	1455	4637	7382	8486	9569	..	13.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	823	1452	1913	1840	1851	..	5.6
<i>Industry</i>	-	823	1452	1913	1840	1851	..	5.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	314 e	1008	4335	6638	7623	8202	9300	15.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	314 e	1008	4335	6638	7623	8202	9300	15.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	314 e	691	3266	5448	6410	7006	..	16.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	317	1069	1190	1213	1196	..	9.3
<i>Industry</i>	-	317	1069	1190	1213	1196	..	9.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	180437	268294	326228	338359	339838	330799	346442	1.4
Net imports ¹	-	-	-1014	1206	823	1080	1017	-
Stock changes	9847	-	-	-	-	-	-	-
Gross consumption	190284	268294	325214	339565	340661	331879	347459	1.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	42843	82108	130046	144110	137787	129806	..	3.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	147441	186186	195168	195455	202874	202073	..	0.5
<i>Industry</i>	102741	140824	123156	132397	139612	142825	..	0.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	44700	45362	72012	63058	63262	59248	..	1.8
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	857	1692	3725	4173	4321	4500	11.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	857	1692	3725	4173	4321	4500	11.4
Statistical differences	-	-	-	-	-3	-2	..	-
Transformation processes	-	340	1105	2880	3317	3622	..	17.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	517	587	845	853	697	..	2.0
<i>Industry</i>	-	107	122	218	202	171	..	3.2
<i>Transport</i>	-	-	2	4	7	7	..	-
<i>Other</i>	-	410	463	623	644	519	..	1.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	5	22	19	c	c	..
Net imports ¹	-	-	106	87	93	103	102	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	111	109	112	103	102	-
Statistical differences	-	-	-	-1	1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	111	108	113	103	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	106	101	106	96	..	-
<i>Other</i>	-	-	5	7	7	7	..	-
Biodiesel (kt)								
Production	-	-	285	306	342	418	99	-
Net imports ¹	-	-	-167	-100	108	c	c	..
Stock changes	-	-	-	-	-10	c	c	-
Gross consumption	-	-	118	206	440	418	99	-
Statistical differences	-	-	-58	-54	-27	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	60	152	413	418	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	60	152	413	418	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	16	29	33	35	43	-
Net imports ¹	-	-	37	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	53	29	33	35	43	-
Statistical differences	-	-	1	-	-	-	..	-
Transformation processes	-	-	-	-	-	2	..	-
Energy industry own use	-	-	16	29	33	32	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	38	-	-	1	..	-
<i>Industry</i>	-	-	7	-	-	1	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	31	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

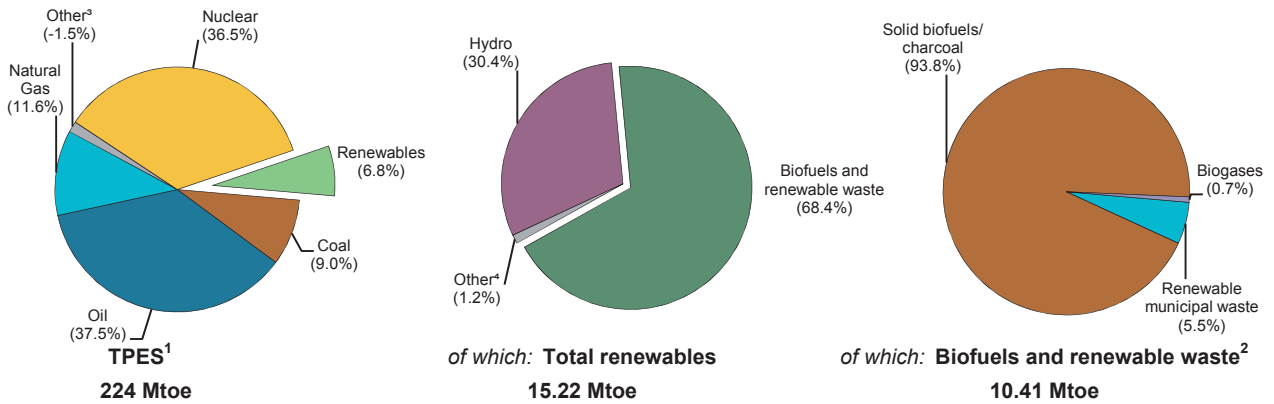


Figure 2. Contribution of renewables in 2016 provisional

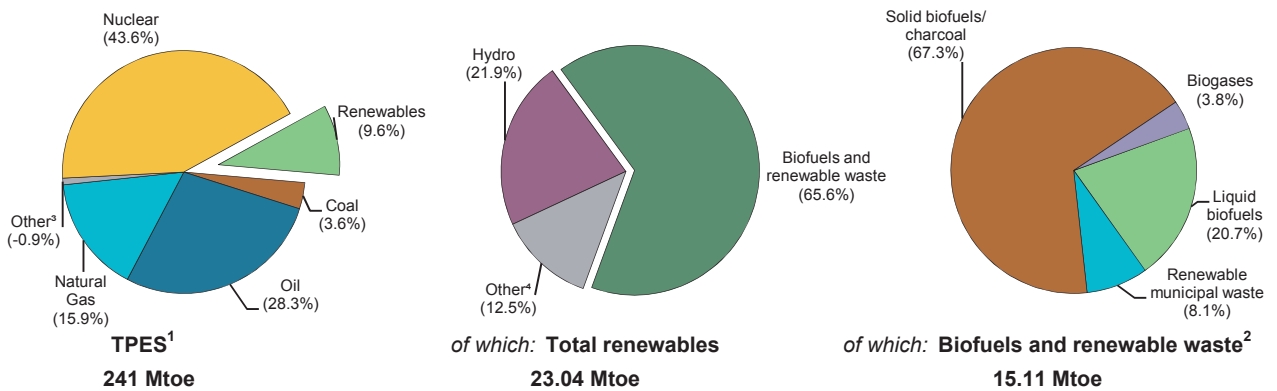
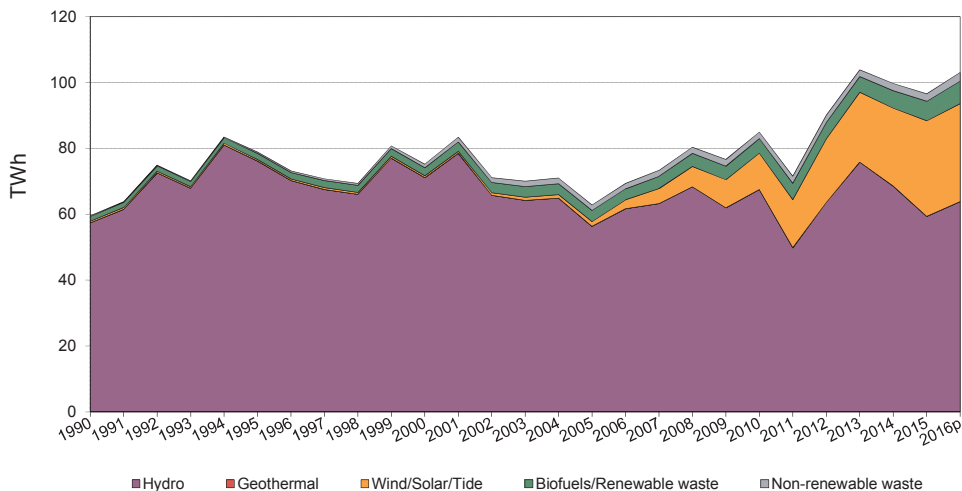


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	224.01	251.90	261.21	253.19	242.72	246.51	241.19	-0.3
<i>of which: Renewables (Mtoe)</i> ¹	15.22	15.74	20.80	22.87	21.34	21.81	23.04	2.4
<i>Renewables/TPES(%)</i>	6.8	6.2	8.0	9.0	8.8	8.8	9.6	2.7
GDP (billion 2010 US dollars)	1907.28	2346.48	2646.84	2722.41	2748.20	2777.54	2810.53	1.1
TPES/GDP ²	0.12	0.11	0.10	0.09	0.09	0.09	0.09	-1.4
TPES/GDP (year 2010 = 100)	119	109	100	94	89	90	87	-1.4
Population (millions)	58.23	60.87	64.97	65.93	66.23	66.50	66.67	0.6
TPES/population (toe per capita)	3.85	4.14	4.02	3.84	3.67	3.71	3.62	-0.8
Electricity generation (TWh) ³	417.2	535.2	564.3	567.1	557.9	563.5	549.6	0.2
<i>of which: Renewables (TWh)</i> ^{1,3}	55.78	69.40	78.20	96.67	91.81	89.36	95.33	2.0
<i>Renew./Total Elec.(%)</i> ^{1,4}	13.4	13.0	13.9	17.0	16.5	15.9	17.3	1.8
Road energy consumption (Mtoe)	36.3	42.1	41.3	40.7	41.1	41.5	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	0.32	2.40	2.69	2.91	2.95	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	0.8	5.8	6.6	7.1	7.1	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	24913	26059	33928	39950	41900	44193	3.6
Hydro	24673	25126	25401	25360	25294	25278	0.0
<i>Hydro <1MW</i>	366	372	447	417	415	427	0.9
<i>Hydro 1-10MW</i>	1442	1462	1621	1604	1614	1638	0.8
<i>Hydro 10+MW</i>	15909	15812	16088	16094	16100	16098	0.1
<i>Mixed plants</i>	5164	5623	5437	5437	5437	5387	-0.3
<i>Pure pumped storage</i>	1792	1857	1808	1808	1728	1728	-0.5
Geothermal	-	-	-	2	2	2	-
Solar photovoltaic	-	7	1044	4652	5654	6755	58.1
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	240	240	240	240	240	240	-
Wind	-	38	5912	8202	9068	10217	45.2
Industrial waste	-	-	-	63	97	116	-
Municipal waste	-	432	807	826	844	782	4.0
Solid biofuels	-	182	353	325	411	483	6.7
Biogases	-	34	171	280	290	320	16.1
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	571	513	1447	1975	2096	2171	10.1
<i>Cap. of solar collectors (MW_{th})</i> ⁶	400	359	1013	1383	1467	1520	10.1

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	27.29	32.97	28.59	29.68	27.18	24.94	x
Hydro	26.57	32.32	30.35	34.15	30.97	26.83	28.61
<i>of which: <1MW</i>	-	44.79	42.95	43.39	41.54	34.81	36.12
<i>of which: 1-10MW</i>	-	41.12	36.48	39.93	37.46	30.89	33.45
<i>of which: 10+MW</i>	38.65	43.06	39.63	45.06	39.72	34.54	37.06
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	0.96
Solar photovoltaic	-	8.52	6.78	11.62	11.94	12.27	11.17
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	23.91	24.13	22.66	19.67	22.86	23.18	22.04
Wind	-	14.47	19.20	22.32	21.71	23.74	22.20
Industrial waste	-	-	-	26.79	20.79	24.69	24.09
Municipal waste	- e	57.13	55.82	52.53	53.31	58.33	55.41
Solid biofuels	-	68.37	47.30	48.01	48.04	50.58	53.09
Biogases	-	103.65	67.13	61.42	64.27	63.62	62.25
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

FRANCE

Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	59552	75253	84980	103871	99751	96566	103058	2.0
Hydro	57418	71133	67525	75867	68627	59400	63847	-0.7
<i>of which: pumped storage</i>	3552	4770	4812	5151	5797	4960	5118	0.4
Geothermal	-	-	-	-	-	-	4	-
Solar photovoltaic	-	5	620	4735	5913	7259	8257	58.9
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	503	507	476	414	481	487	500	-0.1
Wind	-	48	9945	16033	17249	21249	20952	46.2
Industrial waste	-	-	-	147	176	250	289	-
Municipal waste renew.	222	1081	1973	1901	1971	1999	2324	4.9
Municipal waste non-renew.	221	1081	1973	1901	1971	1999	2324	4.9
Solid biofuels	1116	1090	1463	1367	1731	2140	2488	5.3
Biogases	72	308	1005	1506	1632	1783	2073	12.7
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	58396	73200	82054	100420	95412	91663	..	-
Hydro	57418	71133	67525	75867	68627	59400	..	-
<i>of which: pumped storage</i>	3552	4770	4812	5151	5797	4960	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	5	620	4735	5913	7259	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	503	507	476	414	481	487	..	-
Wind	-	48	9945	16033	17249	21249	..	-
Industrial waste	-	-	-	90	109	173	..	-
Municipal waste renew.	222	487	1196	1219	1113	1142	..	-
Municipal waste non-renew.	221	487	1196	1219	1113	1142	..	-
Solid biofuels	-	278	374	69	98	98	..	-
Biogases	32	255	722	774	709	713	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	1156	2053	2926	3451	4339	4903	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	57	67	77	..	-
Municipal waste renew.	-	594	777	682	858	857	..	-
Municipal waste non-renew.	-	594	777	682	858	857	..	-
Solid biofuels	1116	812	1089	1298	1633	2042	..	-
Biogases	40	53	283	732	923	1070	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	19997	23992	38778	49344	53700	60171	60171	5.9
Geothermal	..	..	3199	3937	3747	3844	3844	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	102	214	216	216	-
Municipal waste renew.	9999 e	11996	11299	11267	11597	12211	12211	0.1
Municipal waste non-renew.	9998 e	11996	11299	11267	11597	12211	12211	0.1
Solid biofuels	-	-	12632	22067	25572	30257	30257	-
Biogases	-	-	349	704	973	1432	1432	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	17814	24909	31645	34780	38155	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	102	214	216	..	-
Municipal waste renew.	-	8907	8165	8879	9423	10037	..	-
Municipal waste non-renew.	-	8907	8165	8879	9423	10037	..	-
Solid biofuels	-	-	8349	13183	14847	16544	..	-
Biogases	-	-	230	602	873	1321	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	19997	6178	13869	17699	18920	22016	..	-
Geothermal	..	..	3199	3937	3747	3844	..	..
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	9999 e	3089	3134	2388	2174	2174	..	-
Municipal waste non-renew.	9998 e	3089	3134	2388	2174	2174	..	-
Solid biofuels	-	-	4283	8884	10725	13713	..	-
Biogases	-	-	119	102	100	111	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	53	204	381	381 e	-
Heat pumps ²	-	-	-	75	272	503	503 e	-
(-) Input to heat pumps	-	-	-	22	68	122	122	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	4682	1827	42	624	213	99	133	1212
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	4682	1827	42	624	213	99	133	1212
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-4630	-1702	-42	-303	-	-	-	-2
Autoproducer electricity plants	-52	-125	-	-321	-	-	-104	-450
Main activity CHP plants	-	-	-	-	-	-	-6	-102
Autoproducer CHP plants	-	-	-	-	-	-	-20	-405
Main heat plants	-	-	-	-	-159	-	-	-
Autoproducer heat plants	-	-	-	-	-24	-	-	-104
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-24
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	30	99	4	125
Industry	-	-	-	-	-	-	1	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	1	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	30	99	3	125
Residential	-	-	-	-	-	85	-	-
Commercial and public services	-	-	-	-	17	12	3	125
Agriculture/forestry	-	-	-	-	5	2	-	-
Fishing	-	-	-	-	8	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	54440	21249	487	7259	-	-	250	1999
<i>Electricity plants</i>	54440	21249	487	7259	-	-	173	1142
<i>CHP plants</i>	-	-	-	-	-	-	77	857
Heat generated - TJ	-	-	-	-	3844	-	216	12211
<i>CHP plants</i>	-	-	-	-	-	-	216	10037
<i>Heat plants</i>	-	-	-	-	3844	-	-	2174

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
1212	9659	-	538	380	2139	-	22760	16.5%
-	-	-	-	101	506	-	607	0.4%
-	-	-	-	-58	-120	-	-178	0.5%
-	-	-	-	1	-33	-	-32	x
1212	9659	-	538	423	2493	-	23157	9.4%
-	-	-	-	-2	35	-	33	x
-2	-	-	-19	-	-	-	-6700	x
-450	-39	-	-168	-	-	-	-1709	x
-102	-653	-	-93	-	-	-	-956	x
-405	-374	-	-123	-	-	-	-1327	x
-	-349	-	-	-	-	-	-508	x
-104	-31	-	-2	-	-	-	-265	x
-	-	-	-	-	-	-	-	-
-	-	-	-6	-	-	-	-6	x
-24	-	-	-1	-	-	-	-49	x
-	-	-	-	-	-	-	-	-
125	8212	-	124	421	2528	-	11668	7.9%
-	1308	-	55	-	-	-	1364	5.4%
-	17	-	-	-	-	-	17	1.0%
-	72	-	28	-	-	-	100	1.9%
-	-	-	-	-	-	-	-	-
-	142	-	3	-	-	-	145	4.5%
-	7	-	-	-	-	-	7	0.7%
-	3	-	-	-	-	-	3	0.2%
-	6	-	5	-	-	-	11	2.9%
-	127	-	7	-	-	-	134	2.7%
-	596	-	12	-	-	-	609	26.4%
-	315	-	-	-	-	-	315	51.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	22	-	-	-	-	-	22	1.9%
-	-	-	-	421	2528	-	2949	6.7%
-	-	-	-	421	2528	-	2949	7.1%
-	-	-	-	-	-	-	-	-
125	6904	-	69	-	-	-	7355	11.3%
-	6462	-	-	-	-	-	6547	17.4%
125	311	-	59	-	-	-	652	2.9%
-	131	-	10	-	-	-	148	3.6%
-	-	-	-	-	-	-	8	2.7%
-	-	-	-	-	-	-	-	-
1999	2140	-	1783	-	-	-	91606	16.3%
1142	98	-	713	-	-	-	86703	15.9%
857	2042	-	1070	-	-	-	4903	29.8%
12211	30257	-	1432	-	-	-	60171	44.3%
10037	16544	-	1321	-	-	-	38155	48.0%
2174	13713	-	111	-	-	-	22016	39.0%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	4624	5275	7309	9039	9162	8925	9069 e	3.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	4624	5275	7309	9039	9162	8925	9069 e	3.6
Statistical differences	-	-	-	-1	-1	-1	..	..
Transformation processes	-	-	6398	7758	7881	7687	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	4624	5275	911	1280	1280	1237	..	-9.2
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	4624	5275	911	1280	1280	1237	..	-9.2
Solar thermal (TJ)								
Production	1015	866	2694	3748	3993	4146	4272	11.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1015	866	2694	3748	3993	4146	4272	11.0
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	1015	866	2694	3748	3993	4146	..	11.0
<i>Industry</i>	-	-	5	10	17	19	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1015	866	2689	3738	3976	4127	..	11.0
Industrial waste (TJ)								
Production	-	-	-	2149	3058	5584	5673	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	2149	3058	5584	5673	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	1979	2917	5427	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	170	141	157	..	-
<i>Industry</i>	-	-	-	8	19	26	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	162	122	131	..	-
Municipal waste - renewables (TJ)								
Production	23991 e	38877	50263	50316	49038	50741	51543	1.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	23991 e	38877	50263	50316	49038	50741	51543	1.8
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	23991 e	32519	45701	44483	42146	44463	..	2.1
Energy industry own use	-	-	426	815	1618	1025	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	6358	4136	5018	5274	5253	..	-1.3
<i>Industry</i>	-	-	8	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	6358	4128	5018	5274	5253	..	-1.3

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	23991 e	38877	50263	50316	49038	50741	51543	1.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	23991 e	38877	50263	50316	49038	50741	51543	1.8
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	23991 e	32519	45701	44483	42146	44463	..	2.1
Energy industry own use	-	-	426	815	1618	1025	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	6358	4136	5018	5274	5253	..	-1.3
<i>Industry</i>	-	-	8	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	6358	4128	5018	5274	5253	..	-1.3
Solid Biofuel excluding charcoal (TJ)								
Production	409016	353091	430718	433770	380088	404492	426256	0.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	409016	353091	430718	433770	380088	404492	426256	0.9
Statistical differences	1	-	-	-	-	-	..	..
Transformation processes	6780	7019	56565	49396	56984	60585	..	15.5
Energy industry own use	-	-	320	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	402237	346072	373833	384374	323104	343907	..	-0.0
<i>Industry</i>	62328	64700	60391	57813	52544	54784	..	-1.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	339909	281372	313442	326561	270560	289123	..	0.2
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	3035	6248	13737	18279	19783	22549	24265	8.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	3035	6248	13737	18279	19783	22549	24265	8.9
Statistical differences	-	-	-1	-	-	-	..	..
Transformation processes	712	2834	11328	14387	15329	17281	..	12.8
Energy industry own use	-	-	-	-	25	61	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	2323	3414	2408	3892	4429	5207	..	2.9
<i>Industry</i>	315	738	827	861	1934	2298	..	7.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2008	2676	1581	3031	2495	2909	..	0.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	93	744	786	729	593	611	13.1
Net imports ¹	-	-	-133	-176	-93	67	110	-
Stock changes	-	-2	7	7	-3	1	-6	
Gross consumption	-	91	618	617	633	661	715	14.1
Statistical differences	-	-	-	-5	2	-3	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	91	618	612	635	658	..	14.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	91	618	612	635	658	..	14.1
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	300	2018	2179	2360	2434	2352	15.0
Net imports ¹	-	8	273	415	497	439	694	30.6
Stock changes	-	-5	-10	-9	-52	-37	-12	
Gross consumption	-	303	2281	2585	2805	2836	3034	16.1
Statistical differences	-	-	-	30	39	40	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	303	2281	2615	2844	2876	..	16.2
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	303	2281	2615	2844	2876	..	16.2
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

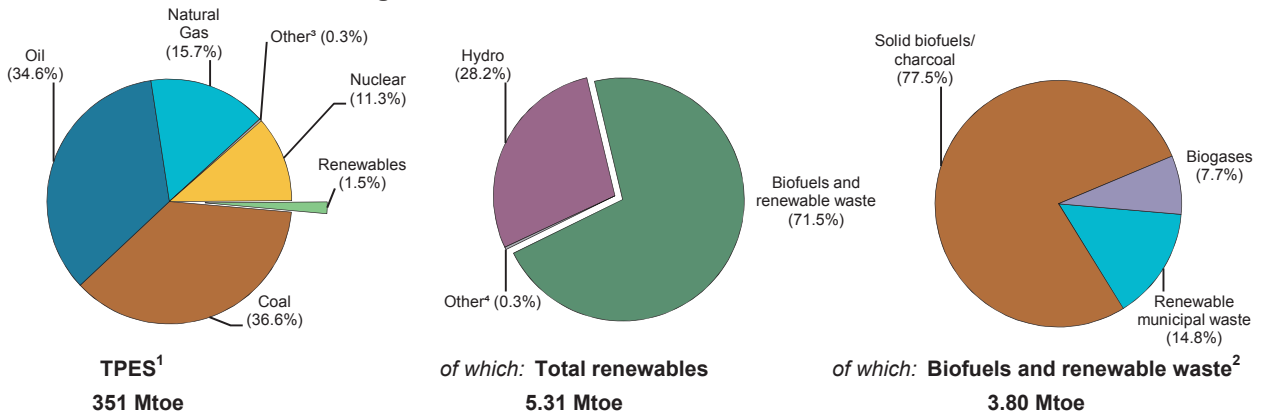


Figure 2. Contribution of renewables in 2016 provisional

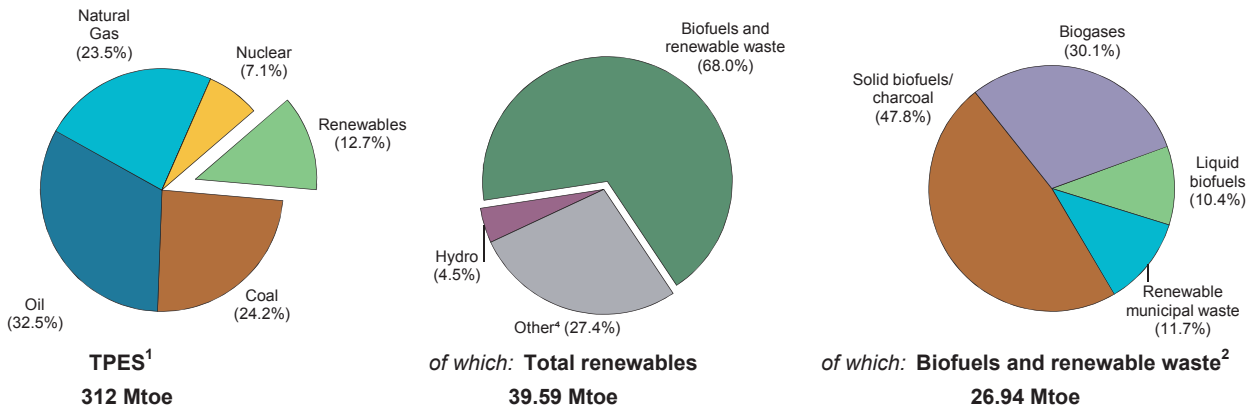
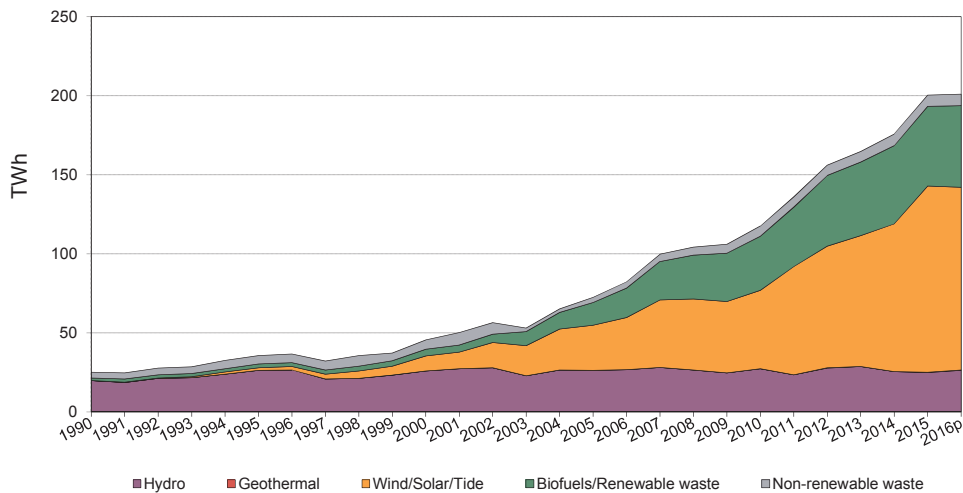


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	351.20	336.58	325.97	317.60	305.72	307.79	311.53	-0.5
<i>of which: Renewables (Mtoe)</i> ¹	5.31	8.98	27.57	33.40	35.40	38.35	39.59	9.7
<i>Renewables/TPES(%)</i>	1.5	2.7	8.5	10.5	11.6	12.5	12.7	10.2
GDP (billion 2010 US dollars)	2568.63	3123.91	3417.10	3577.02	3634.08	3696.61	3765.64	1.2
TPES/GDP ²	0.14	0.11	0.10	0.09	0.08	0.08	0.08	-1.6
TPES/GDP (year 2010 = 100)	143	113	100	93	88	87	87	-1.6
Population (millions)	79.36	81.46	80.28	80.65	80.98	81.69	82.73	0.1
TPES/population (toe per capita)	4.43	4.13	4.06	3.94	3.78	3.77	3.77	-0.6
Electricity generation (TWh) ³	547.7	572.3	626.6	632.9	621.9	641.0	642.9	0.7
<i>of which: Renewables (TWh)</i> ^{1,3}	19.09	35.48	104.81	152.37	162.51	187.37	188.22	11.0
<i>Renew./Total Elec.(%)</i> ^{1,4}	3.5	6.2	16.7	24.1	26.1	29.2	29.3	10.2
Road energy consumption (Mtoe)	50.5	56.3	50.3	51.5	52.2	53.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	0.24	2.87	2.68	2.77	2.55	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	0.4	5.7	5.2	5.3	4.8	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	9146	17638	63760	91481	98497	105871	12.7
Hydro	8182	9485	11218	11240	11234	11399	1.2
<i>Hydro <1MW</i>	374	558	616	646	599	612	0.6
<i>Hydro 1-10MW</i>	912	872	532	640	684	715	-1.3
<i>Hydro 10+MW</i>	2024	2656	3104	3148	3141	3250	1.4
<i>Mixed plants</i>	672	745	1155	1156	1156	1156	3.0
<i>Pure pumped storage</i>	4200	4654	5811	5650	5654	5666	1.3
Geothermal	-	-	8	24	24	26	-
Solar photovoltaic	2	114	17552	36335	38234	39786	47.7
Solar thermal	-	-	2	2	2	2	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	48	6095	27180	34660	39193	44670	14.2
Industrial waste	253	885	1226	953	953	953	0.5
Municipal waste	550	585	1526	1860	1888	1924	8.3
Solid biofuels	22	129	1913	2057	2074	2075	20.3
Biogases	89	345	2802	4100	4700	4803	19.2
Liquid biofuels	-	-	333	250	195	233	-
Solar collectors surface (1000 m ²)	348	3251	14044	17222	17987	18625	12.3
<i>Cap. of solar collectors (MW_{th})</i> ⁶	244	2276	9831	12055	12591	13038	12.3

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	31.26	29.44	21.05	20.56	20.37	21.60	x
Hydro	27.61	31.25	27.83	29.23	25.86	24.93	26.35
<i>of which: <1MW</i>	41.08	51.74	42.54	42.20	39.00	36.98	38.06
<i>of which: 1-10MW</i>	62.25	63.71	62.89	85.07	46.32	42.94	53.48
<i>of which: 10+MW</i>	62.64	61.62	57.84	57.44	53.66	50.25	53.92
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	39.53	37.99	46.68	58.89	38.91
Solar photovoltaic	5.71	6.01	7.63	9.74	10.77	11.11	9.96
Solar thermal	-	-	0.41	-	-	-	0.04
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	16.89	17.52	15.87	17.03	16.71	20.24	18.33
Industrial waste	107.07	50.90	14.95	13.92	16.32	15.43	15.09
Municipal waste	50.58	71.97	71.01	66.46	73.40	68.45	71.70
Solid biofuels	66.94	71.15	64.25	64.61	65.32	60.70	64.82
Biogases	31.68	55.69	71.01	81.40	75.57	78.61	78.13
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	46.69	12.72	21.34	21.92	17.06

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	25049	45495	117561	164728	175803	200343	200997	9.7
Hydro	19791	25962	27353	28782	25444	24898	26405	0.1
<i>of which: pumped storage</i>	2365	4230	6400	5784	5857	5921	5500	1.7
Geothermal	-	-	28	80	98	134	151	-
Solar photovoltaic	1	60	11729	31010	36056	38726	38171	49.7
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	71	9352	37793	51708	57357	79206	77412	14.1
Industrial waste	2373	3946	1605	1162	1363	1288	1300	-6.7
Municipal waste renew.	1219	1844	4747	5416	6070	5768	5979	7.6
Municipal waste non-renew.	1218	1844	4747	5416	6070	5768	5979	7.6
Solid biofuels	129	804	10768	11642	11868	11034	10997	17.8
Biogases	247	1683	17430	29234	31113	33073	34162	20.7
Liquid biofuels	-	-	1361	278	364	448	441	-
of which:								
Electricity only plants	25049	45495	92632	132863	141296	164487	..	-
Hydro	19791	25962	27353	28782	25444	24898	..	-
<i>of which: pumped storage</i>	2365	4230	6400	5784	5857	5921	..	-
Geothermal	-	-	28	80	98	134	..	-
Solar photovoltaic	1	60	11729	31010	36056	38726	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	71	9352	37793	51708	57357	79206	..	-
Industrial waste	2373	3946	772	715	879	735	..	-
Municipal waste renew.	1219	1844	3182	3274	3684	3530	..	-
Municipal waste non-renew.	1218	1844	3182	3274	3684	3530	..	-
Solid biofuels	129	804	4255	5199	5333	4796	..	-
Biogases	247	1683	4204	8800	8745	8845	..	-
Liquid biofuels	-	-	134	21	16	87	..	-
CHP plants	-	-	24929	31865	34507	35856	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	833	447	484	553	..	-
Municipal waste renew.	-	-	1565	2142	2386	2238	..	-
Municipal waste non-renew.	-	-	1565	2142	2386	2238	..	-
Solid biofuels	-	-	6513	6443	6535	6238	..	-
Biogases	-	-	13226	20434	22368	24228	..	-
Liquid biofuels	-	-	1227	257	348	361	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	19771	19368	74198	93594	95042	102523	104458	11.1
Geothermal	-	-	225	207	304	626	799	-
Solar thermal	-	-	-	1	11	9	9	-
Industrial waste	-	-	9009	5747	6287	7481	6941	-
Municipal waste renew.	10874	10652	23626	30134	29611	30284	30706	6.8
Municipal waste non-renew.	8897	8716	23626	30134	29611	30284	30706	8.2
Solid biofuels	-	-	15871	22358	22501	24417	25745	-
Biogases	-	-	1508	4877	6581	9285	9422	-
Liquid biofuels	-	-	333	136	136	137	130	-
<i>of which:</i>								
CHP plants	19771	19368	47661	57655	62681	65275	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	5999	3790	4467	5119	..	-
Municipal waste renew.	10874	10652	15414	18068	19378	18524	..	-
Municipal waste non-renew.	8897	8716	15414	18068	19378	18524	..	-
Solid biofuels	-	-	9692	14661	15040	16719	..	-
Biogases	-	-	939	2953	4305	6280	..	-
Liquid biofuels	-	-	203	115	113	109	..	-
Heat only plants	-	-	26537	35939	32361	37248	..	-
Geothermal	-	-	225	207	304	626	..	-
Solar thermal	-	-	-	1	11	9	..	-
Industrial waste	-	-	3010	1957	1820	2362	..	-
Municipal waste renew.	-	-	8212	12066	10233	11760	..	-
Municipal waste non-renew.	-	-	8212	12066	10233	11760	..	-
Solid biofuels	-	-	6179	7697	7461	7698	..	-
Biogases	-	-	569	1924	2276	3005	..	-
Liquid biofuels	-	-	130	21	23	28	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	6606	7461	7043	8739	7376	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	6606	7461	7043	8739	7376	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	1632	6812	-	3330	214	671	1257	2994
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	1632	6812	-	3330	214	671	1257	2994
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-1619	-6812	-	-3330	-115	-	-208	-966
Autoproducer electricity plants	-14	-	-	-	-	-	-28	-5
Main activity CHP plants	-	-	-	-	-	-	-251	-1134
Autoproducer CHP plants	-	-	-	-	-	-	-29	-41
Main heat plants	-	-	-	-	-30	-	-96	-455
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-12
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	68	671	646	380
Industry	-	-	-	-	-	-	646	380
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	164	22
Non-ferrous metals	-	-	-	-	-	-	6	-
Non-metallc minerals	-	-	-	-	-	-	458	301
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	18	57
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	68	671	-	-
Residential	-	-	-	-	23	633	-	-
Commercial and public services	-	-	-	-	45	38	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	18977	79206	-	38726	134	-	1288	5768
<i>Electricity plants</i>	18977	79206	-	38726	134	-	735	3530
<i>CHP plants</i>	-	-	-	-	-	-	553	2238
Heat generated - TJ	-	-	-	-	626	9	7481	30284
<i>CHP plants</i>	-	-	-	-	-	-	5119	18524
<i>Heat plants</i>	-	-	-	-	626	9	2362	11760

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
2994	12059	-	7853	436	2765	118	43135	36.1%
-	-	-	-	376	667	-	1043	0.4%
-	-	-	-	-68	-1507	-	-1575	2.6%
-	-	-	-	-	-	-	-	-
2994	12059	-	7853	744	1925	118	42603	13.8%
-	-	-	-	-	-	-1	-1	x
-966	-1061	-	-2007	-	-	-17	-17101	x
-5	-315	-	-2	-	-	-4	-373	x
-1134	-1105	-	-3720	-	-	-51	-7395	x
-41	-558	-	-33	-	-	-2	-704	x
-455	-323	-	-122	-	-	-1	-1482	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-12	-27	-	-488	-	-	-	-539	x
-	-	-	-23	-	-	-	-23	x
380	8670	-	1457	744	1925	43	14984	6.8%
380	2158	-	60	-	-	19	3643	6.6%
-	2	-	-	-	-	-	2	0.0%
22	34	-	9	-	-	8	259	1.8%
-	-	-	-	-	-	-	6	0.3%
301	138	-	1	-	-	4	1203	18.3%
-	5	-	-	-	-	1	6	0.2%
-	51	-	9	-	-	2	62	1.2%
-	19	-	1	-	-	-	20	5.5%
-	39	-	16	-	-	1	56	1.2%
57	538	-	22	-	-	3	695	12.2%
-	1200	-	-	-	-	-	1200	67.0%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	2	0.4%
-	129	-	1	-	-	-	130	4.9%
-	-	-	30	744	1792	1	2567	4.6%
-	-	-	30	744	1775	1	2550	4.8%
-	-	-	-	-	17	-	17	0.6%
-	6511	-	1367	-	134	24	8775	10.0%
-	5316	-	-	-	-	-	5972	11.2%
-	1196	-	1367	-	134	24	2804	8.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
5768	11034	-	33073	-	-	448	194422	30.3%
3530	4796	-	8845	-	-	87	158566	30.2%
2238	6238	-	24228	-	-	361	35856	31.0%
30284	24417	-	9285	-	-	137	102523	22.4%
18524	16719	-	6280	-	-	109	65275	19.9%
11760	7698	-	3005	-	-	28	37248	28.7%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	..	..	3611	6140	7629	8943	10134	..
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	..	..	3611	6140	7629	8943	10134	..
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	1447	3288	4142	6080	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	..	..	2164	2852	3487	2863	..	..
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	..	..	2164	2852	3487	2863	..	..
Solar thermal (TJ)								
Production	468	4644	20269	24409	26232	28100	28109	12.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	468	4644	20269	24409	26232	28100	28109	12.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	1	1	11	9	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	468	4644	20268	24408	26221	28091	..	12.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	468	4644	20268	24408	26221	28091	..	12.7
Industrial waste (TJ)								
Production	20526 e	43047 e	65840	49437	52968	52659	55000	1.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	20526 e	43047 e	65840	49437	52968	52659	55000	1.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	20526 e	43047 e	30412	22400	25434	25601	..	-3.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	35428	27037	27534	27058	..	-
<i>Industry</i>	-	-	35428	27037	27534	27058	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	23512	29674	97702	122530	127155	125360	132000	10.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	23512	29674	97702	122530	127155	125360	132000	10.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	23512	29674	93218	107255	111899	108937	..	9.1
Energy industry own use	-	-	-	196	178	515	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	4484	15079	15078	15908	..	-
<i>Industry</i>	-	-	3612	15079	15078	15908	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	872	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	21323	27344	97702	122530	127155	125360	132000	10.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	21323	27344	97702	122530	127155	125360	132000	10.7
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	21323	27344	93218	107255	111899	108937	..	9.7
Energy industry own use	-	-	-	196	178	515	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	4484	15079	15078	15908	..	-
<i>Industry</i>	-	-	3612	15079	15078	15908	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	872	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	123259	196434	460975	456457	478330	504993	539000	6.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	123259	196434	460975	456457	478330	504993	539000	6.5
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	4644	13805	123512	142242	149548	140822	..	16.7
Energy industry own use	-	-	387	695	653	1117	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	118615	182629	337076	313520	328129	363054	..	4.7
<i>Industry</i>	27337	14000	78368	73659	95508	90388	..	13.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	91278	168629	258708	239861	232621	272666	..	3.3
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	12231	23341	177346	287845	311259	328840	340000	19.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	12231	23341	177346	287845	311259	328840	340000	19.3
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	6360	18360	123186	217991	232451	246435	..	18.9
Energy industry own use	-	-	18638	17463	19717	20428	..	-
Losses	-	-	918	1005	907	964	..	..
Final energy consumption	5871	4981	34604	51386	58184	61013	..	18.2
<i>Industry</i>	5871	4981	6513	2163	2216	2521	..	-4.4
<i>Transport</i>	-	-	583	1919	2088	1251	..	-
<i>Other</i>	-	-	27508	47304	53880	57241	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	619	640	709	688	738	-
Net imports ¹	-	-	546	567	520	486	437	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1165	1207	1229	1174	1175	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1165	1207	1229	1174	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	1165	1207	1229	1174	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	250	3084	2911	3352	3085	3100	18.2
Net imports ¹	-	-	-555	-700	-1037	-937	-946	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	250	2529	2211	2315	2148	2154	15.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	250	2529	2211	2315	2148	..	15.4
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	250	2372	2063	2156	1999	..	14.9
<i>Other</i>	-	-	157	148	159	149	..	-
Other liquid biofuels (kt)								
Production	-	16	730	158	178	195	194	18.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	16	730	158	178	195	194	18.1
Statistical differences	-	-	-	-1	-	-1	..	-
Transformation processes	-	-	416	85	96	122	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	16	314	72	82	72	..	10.5
<i>Industry</i>	-	-	94	39	38	31	..	-
<i>Transport</i>	-	16	61	1	6	2	..	-12.9
<i>Other</i>	-	-	159	32	38	39	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

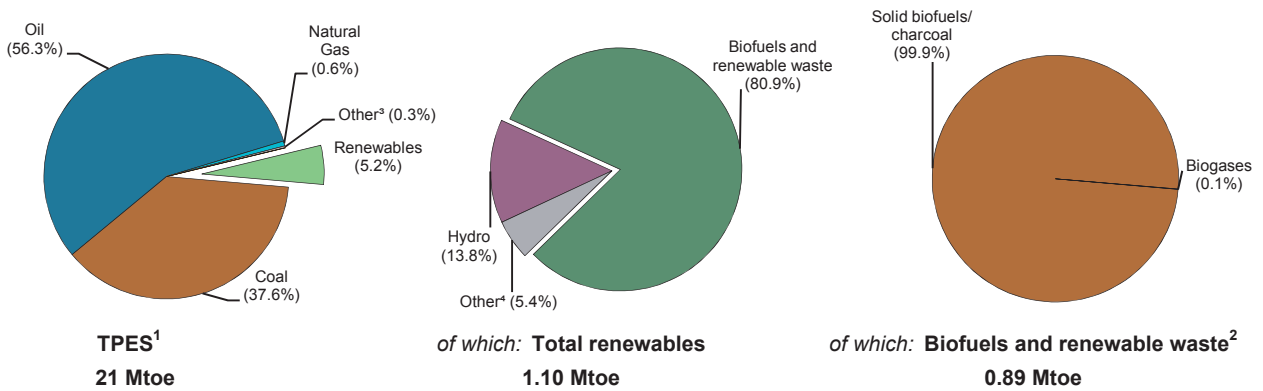


Figure 2. Contribution of renewables in 2016 provisional

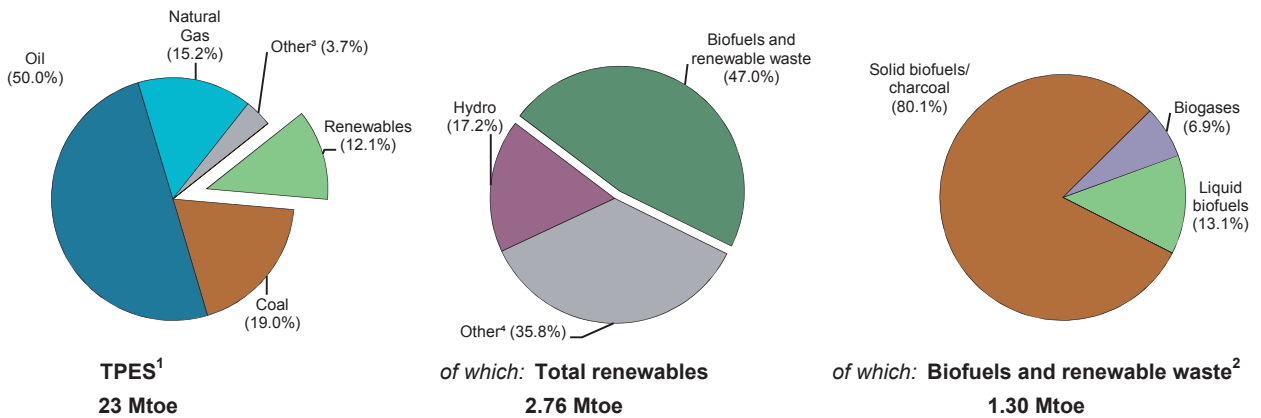
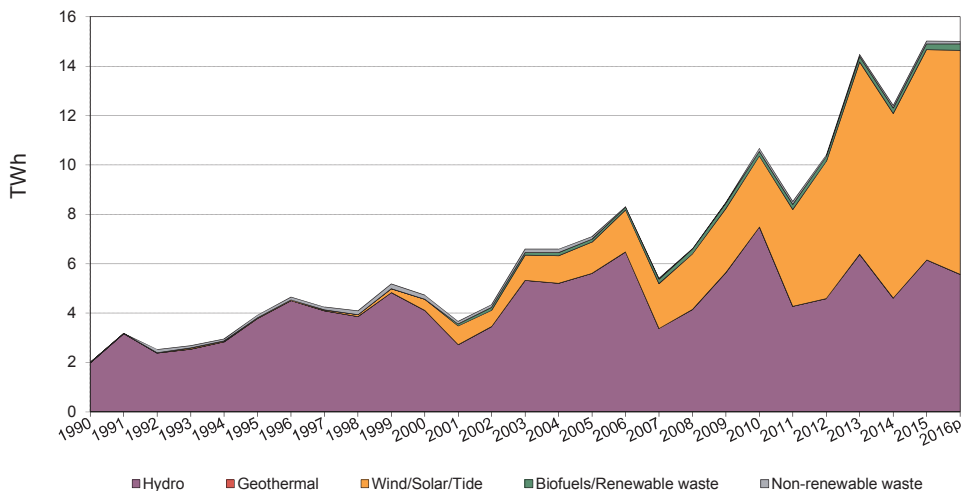


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	21.44	27.09	27.60	23.33	23.13	23.19	22.91	-1.0
<i>of which: Renewables (Mtoe)</i> ¹	1.10	1.40	2.13	2.62	2.44	2.78	2.76	4.3
<i>Renewables/TPES(%)</i>	5.2	5.2	7.7	11.2	10.6	12.0	12.1	5.4
GDP (billion 2010 US dollars)	197.65	251.51	299.36	243.99	244.85	244.31	244.34	-0.2
TPES/GDP ²	0.11	0.11	0.09	0.10	0.09	0.09	0.09	-0.9
TPES/GDP (year 2010 = 100)	118	117	100	104	102	103	102	-0.9
Population (millions)	10.27	10.81	11.12	10.97	10.89	10.86	10.88	0.0
TPES/population (toe per capita)	2.09	2.51	2.48	2.13	2.12	2.14	2.11	-1.1
Electricity generation (TWh) ³	34.8	53.4	57.4	57.1	50.3	51.8	48.8	-0.6
<i>of which: Renewables (TWh)</i> ^{1,3}	1.77	4.14	10.52	14.35	12.18	14.85	14.87	8.3
<i>Renew./Total Elec.(%)</i> ^{1,4}	5.1	7.8	18.3	25.1	24.2	28.7	30.5	8.9
Road energy consumption (Mtoe)	3.9	5.3	6.5	5.0	4.9	5.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.13	0.12	0.14	0.14	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	2.0	2.5	2.7	2.9	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	2458	3334	4799	7715	8053	8181	6.2
Hydro	2408	3072	3215	3238	3389	3392	0.7
<i>Hydro <1MW</i>	-	14	34	33	35	35	6.3
<i>Hydro 1-10MW</i>	-	42	163	187	185	188	10.5
<i>Hydro 10+MW</i>	2093	2317	2319	2319	2470	2470	0.4
<i>Mixed plants</i>	315	699	699	699	699	699	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	2	-	-	-	-	-	-
Solar photovoltaic	-	-	202	2579	2596	2604	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	1	226	1298	1809	1978	2091	16.0
Industrial waste	47	35	43	43	43	43	1.4
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	2	-
Biogases	-	1	41	46	47	49	29.6
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	1448	2941	4100	4181	4287	4390	2.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	1014	2059	2870	2927	3001	3073	2.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	9.28	16.18	25.39	21.41	17.59	20.95	x
Hydro	9.47	15.28	26.58	22.51	15.52	20.70	18.01
<i>of which: <1MW</i>	-	21.20	48.35	42.20	42.01	43.18	40.00
<i>of which: 1-10MW</i>	-	38.05	42.93	39.65	35.31	34.92	35.23
<i>of which: 10+MW</i>	9.65	17.38	33.00	27.44	17.45	24.91	21.01
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	8.91	16.15	16.67	17.10	14.78
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	22.83	22.78	23.87	26.12	21.29	25.23	24.16
Industrial waste	-	53.16	34.25	22.57	26.55	29.73	24.96
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	6.06	6.06
Biogases	-	-	52.90	53.70	53.35	53.67	53.00
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	1999	4725	10676	14472	12408	15014	15008	7.5
Hydro	1997	4111	7485	6384	4607	6150	5567	1.9
<i>of which: pumped storage</i>	228	418	25	38	131	52	23	-16.6
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	158	3648	3792	3900	3930	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	2	451	2714	4139	3689	4621	5146	16.4
Industrial waste	-	163	129	85	100	112	112	-2.3
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	1	1	-
Biogases	-	-	190	216	220	230	252	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	1999	4562	10518	14210	12124	14706	..	-
Hydro	1997	4111	7485	6384	4607	6150	..	-
<i>of which: pumped storage</i>	228	418	25	38	131	52	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	158	3648	3792	3900	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	2	451	2714	4139	3689	4621	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	1	..	-
Biogases	-	-	161	39	36	34	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	163	158	262	284	308	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	163	129	85	100	112	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	29	177	184	196	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

GREECE

Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	1	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	1	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	1	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	1	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	524	397	-	335	10	196	89	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	524	397	-	335	10	196	89	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-524	-397	-	-335	-	-	-	-
Autoproducer electricity plants	-	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-25	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	10	196	65	-
Industry	-	-	-	-	-	1	65	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	65	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	1	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	10	195	-	-
Residential	-	-	-	-	-	188	-	-
Commercial and public services	-	-	-	-	6	7	-	-
Agriculture/forestry	-	-	-	-	4	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	6098	4621	-	3900	-	-	112	-
<i>Electricity plants</i>	6098	4621	-	3900	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	112	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	952	-	91	-	133	-	2727	32.2%
-	63	45	-	-	31	-	139	0.4%
-	-2	-	-	-	-6	-	-8	0.1%
-	-	-	-	-	6	-	6	x
-	1013	45	91	-	164	-	2864	12.4%
-	-	-	-	-	-1	-	-1	x
-	-	-	-9	-	-	-	-1265	x
-	-	-	-	-	-	-	-	-
-	-	-	-61	-	-	-	-61	x
-	-	-	-5	-	-	-	-30	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-3	1	-	-	-	-	-2	x
-	-	-	-	-	-	-	-	-
-	-	-	-1	-	-	-	-1	x
-	-	-	-	-	-	-	-	-
-	1010	46	16	-	163	-	1506	9.2%
-	180	-	2	-	14	-	262	8.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	65	29.3%
-	-	-	-	-	-	-	-	-
-	16	-	-	-	1	-	17	2.3%
-	-	-	-	-	1	-	1	4.7%
-	-	-	-	-	1	-	1	2.7%
-	-	-	-	-	3	-	3	3.4%
-	145	-	2	-	1	-	148	28.3%
-	3	-	-	-	-	-	3	3.6%
-	17	-	-	-	-	-	17	55.4%
-	-	-	-	-	6	-	6	4.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	1	-	2	0.7%
-	-	-	-	-	146	-	146	2.5%
-	-	-	-	-	143	-	143	2.9%
-	-	-	-	-	3	-	3	0.4%
-	830	46	14	-	4	-	1099	16.2%
-	784	46	-	-	-	-	1018	23.1%
-	18	-	14	-	3	-	48	2.6%
-	28	-	-	-	-	-	32	12.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	1	-	1	0.4%
-	1	-	230	-	-	-	14962	28.9%
-	1	-	34	-	-	-	14654	35.1%
-	-	-	196	-	-	-	308	3.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

GREECE

Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	108	67	670	481	490	410	425	12.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	108	67	670	481	490	410	425	12.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	108	67	670	481	490	410	..	12.8
<i>Industry</i>	-	-	-	5	5	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	108	67	670	476	485	410	..	12.8
Solar thermal (TJ)								
Production	2363	4138	7676	7831	8029	8221	8300	4.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2363	4138	7676	7831	8029	8221	8300	4.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	2363	4138	7676	7831	8029	8221	..	4.7
<i>Industry</i>	-	-	-	43	44	45	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2363	4138	7676	7788	7985	8176	..	4.6
Industrial waste (TJ)								
Production	-	2662	1341	883	868	3732	3732	2.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	2662	1341	883	868	3732	3732	2.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	2662	1341	883	868	1030	..	-6.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	2702	..	-
<i>Industry</i>	-	-	-	-	-	2702	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

GREECE

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	37384	39547	30351 e	35446	36391	39876	39000	0.1
Net imports ¹	-	-	4185	3422	2556	2550	2705	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	37384	39547	34536 e	38868	38947	42426	41705	0.5
Statistical differences	-	-	-	-	-	4	..	-
Transformation processes	-	-	78 e	248	124	128	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	37384	39547	34458	38620	38823	42302	..	0.4
<i>Industry</i>	7991	9741	10248	4800	6140	7551	..	-1.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	29393	29806	24210	33820	32683	34751	..	1.0
Charcoal (kt)								
Production	-	-	1	2	1	1	1	-
Net imports ¹	-	-	56	61	56	61	60	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	57	63	57	62	61	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	57	63	57	62	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	57	63	57	62	..	-
Biogases (TJ)								
Production	19	52	2065	3704	3640	3826	3738	33.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	19	52	2065	3704	3640	3826	3738	33.2
Statistical differences	-	-	-	-1	-1	16	..	-
Transformation processes	-	-	1981	2975	2961	3138	..	-
Energy industry own use	-	-	-	17	60	43	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	19	52	84	711	618	661	..	18.5
<i>Industry</i>	19	13	27	100	65	73	..	12.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	39	57	611	553	588	..	19.8

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	124	152	156	147	152	-
Net imports ¹	-	-	17	1	13	27	39	-
Stock changes	-	-	-	1	1	7	-4	-
Gross consumption	-	-	141	154	170	181	187	-
Statistical differences	-	-	-	3	1	-1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	141	157	171	180	..	-
<i>Industry</i>	-	-	-	12	16	15	..	-
<i>Transport</i>	-	-	141	138	153	161	..	-
<i>Other</i>	-	-	-	7	2	4	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

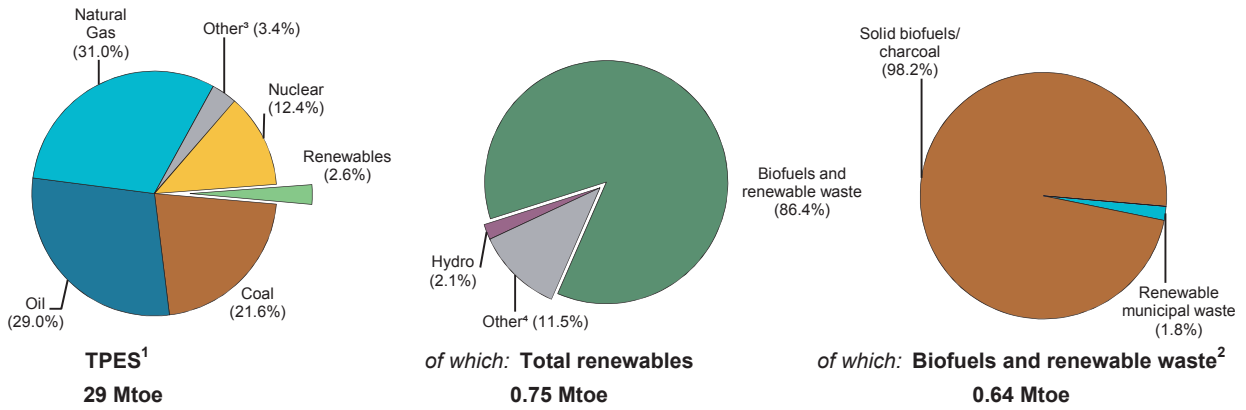


Figure 2. Contribution of renewables in 2016 provisional

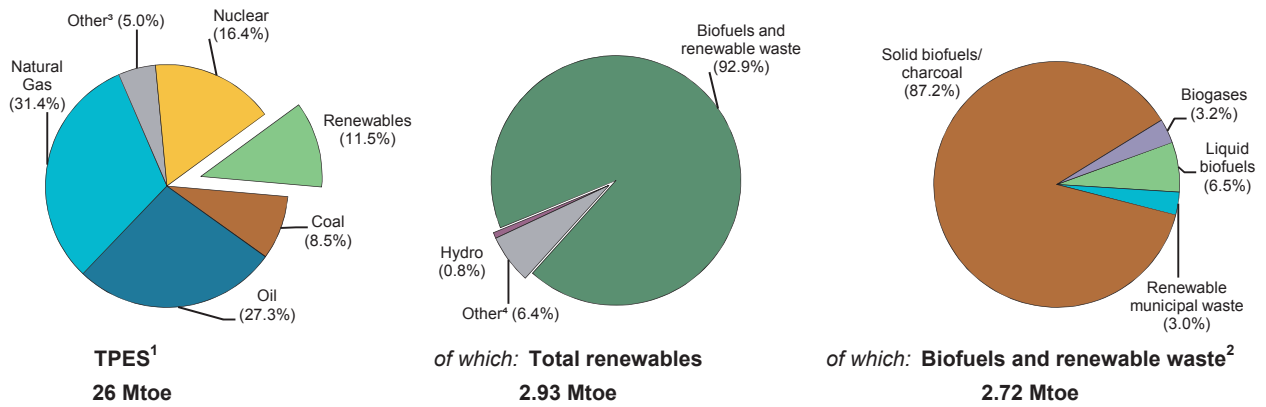
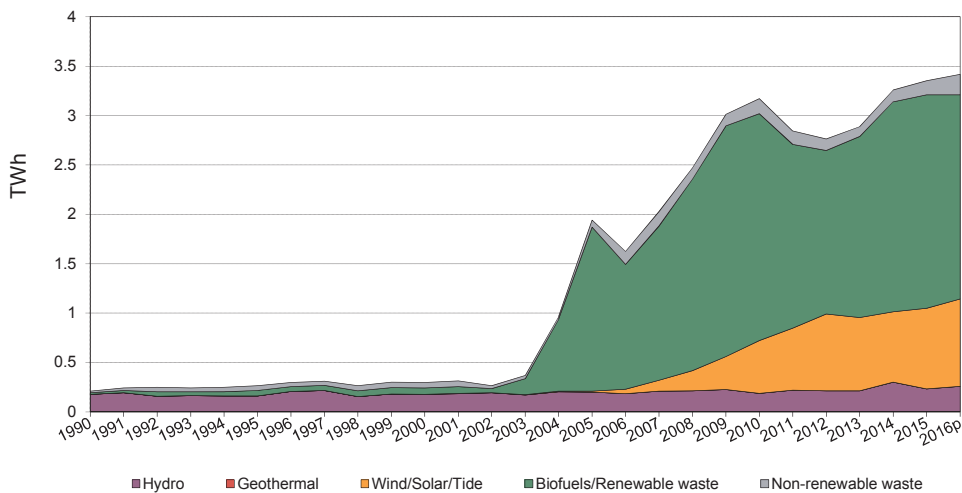


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	28.78	25.00	26.51	23.89	23.83	25.21	25.60	0.1
<i>of which: Renewables (Mtoe)</i> ¹	0.75	0.83	2.78	3.11	2.86	3.01	2.93	8.2
<i>Renewables/TPES(%)</i>	2.6	3.3	10.5	13.0	12.0	12.0	11.5	8.0
GDP (billion 2010 US dollars)	103.77	106.60	130.26	133.16	138.55	142.91	145.70	2.0
TPES/GDP ²	0.28	0.23	0.20	0.18	0.17	0.18	0.18	-1.8
TPES/GDP (year 2010 = 100)	136	115	100	88	84	87	86	-1.8
Population (millions)	10.37	10.21	10.00	9.89	9.87	9.84	9.82	-0.2
TPES/population (toe per capita)	2.78	2.45	2.65	2.41	2.42	2.56	2.61	0.4
Electricity generation (TWh) ³	28.4	35.2	37.4	30.3	29.4	30.3	31.8	-0.6
<i>of which: Renewables (TWh)</i> ^{1,3}	0.20	0.24	3.02	2.79	3.14	3.21	3.21	17.5
<i>Renew./Total Elec.(%)</i> ^{1,4}	0.7	0.7	8.1	9.2	10.7	10.6	10.1	18.2
Road energy consumption (Mtoe)	2.6	2.9	3.9	3.3	3.7	4.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.17	0.14	0.19	0.18	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	4.4	4.1	5.1	4.3	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	72	79	885	776	1040	1104	19.2
Hydro	48	48	53	57	57	57	1.2
<i>Hydro <1MW</i>	1	1	4	4	4	4	9.7
<i>Hydro 1-10MW</i>	8	8	10	12	12	12	2.7
<i>Hydro 10+MW</i>	39	39	39	41	41	41	0.3
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	2	35	77	168	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	293	329	329	329	-
Industrial waste	-	1	2	9	9	10	16.6
Municipal waste	24	24	42	36	38	49	4.9
Solid biofuels	-	5	469	247	467	422	34.4
Biogases	-	1	24	63	63	69	32.6
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	20	36	140	230	250	280	14.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	14	25	98	161	175	196	14.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	33.61	43.03	40.90	42.47	35.76	34.66	x
Hydro	42.33	42.33	40.58	42.68	60.38	46.81	47.87
<i>of which: <1MW</i>	57.08	57.08	49.13	46.93	66.05	52.38	53.46
<i>of which: 1-10MW</i>	32.82	57.08	57.19	43.78	55.49	38.81	40.26
<i>of which: 10+MW</i>	43.91	38.93	35.44	41.95	61.25	48.60	49.50
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	4.85	8.03	8.29	8.33	7.26
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	20.80	24.90	22.78	24.06	24.07
Industrial waste	-	-	38.81	6.80	20.23	53.00	21.60
Municipal waste	16.17 e	52.32 e	78.75	73.01	71.57	70.45	71.43
Solid biofuels	-	22.32	49.51	66.05	41.61	44.93	50.22
Biogases	-	-	55.80	48.41	52.13	48.47	49.68
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	212	298	3171	2888	3258	3352	3418	16.5
Hydro	178	178	188	213	301	234	260	2.4
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	1	25	56	123	200	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	534	718	657	693	684	-
Industrial waste	-	-	7	5	16	46	109	-
Municipal waste renew.	17	55	145	136	137	208	245	9.8
Municipal waste non-renew.	17	55	145	95	102	95	100	3.8
Solid biofuels	-	10	2034	1429	1702	1660	1485	36.7
Biogases	-	-	117	267	287	293	335	-
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	178	178	2768	2111	2384	2329	..	-
Hydro	178	178	188	213	301	234	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	1	25	56	123	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	534	718	657	693	..	-
Industrial waste	-	-	3	5	16	46	..	-
Municipal waste renew.	-	-	66	63	57	131	..	-
Municipal waste non-renew.	-	-	66	16	22	19	..	-
Solid biofuels	-	-	1900	979	1210	1011	..	-
Biogases	-	-	10	92	65	72	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	34	120	403	777	874	1023	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	4	-	-	-	-	-
Municipal waste renew.	17	55	79	73	80	77	..	-
Municipal waste non-renew.	17	55	79	79	80	76	..	-
Solid biofuels	-	10	134	450	492	649	..	-
Biogases	-	-	107	175	222	221	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	558	1180	3798	5262	5591	7591	8645	13.3
Geothermal	-	218	233	574	1166	1769	1796	14.1
Solar thermal	-	-	5	-	-	-	-	-
Industrial waste	-	-	-	162	150	302	518	-
Municipal waste renew.	159 e	408 e	538	288	368	483	505	1.3
Municipal waste non-renew.	159 e	407 e	538	312	367	478	504	1.3
Solid biofuels	240	147	2363	3835	3464	4428	5183	24.9
Biogases	-	-	121	91	76	131	139	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	318	890	3387	3131	3073	3516	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	162	150	158	..	-
Municipal waste renew.	159 e	408 e	538	288	368	483	..	-
Municipal waste non-renew.	159 e	407 e	538	312	367	478	..	-
Solid biofuels	-	75	2201	2279	2112	2320	..	-
Biogases	-	-	110	90	76	77	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	240	290	411	2131	2518	4075	..	-
Geothermal	-	218	233	574	1166	1769	..	-
Solar thermal	-	-	5	-	-	-	-	-
Industrial waste	-	-	-	-	-	144	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	240	72	162	1556	1352	2108	..	-
Biogases	-	-	11	1	-	54	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	965	1736	1678	1630	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	965	1736	1678	1630	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	20	60	-	11	105	11	60	66
Imports	-	-	-	-	-	-	20	9
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	20	60	-	11	105	11	80	75
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-20	-60	-	-	-	-	-5	-32
Autoproducer electricity plants	-	-	-	-11	-	-	-9	-
Main activity CHP plants	-	-	-	-	-	-	-	-39
Autoproducer CHP plants	-	-	-	-	-	-	-6	-
Main heat plants	-	-	-	-	-38	-	-	-
Autoproducer heat plants	-	-	-	-	-14	-	-10	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	53	11	51	3
Industry	-	-	-	-	1	-	47	3
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	47	3
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	52	11	4	-
Residential	-	-	-	-	-	10	-	-
Commercial and public services	-	-	-	-	20	-	4	-
Agriculture/forestry	-	-	-	-	33	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	234	693	-	123	-	-	46	208
<i>Electricity plants</i>	234	693	-	123	-	-	46	131
<i>CHP plants</i>	-	-	-	-	-	-	-	77
Heat generated - TJ	-	-	-	-	1769	-	302	483
<i>CHP plants</i>	-	-	-	-	-	-	158	483
<i>Heat plants</i>	-	-	-	-	1769	-	144	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
47	2510	-	80	252	131	-	3353	29.7%
5	59	-	-	36	99	-	228	1.3%
-	-91	-	-	-233	-103	-	-427	9.5%
-	-	-	-	-11	5	-	-6	x
52	2479	-	80	43	132	-	3148	12.5%
-	-	-	-	-	1	-	1	x
-5	-293	-	-15	-	-	-	-430	x
-	-	-	-2	-	-	-	-22	x
-39	-209	-	-9	-	-	-	-296	x
-	-1	-	-26	-	-	-	-33	x
-	-54	-	-1	-	-	-	-93	x
-	-4	-	-	-	-	-	-28	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-13	-	-	-	-13	x
-	-	-	-	-	-	-	-	-
8	1918	-	13	43	133	-	2233	11.8%
8	115	-	10	-	-	-	184	4.6%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	1	0.1%
-	-	-	-	-	-	-	-	-
8	10	-	-	-	-	-	68	14.0%
-	-	-	-	-	-	-	-	-
-	4	-	-	-	-	-	4	1.0%
-	-	-	-	-	-	-	-	-
-	48	-	8	-	-	-	56	9.5%
-	7	-	2	-	-	-	9	4.8%
-	32	-	-	-	-	-	32	52.1%
-	4	-	-	-	-	-	4	1.9%
-	-	-	-	-	-	-	-	-
-	9	-	-	-	-	-	9	3.5%
-	-	-	-	43	133	-	176	4.2%
-	-	-	-	43	133	-	176	4.4%
-	-	-	-	-	-	-	-	-
-	1803	-	3	-	-	-	1873	21.5%
-	1764	-	-	-	-	-	1774	29.8%
-	30	-	2	-	-	-	56	2.6%
-	9	-	1	-	-	-	43	7.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
95	1660	-	293	-	-	-	3352	11.1%
19	1011	-	72	-	-	-	2329	23.6%
76	649	-	221	-	-	-	1023	5.0%
478	4428	-	131	-	-	-	7591	14.6%
478	2320	-	77	-	-	-	3516	17.0%
-	2108	-	54	-	-	-	4075	13.0%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	3600	3600	4130	4720	3816	4410	4174	1.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	3600	3600	4130	4720	3816	4410	4174	1.4
Statistical differences	-	-	-	-2	-	-	..	..
Transformation processes	-	242	245	614	1350	2180	..	15.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	3600	3358	3885	4104	2466	2230	..	-2.7
<i>Industry</i>	-	-	57	53	68	44	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	3600	3358	3828	4051	2398	2186	..	-2.8
Solar thermal (TJ)								
Production	-	-	225	368	406	448	480	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	225	368	406	448	480	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	5	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	220	368	406	448	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	220	368	406	448	..	-
Industrial waste (TJ)								
Production	-	-	1449	1680	2255	2510	2761	-
Net imports ¹	-	-	-	-	-	831	922	-
Stock changes	-	-	-	3	-	-	-	-
Gross consumption	-	-	1449	1683	2255	3341	3683	-
Statistical differences	-	-	-	-	1	-	..	..
Transformation processes	-	-	115	296	398	1210	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	1334	1387	1858	2131	..	-
<i>Industry</i>	-	-	1334	1258	1765	1950	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	129	93	181	..	-
Municipal waste - renewables (TJ)								
Production	494 e	1218 e	2229	1780	1845	2756	2771	5.6
Net imports ¹	-	-	-	358	404	367	671	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	494 e	1218 e	2229	2138	2249	3123	3442	6.5
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	494 e	1218 e	2229	2138	2229	2992	..	6.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	20	131	..	-
<i>Industry</i>	-	-	-	-	20	131	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	494 e	1218 e	2229	1695	1864	1972	1776	3.3
Net imports ¹	-	-	-	90	159	217	489	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	494 e	1218 e	2229	1785	2023	2189	2265	4.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	494 e	1218 e	2229	1785	1867	1835	..	2.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	156	354	..	-
<i>Industry</i>	-	-	-	-	156	354	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	28331	29295	98248	112320	98928	105128	98986	8.9
Net imports ¹	-1158	-	21	-1989	-540	-1307	456	-
Stock changes	-674	-	-	-	-	-	-	-
Gross consumption	26499	29295	98269	110331	98388	103821	99442	8.8
Statistical differences	-	-	1	-1	1	1	..	-
Transformation processes	636	240	27289	19522	23144	23494	..	35.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	25863	29055	70981	90808	75245	80328	..	7.0
<i>Industry</i>	121	2513	3561	3907	4613	4826	..	4.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	25742	26542	67420	86901	70632	75502	..	7.2
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	-	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	6	1516	3336	3323	3335	3666	52.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	6	1516	3336	3323	3335	3666	52.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	858	2270	2113	2259	..	-
Energy industry own use	-	-	393	500	389	540	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	6	265	566	821	536	..	34.9
<i>Industry</i>	-	6	6	308	735	402	..	32.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	259	258	86	134	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	24	283	295	396	423	-
Net imports ¹	-	-	65	-233	-199	-311	-338	-
Stock changes	-	-	1	6	-1	-18	5	-
Gross consumption	-	-	90	56	95	67	90	-
Statistical differences	-	-	-1	-7	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	89	49	95	67	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	89	49	95	67	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	141	140	133	146	156	-
Net imports ¹	-	-	-7	-5	-14	-5	-27	-
Stock changes	-	-	-2	-16	24	6	6	-
Gross consumption	-	-	132	119	143	147	135	-
Statistical differences	-	-	-	-1	-	1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	132	118	143	148	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	132	118	143	148	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

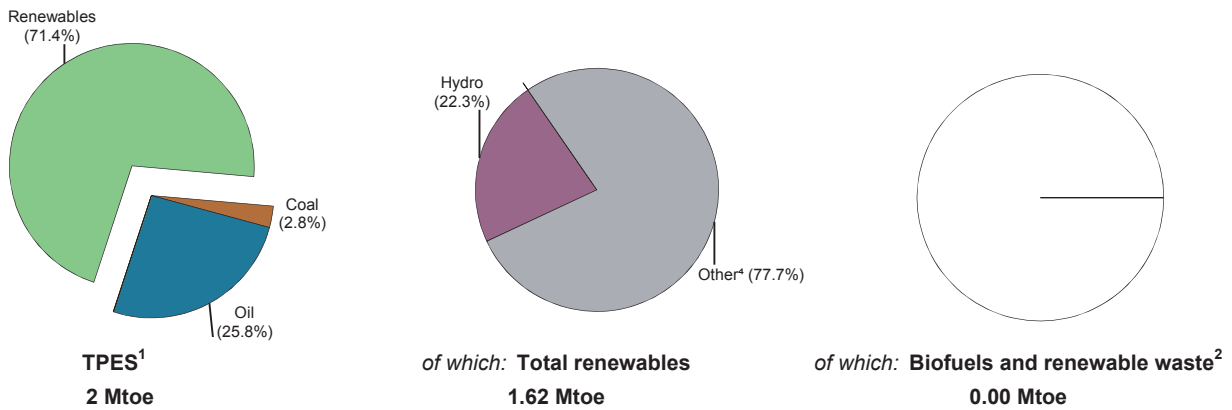


Figure 2. Contribution of renewables in 2016 provisional

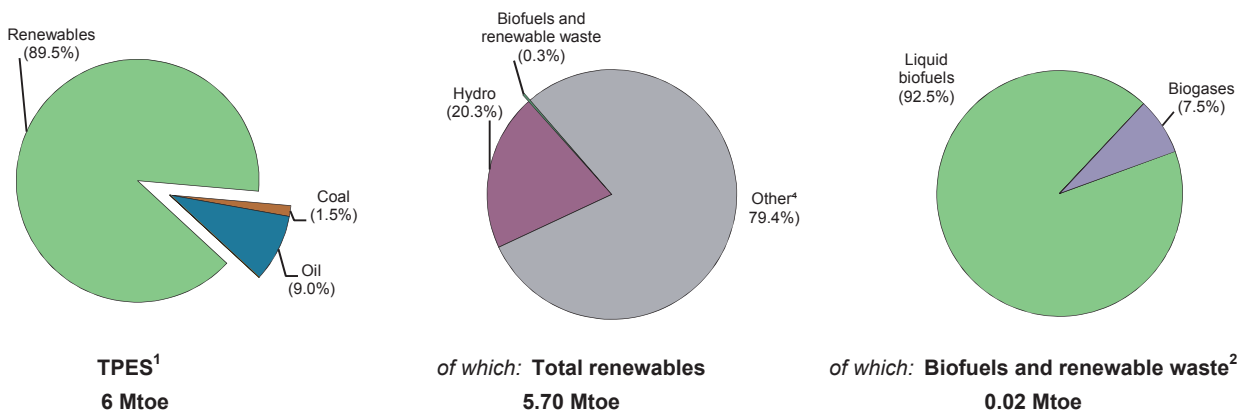
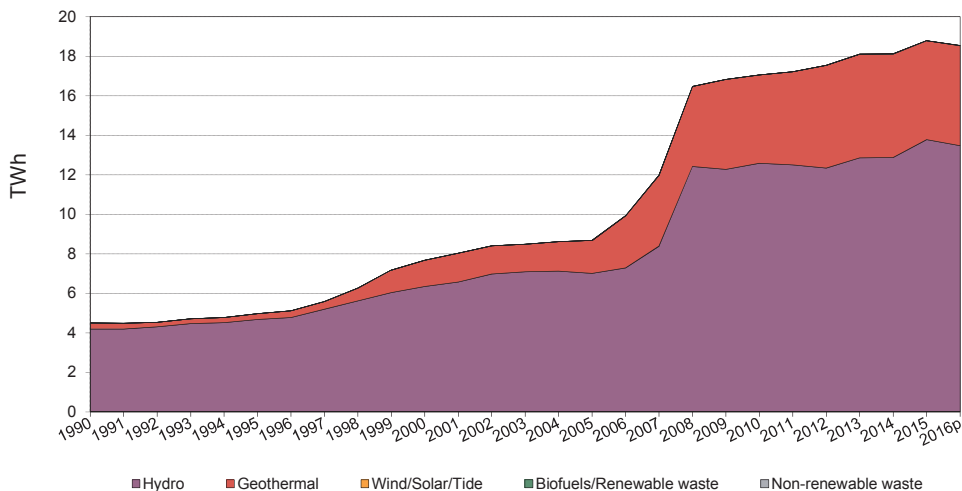


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	2.27	3.12	5.41	5.89	5.86	5.58	6.37	4.6
<i>of which: Renewables (Mtoe)</i> ¹	1.62	2.41	4.79	5.27	5.22	4.93	5.70	5.5
<i>Renewables/TPES(%)</i>	71.4	77.4	88.5	89.6	89.1	88.3	89.5	0.9
GDP (billion 2010 US dollars)	7.97	10.30	13.26	14.29	14.56	15.16	16.25	2.9
TPES/GDP ²	0.28	0.30	0.41	0.41	0.40	0.37	0.39	1.6
TPES/GDP (year 2010 = 100)	70	74	100	101	99	90	96	1.6
Population (millions)	0.26	0.28	0.32	0.32	0.33	0.33	0.34	1.1
TPES/population (toe per capita)	8.90	11.10	17.03	18.16	17.94	16.87	19.02	3.4
Electricity generation (TWh) ³	4.5	7.7	17.1	18.1	18.1	18.8	18.5	5.7
<i>of which: Renewables (TWh)</i> ^{1,3}	4.50	7.68	17.06	18.11	18.12	18.80	18.54	5.7
<i>Renew./Total Elec.(%)</i> ^{1,4}	99.9	99.9	100.0	100.0	100.0	100.0	100.0	0.0
Road energy consumption (Mtoe)	0.2	0.2	0.3	0.3	0.3	0.3	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.00	0.00	0.00	0.02	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	0.2	1.4	1.5	5.4	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	802	1236	2458	2651	2652	2655	5.2
Hydro	756	1064	1883	1984	1984	1987	4.3
<i>Hydro <1MW</i>	-	7	9	11	11	12	3.7
<i>Hydro 1-10MW</i>	-	39	58	52	52	54	2.2
<i>Hydro 10+MW</i>	-	1018	1816	1921	1921	1921	4.3
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	46	172	575	665	665	665	9.4
Solar photovoltaic	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	-	2	3	3	-
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	-	-	-	-	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	-	-	-	-	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	64.11	70.92	79.22	77.99	78.00	80.81	x
Hydro	63.48	68.19	76.34	74.01	74.07	79.17	75.61
<i>of which: <1MW</i>	-	30.98	63.73	56.91	56.43	52.76	58.96
<i>of which: 1-10MW</i>	-	66.74	45.14	44.02	46.81	51.52	48.75
<i>of which: 10+MW</i>	-	68.50	77.40	74.92	74.91	80.11	76.41
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	74.45	87.81	88.65	90.04	89.92	85.88	87.20
Solar photovoltaic	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	-	15.70	31.91	41.45	29.69
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	4504	7679	17057	18111	18120	18795	18544	5.7
Hydro	4204	6356	12592	12863	12873	13781	13470	4.8
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	300	1323	4465	5245	5239	5003	5065	8.8
Solar photovoltaic	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	-	3	8	11	9	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	4504	6830	15587	13349	13352	14279	..	-
Hydro	4204	6356	12592	12863	12873	13781	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	300	474	2995	483	471	487	..	-
Solar photovoltaic	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	-	3	8	11	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	849	1470	4762	4768	4516	..	-
Geothermal	-	849	1470	4762	4768	4516	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	15336	17643	20892	22060	22443	25873	32965	4.0
Geothermal	15336	17598	20864	22060	22443	25873	32965	4.0
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	23 e	14	-	-	-	-	-
Municipal waste non-renew.	-	22 e	14	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	4474	5046	5750	6073	5835	6869	..	-
Geothermal	4474	5046	5750	6073	5835	6869	..	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	10862	12597	15142	15987	16608	19004	..	-
Geothermal	10862	12552	15114	15987	16608	19004	..	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	23 e	14	-	-	-	-	-
Municipal waste non-renew.	-	22 e	14	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	1185	1	-	-	3729	-	-	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	1185	1	-	-	3729	-	-	-
Statistical differences	-	-	-	-	-24	-	-	-
Main activity electricity plants	-1185	-1	-	-	-348	-	-	-
Autoproducer electricity plants	-	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-2649	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-619	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-8	-	-	-
TFC	-	-	-	-	82	-	-	-
Industry	-	-	-	-	14	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	14	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	67	-	-	-
Residential	-	-	-	-	13	-	-	-
Commercial and public services	-	-	-	-	38	-	-	-
Agriculture/forestry	-	-	-	-	6	-	-	-
Fishing	-	-	-	-	11	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	13781	11	-	-	5003	-	-	-
<i>Electricity plants</i>	13781	11	-	-	487	-	-	-
<i>CHP plants</i>	-	-	-	-	4516	-	-	-
Heat generated - TJ	-	-	-	-	25873	-	-	-
<i>CHP plants</i>	-	-	-	-	6869	-	-	-
<i>Heat plants</i>	-	-	-	-	19004	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	52692	78118	155196	174325	172205	156152	189622	4.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	52692	78118	155196	174325	172205	156152	189622	4.7
Statistical differences	-1145	-635	92	-1783	-1282	-989	..	..
Transformation processes	48569	73788	150696	168691	167028	151398	..	4.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	229	284	359	356	352	350	..	..
Final energy consumption	2749	3411	4233	3495	3543	3415	..	0.0
<i>Industry</i>	352	434	469	469	594	594	..	2.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2397	2977	3764	3026	2949	2821	..	-0.4
Solar thermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Industrial waste (TJ)								
Production	-	-	-	-	-	-	98	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-70	-
Gross consumption	-	-	-	-	-	-	28	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	28 e	18	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	28 e	18	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	28 e	18	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	28 e	18	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	28 e	18	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	28 e	18	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	-	22	71	71	69	51	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	22	71	71	69	51	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	22	71	71	69	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	22	71	71	69	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	2	6	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	2	6	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	2 e	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	2 e	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	3	3	12	12	-
Stock changes	-	-	-	-1	-1	-	-1	-
Gross consumption	-	-	-	2	2	12	11	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	2	2 e	12 e	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	2	2 e	12 e	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

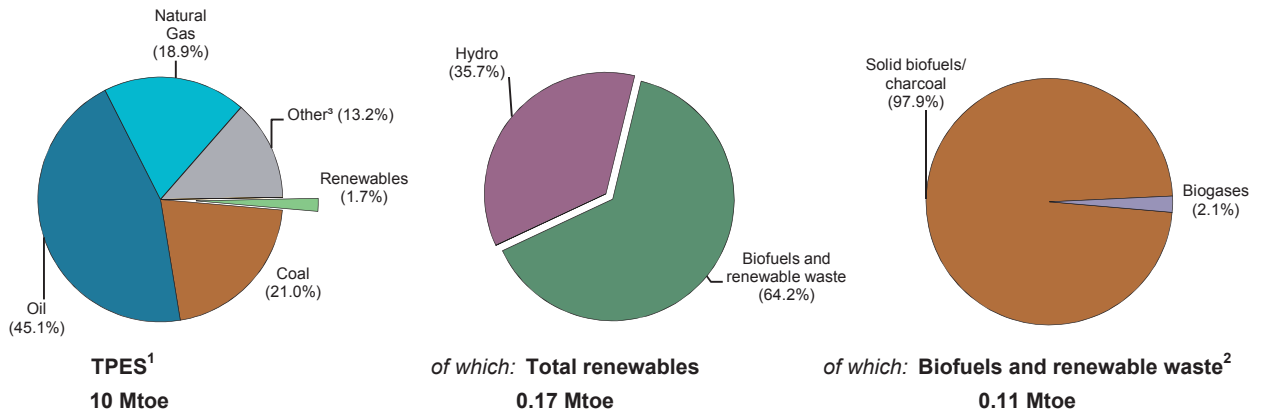


Figure 2. Contribution of renewables in 2016 provisional

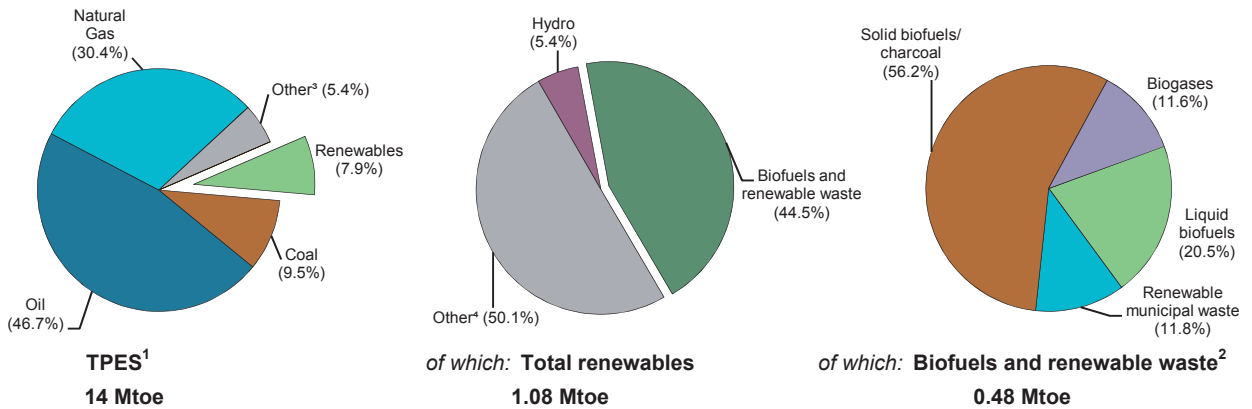
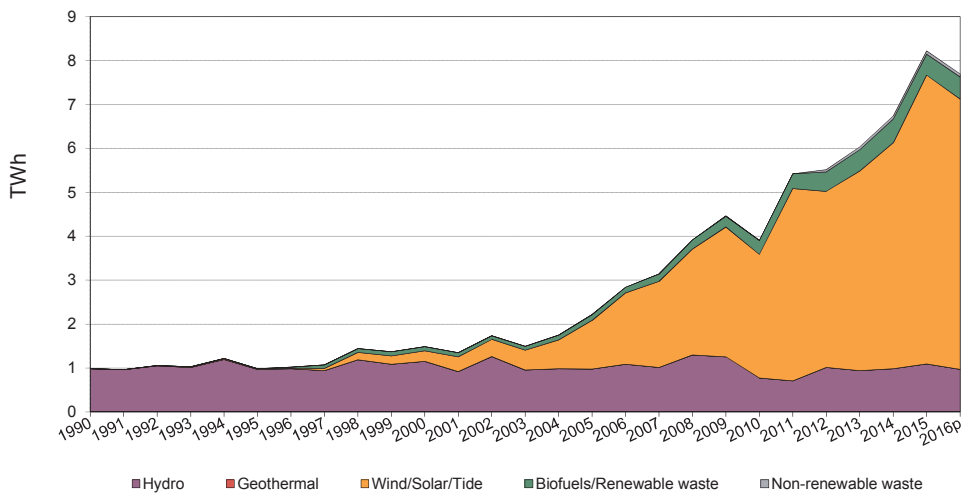


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	9.91	13.80	14.37	13.02	12.75	13.26	13.75	-0.0
<i>of which: Renewables (Mtoe)</i> ¹	0.17	0.23	0.66	0.84	0.96	1.07	1.08	10.0
<i>Renewables/TPES(%)</i>	1.7	1.7	4.6	6.5	7.5	8.1	7.9	10.1
GDP (billion 2010 US dollars)	82.62	165.09	221.34	221.22	239.94	302.99	318.78	4.2
TPES/GDP ²	0.12	0.08	0.06	0.06	0.05	0.04	0.04	-4.0
TPES/GDP (year 2010 = 100)	185	129	100	91	82	67	66	-4.0
Population (millions)	3.51	3.80	4.56	4.60	4.62	4.64	4.68	1.3
TPES/population (toe per capita)	2.83	3.63	3.15	2.83	2.76	2.86	2.94	-1.3
Electricity generation (TWh) ³	14.2	23.7	28.2	25.6	25.8	28.1	30.1	1.5
<i>of which: Renewables (TWh)</i> ^{1,3}	0.70	1.19	3.73	5.63	6.39	7.86	7.34	12.1
<i>Renew./Total Elec.(%)</i> ^{1,4}	4.9	5.0	13.2	22.0	24.8	28.0	24.4	10.4
Road energy consumption (Mtoe)	1.6	3.3	3.8	3.4	3.6	3.6	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.09	0.07	0.09	0.09	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	2.4	2.1	2.5	2.4	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	513	662	1648	2544	2822	3051	10.7
Hydro	513	528	237	529	529	529	0.0
<i>Hydro <1MW</i>	4	8	20	20	20	20	6.3
<i>Hydro 1-10MW</i>	23	23	21	21	21	21	-0.6
<i>Hydro 10+MW</i>	196	205	196	196	196	196	-0.3
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	290	292	-	292	292	292	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	1	1	2	2	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	119	1374	1941	2211	2440	22.3
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	16	22	22	-
Solid biofuels	-	-	5	5	5	5	-
Biogases	-	15	31	52	53	53	8.8
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	2	4	185	278	300	320	33.9
<i>Cap. of solar collectors (MW_{th})</i> ⁶	1	3	130	195	210	224	33.3

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	21.87	25.68	27.05	27.09	27.26	30.75	x
Hydro	21.87	24.86	37.38	20.38	21.31	23.62	24.25
<i>of which: <1MW</i>	35.68	40.97	23.81	11.87	23.09	28.82	18.81
<i>of which: 1-10MW</i>	35.68	40.97	28.06	30.58	35.31	39.95	36.21
<i>of which: 10+MW</i>	35.68	40.91	29.46	30.43	35.13	39.75	36.41
<i>of which: pure pumped storage²</i>	11.26	11.88	-	13.48	10.91	11.26	10.98
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	5.43	7.98	6.39	9.22	7.43
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	23.41	23.38	26.71	26.54	30.75	28.12
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	99.78	73.70	78.43	85.13
Solid biofuels	-	-	x	x	x	x	x
Biogases	-	72.30	75.38	40.52	43.86	43.39	47.48
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	983	1489	3905	6038	6739	8220	7701	10.8
Hydro	983	1150	776	944	988	1095	973	-1.0
<i>of which: pumped storage</i>	286	304	177	345	279	288	292	-0.3
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	1	1	2	5	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	244	2815	4542	5140	6573	6151	22.3
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	74	72	77	76	-
Municipal waste non-renew.	-	-	-	65	70	74	70	-
Solid biofuels	-	-	110	227	265	197	211	-
Biogases	-	95	204	185	203	202	215	5.2
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	983	1489	3864	5995	6689	8177	..	-
Hydro	983	1150	776	944	988	1095	..	-
<i>of which: pumped storage</i>	286	304	177	345	279	288	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	1	1	2	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	244	2815	4542	5140	6573	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	74	72	77	..	-
Municipal waste non-renew.	-	-	-	65	70	74	..	-
Solid biofuels	-	-	91	213	251	184	..	-
Biogases	-	95	182	156	167	172	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	-	41	43	50	43	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	19	14	14	13	..	-
Biogases	-	-	22	29	36	30	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	69	565	-	-	-	13	-	53
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	69	565	-	-	-	13	-	53
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-69	-565	-	-	-	-	-	-26
Autoproducer electricity plants	-	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	13	-	27
Industry	-	-	-	-	-	-	-	27
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	27
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	13	-	-
Residential	-	-	-	-	-	13	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	807	6573	-	2	-	-	-	77
<i>Electricity plants</i>	807	6573	-	2	-	-	-	77
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
62	201	-	55	-	24	-	1042	54.5%
-	27	-	-	24	38	-	89	0.6%
-	-	-	-	-	-	-	-	-
-	-1	-	-	-	1	-	-	x
62	228	-	55	24	63	-	1132	8.5%
-	8	-	-	-	1	-	9	x
-25	-40	-	-41	-	-	-	-766	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-3	-	-5	-	-	-	-8	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
37	193	-	9	24	64	-	367	3.5%
37	144	-	3	-	-	-	211	8.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
37	2	-	-	-	-	-	66	17.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	27	-	3	-	-	-	30	6.4%
-	-	-	-	-	-	-	-	-
-	115	-	-	-	-	-	115	73.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	24	64	-	88	2.4%
-	-	-	-	24	64	-	88	2.4%
-	-	-	-	-	-	-	-	-
-	49	-	5	-	-	-	67	1.6%
-	32	-	-	-	-	-	45	1.7%
-	17	-	5	-	-	-	22	1.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
74	197	-	202	-	-	-	7932	28.2%
74	184	-	172	-	-	-	7889	30.4%
-	13	-	30	-	-	-	43	2.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	2	5	314	472	511	544	578	36.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2	5	314	472	511	544	578	36.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	2	5	314	472	511	544	..	36.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2	5	314	472	511	544	..	36.7
Industrial waste (TJ)								
Production	-	-	-	4	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	4	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	4	-	-	..	-
<i>Industry</i>	-	-	-	4	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	267	2041	2161	2201	2385	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	267	2041	2161	2201	2385	-
Statistical differences	-	-	-	-1	1	-	..	-
Transformation processes	-	-	-	1087	1069	1081	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	267	953	1093	1120	..	-
<i>Industry</i>	-	-	267	953	1093	1120	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	358	2414	2638	2597	2476	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	358	2414	2638	2597	2476	-
Statistical differences	-	-	-	-	1	-	..	-
Transformation processes	-	-	-	957	1027	1039	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	358	1457	1612	1558	..	-
<i>Industry</i>	-	-	358	1457	1612	1558	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	4416	4740	7968	7674	8809	8436	9458	3.9
Net imports ¹	-	-	447	1495	1755	1135	1880	-
Stock changes	-	-	135	-39	-	-24	6	-
Gross consumption	4416	4740	8550	9130	10564	9547	11344	4.8
Statistical differences	-	-	19	77	63	342	..	-
Transformation processes	-	-	1020	2141	2437	1804	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	4416	4740	7549	7066	8190	8085	..	3.6
<i>Industry</i>	2545	4020	5927	4827	5951	6031	..	2.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1871	720	1622	2239	2239	2054	..	7.2
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	-	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	95	1168	2445	2062	2187	2287	2333	4.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	95	1168	2445	2062	2187	2287	2333	4.6
Statistical differences	-	-	-	-1	1	-	..	-
Transformation processes	-	988	2095	1764	1846	1917	..	4.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	95	180	350	297	342	370	..	4.9
<i>Industry</i>	95	180	190	111	125	141	..	-1.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	160	186	217	229	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	..	-	-	-	-	-
Net imports ¹	-	-	52	46	38	38	66	-
Stock changes	-	-	-4	-2	2	-	-3	-
Gross consumption	-	-	48	44	40	38	63	-
Statistical differences	-	-	-	-	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	48	44	39	38	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	48	44	39	38	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	71	25	27	27	27	-
Net imports ¹	-	-	..	26	47	43	43	-
Stock changes	-	-	-1	-1	-1	1	-4	-
Gross consumption	-	-	70	50	73	71	66	-
Statistical differences	-	-	1	-	-	1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	71	50	73	72	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	71	50	73	72	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

ISRAEL

Figure 1. Contribution of renewables in 1990

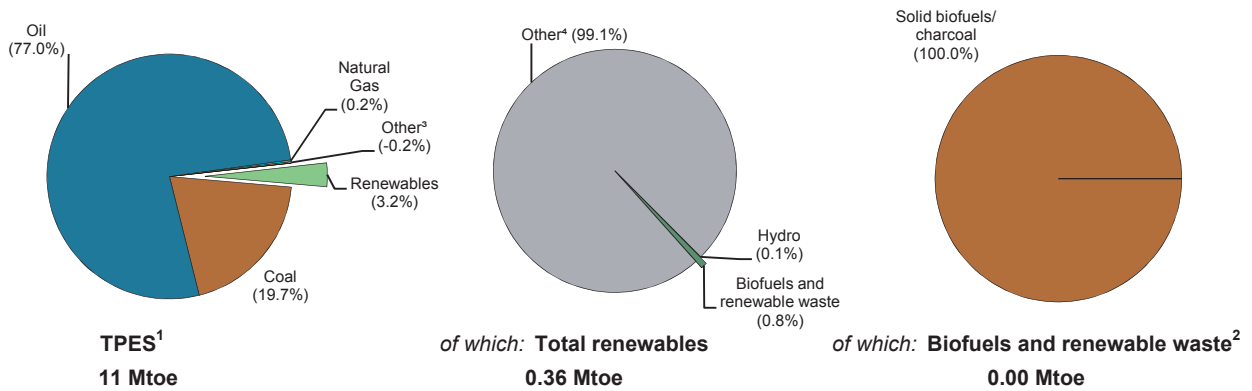


Figure 2. Contribution of renewables in 2016 provisional

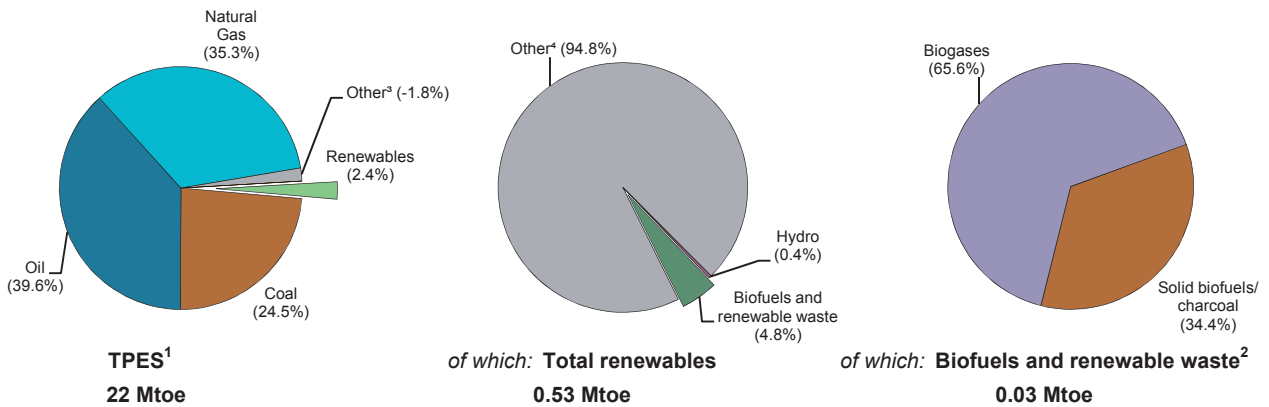
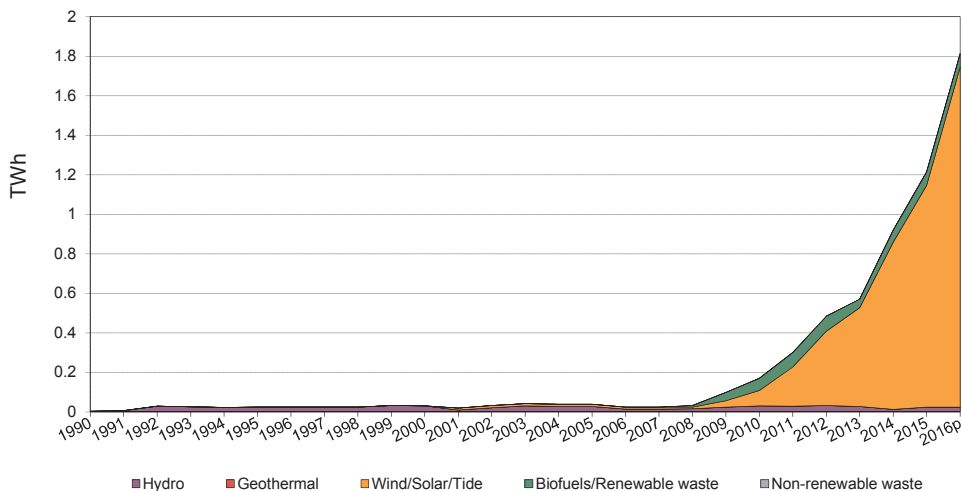


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

ISRAEL

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	11.47	18.23	23.19	22.37	21.46	22.98	22.32	1.3
<i>of which: Renewables (Mtoe)</i> ¹	0.36	0.61	1.16	0.39	0.45	0.48	0.53	-0.8
<i>Renewables/TPES(%)</i>	3.2	3.3	5.0	1.7	2.1	2.1	2.4	-2.1
GDP (billion 2010 US dollars)	95.23	170.72	233.76	262.44	270.74	277.53	287.94	3.3
TPES/GDP ²	0.12	0.11	0.10	0.09	0.08	0.08	0.08	-2.0
TPES/GDP (year 2010 = 100)	121	108	100	86	80	83	78	-2.0
Population (millions)	4.66	6.30	7.62	8.06	8.21	8.38	8.49	1.9
TPES/population (toe per capita)	2.46	2.89	3.04	2.78	2.61	2.74	2.63	-0.6
Electricity generation (TWh) ³	20.9	42.7	58.6	61.3	60.8	64.2	66.2	2.8
<i>of which: Renewables (TWh)</i> ^{1,3}	0.00	0.03	0.17	0.57	0.92	1.21	1.81	29.0
<i>Renew./Total Elec.(%)</i> ^{1,4}	0.0	0.1	0.3	0.9	1.5	1.9	2.7	25.5
Road energy consumption (Mtoe)	2.7	4.5	5.5	5.3	5.3	5.6	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	-	-	-	-	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	-	-	-	-	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	-	-	93	504	712	776	-
Hydro	-	-	7	7	7	7	-
<i>Hydro <1MW</i>	-	-	2	2	2	2	-
<i>Hydro 1-10MW</i>	-	-	5	5	5	5	-
<i>Hydro 10+MW</i>	-	-	-	-	-	-	-
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	70	481 e	681	742	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	6	6	6	6	-
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-
Biogases	-	-	10	10	18	21	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	3500	4168	4136 e	4528 e	4528 e	1.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	2450	2918	2895 e	3170 e	3170 e	1.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	-	-	20.95	12.93	14.77	17.86	x
Hydro	-	-	50.39	45.66	20.78	39.91	41.41
<i>of which: <1MW</i>	-	-	25.76	28.54	27.08	51.91	33.68
<i>of which: 1-10MW</i>	-	-	18.79	52.51	18.26	35.11	30.58
<i>of which: 10+MW</i>	-	-	-	-	-	-	-
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	11.48	11.72 e	14.09	17.16	14.46
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	15.39	11.37	11.84	12.69	11.95
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-
Biogases	-	-	36.53	49.09	39.39	37.00	51.12
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	3	31	170	571	921	1214	1813	29.0
Hydro	3	31	31	28	13	24	24	-1.6
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	70	494	840	1115	1714	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	8	6	6	7	7	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	29	-	-	-	-	-
Biogases	-	-	32	43	62	68	68	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	3	31	170	571	921	1214	..	-
Hydro	3	31	31	28	13	24	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	70	494	840	1115	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	8	6	6	7	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	29	-	-	-	-	-
Biogases	-	-	32	43	62	68	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2	1	-	96	-	356 e	-	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2	1	-	96	-	356	-	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-1	-1	-	-	-	-	-	-
Autoproducer electricity plants	-1	-	-	-96	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	356	-	-
Industry	-	-	-	-	-	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	356	-	-
Residential	-	-	-	-	-	356 e	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	24	7	-	1115	-	-	-	-
<i>Electricity plants</i>	24	7	-	1115	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/ wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	4 e	-	17 e	-	-	-	476	6.5%
-	-	4 e	-	-	-	-	4	0.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	4	4	17	-	-	-	480	2.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-2	x
-	-	-	-17 e	-	-	-	-114	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	4	4	-	-	-	-	364	2.6%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	4	4	-	-	-	-	364	8.2%
-	4 e	-	-	-	-	-	360	18.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	4 e	-	-	-	-	4	0.7%
-	-	-	68	-	-	-	1214	1.9%
-	-	-	68	-	-	-	1214	1.9%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	14996	24949	46980	13630 e	14922 e	14922 e	14922 e	-3.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	14996	24949	46980	13630 e	14922 e	14922 e	14922 e	-3.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	14996	24949	46980	13630 e	14922 e	14922 e	..	-3.4
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	14996	24949	46980	13630 e	14922 e	14922 e	..	-3.4
Industrial waste (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	127	183	550	183 e	183 e	183 e	183 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	127	183	550	183 e	183 e	183 e	183 e	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	367	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	127	183	183	183 e	183 e	183 e	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	127	183	183	183 e	183 e	183 e	..	-
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	6	6	6 e	6 e	6 e	6 e	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	6	6	6 e	6 e	6 e	6 e	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	6	6	6 e	6 e	6 e	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	6	6	6 e	6 e	6 e	..	-
Biogases (TJ)								
Production	-	-	347 e	442 e	638 e	700 e	700 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	347	442 e	638 e	700 e	700 e	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	347	442 e	638 e	700 e	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

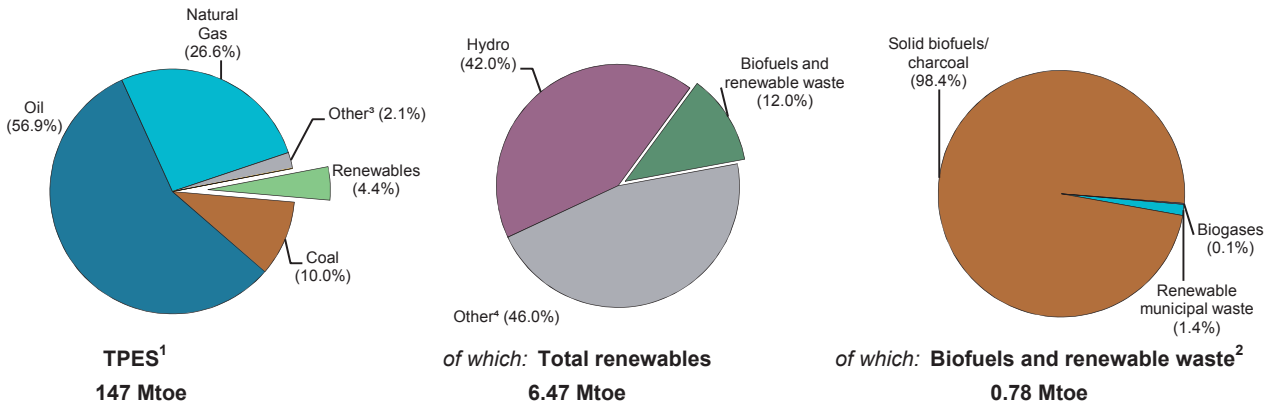


Figure 2. Contribution of renewables in 2016 provisional

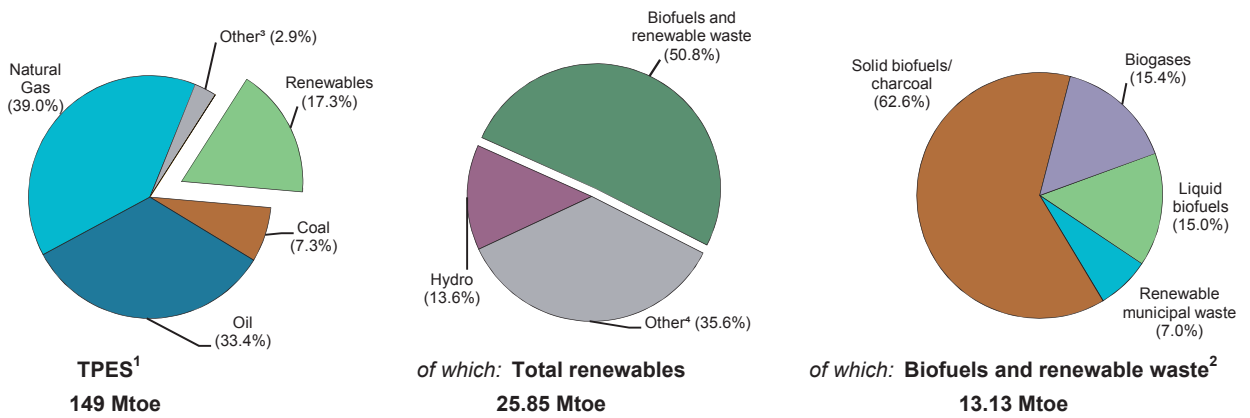
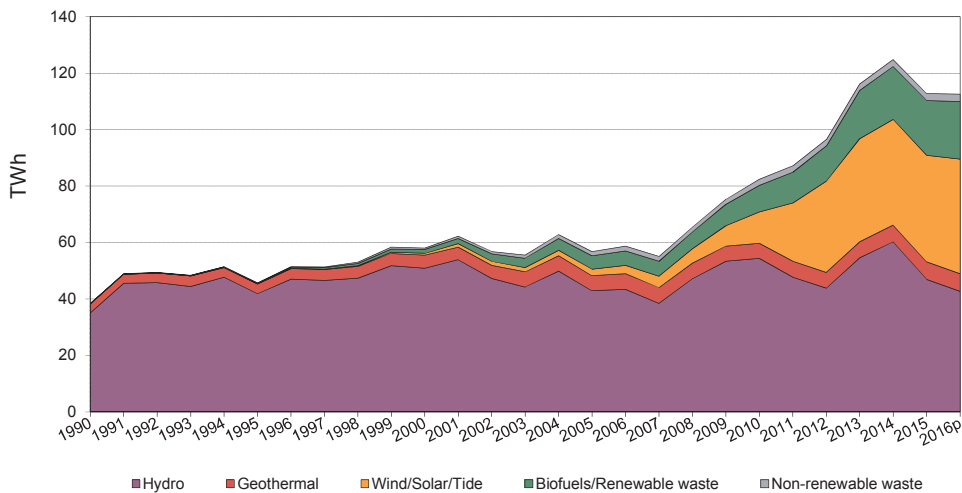


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	146.56	171.52	173.72	155.37	146.77	152.60	149.04	-0.9
<i>of which: Renewables (Mtoe)</i> ¹	6.47	10.11	21.86	26.37	26.51	26.27	25.85	6.0
<i>Renewables/TPES(%)</i>	4.4	5.9	12.6	17.0	18.1	17.2	17.3	7.0
GDP (billion 2010 US dollars)	1749.18	2060.21	2125.06	2041.17	2043.49	2059.49	2077.61	0.1
TPES/GDP ²	0.08	0.08	0.08	0.08	0.07	0.07	0.07	-0.9
TPES/GDP (year 2010 = 100)	102	102	100	93	88	91	88	-0.9
Population (millions)	56.72	56.94	59.83	60.65	60.79	60.73	60.62	0.4
TPES/population (toe per capita)	2.58	3.01	2.90	2.56	2.41	2.51	2.46	-1.3
Electricity generation (TWh) ³	213.1	269.9	298.8	287.9	278.1	281.6	284.1	0.3
<i>of which: Renewables (TWh)</i> ^{1,3}	34.91	50.88	76.97	112.01	120.68	108.91	108.16	4.8
<i>Renew./Total Elec.(%)</i> ^{1,4}	16.4	18.8	25.8	38.9	43.4	38.7	38.1	4.5
Road energy consumption (Mtoe)	30.9	36.9	35.7	32.9	34.3	33.6	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	1.42	1.25	1.07	1.17	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	4.0	3.8	3.1	3.5	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	19364	22003	33833	53248	53932	54827	6.3
Hydro	18770	20346	21520	22009	22098	22220	0.6
<i>Hydro <1MW</i>	-	373	509	621	654	697	4.3
<i>Hydro 1-10MW</i>	-	1824	2155	2413	2432	2511	2.2
<i>Hydro 10+MW</i>	-	11192	11312	11420	11420	11420	0.1
<i>Mixed plants</i>	2954	3001	3587	3598	3610	3610	1.2
<i>Pure pumped storage</i>	3234	3956	3957	3957	3982	3982	0.0
Geothermal	496	590	728	729	768	768	1.8
Solar photovoltaic	4	19	3592	18185	18594	18892	58.4
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	3	363	5794	8542	8683	9137	24.0
Industrial waste	-	-	16	21	17	28	-
Municipal waste	46	287	716	836	826	830	7.3
Solid biofuels	4	218 e	406	606	620	616	7.2
Biogases	41	180	480	1317	1336	1336	14.3
Liquid biofuels	-	-	581	1003	990	1000	-
Solar collectors surface (1000 m ²)	120	271	2415	3318	3538	3724	19.1
<i>Cap. of solar collectors (MW_{th})</i> ⁶	84	190	1691	2323	2477	2607	19.1

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	22.64	30.14	27.80	24.91	26.42	23.48	x
Hydro	21.33	28.56	28.86	28.36	31.13	24.13	26.32
<i>of which: <1MW</i>	-	47.52	50.36	48.45	54.95	41.87	46.54
<i>of which: 1-10MW</i>	-	41.16	46.15	44.23	51.60	37.77	41.78
<i>of which: 10+MW</i>	-	36.79	40.53	40.77	44.39	34.66	37.64
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	74.15	91.03	84.30	88.62	87.94	91.93	88.97
Solar photovoltaic	11.42	10.81 e	6.06	13.55	13.69	13.86	12.66
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	7.61	17.71	17.98	19.91	19.95	18.55	18.71
Industrial waste	-	-	69.90	47.24	54.69	34.56	52.60
Municipal waste	18.12 e	31.98 e	65.26	60.24	65.52	64.45	64.73
Solid biofuels	34.25	22.24 e	63.57	69.30	70.38	73.14	67.20
Biogases	0.56	35.96	48.85	64.56	70.05	70.17	59.86
Biodiesels	-	-	-	21.16	25.37	29.26	20.95
Other liquid biofuels	-	-	60.46	42.86	50.16	55.98	45.38

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	38410	58094	82399	116204	124842	112768	112537	4.2
Hydro	35079	50900	54406	54672	60256	46970	42796	-1.1
<i>of which: pumped storage</i>	<i>3453</i>	<i>6700</i>	<i>3290</i>	<i>1898</i>	<i>1711</i>	<i>1432</i>	<i>1794</i>	<i>-7.9</i>
Geothermal	3222	4705	5376	5659	5916	6185	6229	1.8
Solar photovoltaic	4	18	1906	21589	22306	22942	22899	56.3
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	2	563	9126	14897	15178	14844	17619	24.0
Industrial waste	16	112	98	87	81	85	49	-5.0
Municipal waste renew.	37	402	2047	2207	2371	2344	2538	12.2
Municipal waste non-renew.	36	402	2047	2207	2371	2344	2538	12.2
Solid biofuels	12	425	2261	3679	3823	3947	4084	15.2
Biogases	2	567	2054	7448	8198	8212	8967	18.8
Liquid biofuels	-	-	3078	3759	4342	4895	4818	-
of which:								
Electricity only plants	38378	57120	78161	107743	114884	102036	..	-
Hydro	35079	50900	54406	54672	60256	46970	..	-
<i>of which: pumped storage</i>	<i>3453</i>	<i>6700</i>	<i>3290</i>	<i>1898</i>	<i>1711</i>	<i>1432</i>	..	-
Geothermal	3222	4705	5376	5659	5916	6185	..	-
Solar photovoltaic	4	18	1906	21589	22306	22942	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	2	563	9126	14897	15178	14844	..	-
Industrial waste	-	56	98	75	61	57	..	-
Municipal waste renew.	36	134	1061	1230	1257	1208	..	-
Municipal waste non-renew.	35	133	1061	1230	1257	1208	..	-
Solid biofuels	-	87	1544	2142	2031	2089	..	-
Biogases	-	524	1451	3435	3537	3139	..	-
Liquid biofuels	-	-	2132	2814	3085	3394	..	-
CHP plants	32	974	4238	8461	9958	10732	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	16	56	-	12	20	28	..	-
Municipal waste renew.	1	268	986	977	1114	1136	..	-
Municipal waste non-renew.	1	269	986	977	1114	1136	..	-
Solid biofuels	12	338	717	1537	1792	1858	..	-
Biogases	2	43	603	4013	4661	5073	..	-
Liquid biofuels	-	-	946	945	1257	1501	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	13976	38794	44165	42635	43706	-
Geothermal	-	-	589	650	764	780	795	-
Solar thermal	-	-	-	2	2	2	2	-
Industrial waste	-	-	-	106	56	219	126	-
Municipal waste renew.	-	-	2583	3488	3568	4519	4791	-
Municipal waste non-renew.	-	-	2583	3488	3568	4519	4791	-
Solid biofuels	-	-	6156	21663	24820	22221	22072	-
Biogases	-	-	1029	8417	9997	8604	9373	-
Liquid biofuels	-	-	1036	980	1390	1771	1756	-
<i>of which:</i>								
CHP plants	-	-	11140	35039	40659	38893	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	106	56	219	..	-
Municipal waste renew.	-	-	2583	3488	3568	4519	..	-
Municipal waste non-renew.	-	-	2583	3488	3568	4519	..	-
Solid biofuels	-	-	3919	18571	22104	19281	..	-
Biogases	-	-	1019	8406	9984	8593	..	-
Liquid biofuels	-	-	1036	980	1379	1762	..	-
Heat only plants	-	-	2836	3755	3506	3742	..	-
Geothermal	-	-	589	650	764	780	..	-
Solar thermal	-	-	-	2	2	2	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	2237	3092	2716	2940	..	-
Biogases	-	-	10	11	13	11	..	-
Liquid biofuels	-	-	-	-	11	9	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	3916	1277	-	1973	5468	190	303	846
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	3916	1277	-	1973	5468	190	303	846
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-3864	-1277	-	-1973	-5317	-	-20	-419
Autoproducer electricity plants	-52	-	-	-	-	-	-	-2
Main activity CHP plants	-	-	-	-	-	-	-13	-421
Autoproducer CHP plants	-	-	-	-	-	-	-1	-4
Main heat plants	-	-	-	-	-37	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	114	190	269	-
Industry	-	-	-	-	2	10	269	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	71	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	168	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	3	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	2	10	27	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	112	180	-	-
Residential	-	-	-	-	1	141	-	-
Commercial and public services	-	-	-	-	76	38	-	-
Agriculture/forestry	-	-	-	-	14	2	-	-
Fishing	-	-	-	-	21	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	45538	14844	-	22942	6185	-	85	2344
<i>Electricity plants</i>	45538	14844	-	22942	6185	-	57	1208
<i>CHP plants</i>	-	-	-	-	-	-	28	1136
Heat generated - TJ	-	-	-	-	780	2	219	4519
<i>CHP plants</i>	-	-	-	-	-	-	219	4519
<i>Heat plants</i>	-	-	-	-	780	2	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
846	7339	-	1871	8	510	164	24711	68.5%
-	1262	43	-	17	709	775	2806	1.9%
-	-24	-1	-	-	-88	-	-113	0.4%
-	-	-	-	-	13	-	13	x
846	8576	42	1871	25	1144	938	27415	18.0%
-	-	-	-	-	1	-	1	x
-419	-612	-	-718	-	-1	-603	-15223	x
-2	-18	-	-15	-	-	-34	-123	x
-421	-1035	-	-1043	-	-2	-283	-3218	x
-4	-7	-	-50	-	-	-17	-83	x
-	-90	-	-	-	-	-	-127	x
-	-	-	-	-	-	-	-	-
-	-15	7	-	-	-	-	-8	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	6799	49	45	25	1142	-	8633	7.2%
-	364	7	20	-	-	-	672	2.7%
-	-	-	-	-	-	-	-	-
-	1	-	7	-	-	-	79	2.4%
-	-	-	-	-	-	-	-	-
-	146	-	-	-	-	-	314	6.3%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	5	0.2%
-	-	-	-	-	-	-	-	-
-	29	7	13	-	-	-	49	1.8%
-	-	-	-	-	-	-	-	-
-	135	-	-	-	-	-	135	29.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	51	-	-	-	-	-	90	5.8%
-	-	-	-	25	1142	-	1167	3.2%
-	-	-	-	25	1142	-	1167	3.5%
-	-	-	-	-	-	-	-	-
-	6435	42	25	-	-	-	6794	13.4%
-	6350	42	-	-	-	-	6534	20.1%
-	51	-	25	-	-	-	190	1.2%
-	34	-	-	-	-	-	50	1.9%
-	-	-	-	-	-	-	21	11.2%
-	-	-	-	-	-	-	-	-
2344	3947	-	8212	-	10	4884	111335	39.5%
1208	2089	-	3139	-	3	3389	100602	54.2%
1136	1858	-	5073	-	7	1495	10733	11.2%
4519	22221	-	8604	-	18	1753	42635	19.7%
4519	19281	-	8593	-	18	1744	38893	18.2%
-	2940	-	11	-	-	9	3742	100.0%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	124392	178296 e	199954	210020	219177	228997	230636	1.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	124392	178296 e	199954	210020	219177	228997	230636	1.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	115992	169380 e	194711	205033	214517	224219	..	1.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	8400	8916	5243	4987	4660	4778	..	-4.1
<i>Industry</i>	-	-	107	98	82	82	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	8400	8916	5136	4889	4578	4696	..	-4.2
Solar thermal (TJ)								
Production	202	456	5616	7042	7519	7955	8530	21.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	202	456	5616	7042	7519	7955	8530	21.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	2	2	2	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	202	456	5616	7040	7517	7953	..	21.0
<i>Industry</i>	-	-	281	352	376	398	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	202	456	5335	6688	7141	7555	..	20.6
Industrial waste (TJ)								
Production	6408 e	3832	10998	12994	12532	12696	12037	8.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	6408 e	3832	10998	12994	12532	12696	12037	8.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	586	1232	1673	1234	1147	1452	..	1.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	5822 e	2600 e	9325	11760	11385	11244	..	10.3
<i>Industry</i>	5822 e	2600 e	9325	11760	11385	11244	..	10.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	470 e	6992 e	32589	34651	35941	35420	38435	11.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	470 e	6992 e	32589	34651	35941	35420	38435	11.4
Statistical differences	-	-3400	-	-	-	-	..	-
Transformation processes	470 e	3592 e	32589	34651	35941	35420	..	16.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	469 e	6992 e	32589	34651	35941	35420	38435	11.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	469 e	6992 e	32589	34651	35941	35420	38435	11.4
Statistical differences	-	-3400	-	-	-	-	..	-
Transformation processes	469 e	3592 e	32589	34651	35941	35420	..	16.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	28163	49381	293574	311831	273792	307323	293141	13.0
Net imports ¹	3843	20388	53230	58620	63932	51822	49403	6.4
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	32006	69769	346804	370451	337724	359145	342544	11.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	2943	9910	39677	83008	86465	74434	..	14.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	29063	59859	307127	287443	251259	284711	..	11.0
<i>Industry</i>	3390	8667	8398	9910	12102	15235	..	3.8
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	25673	51192	298729	277533	239157	269476	..	11.7
Charcoal (kt)								
Production	41 e	78	10	10	10	10	10	-12.8
Net imports ¹	-	39	68	56	60	57	57	2.6
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	41 e	117	78	66	70	67	67	-3.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	41 e	117	78	66	70	67	..	-3.6
<i>Industry</i>	-	28	10	10	10	10	..	-6.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	41 e	89	68	56	60	57	..	-2.9
Biogases (TJ)								
Production	42	5480 e	21250	76013	82105	78355	84946	19.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	42	5480 e	21250	76013	82105	78355	84946	19.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	42	5480 e	21199	74147	80239	76489	..	19.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	51	1866	1866	1866	..	-
<i>Industry</i>	-	-	-	828	828	828	..	-
<i>Transport</i>	-	-	1	1	1	1	..	-
<i>Other</i>	-	-	50	1037	1037	1037	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	84	60	1	10	18	-
Net imports ¹	-	-	59	27	11	20	20	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	143	87	12	30	38	-
Statistical differences	-	-	-1	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	142	87	12	30	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	142	87	12	30	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	799	459	580	577	558	-
Net imports ¹	-	-	698	936	597	702	580	-
Stock changes	-	-	-28	-61	20	15	3	-
Gross consumption	-	-	1469	1334	1197	1294	1141	-
Statistical differences	-	-	-1	1	-	1	..	-
Transformation processes	-	-	-	2	3	3	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1468	1333	1194	1292	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	1468	1333	1194	1292	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	75	105	115	187	184	-
Net imports ¹	-	-	578	721	847	886	872	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	653	826	962	1073	1056	-
Statistical differences	-	-	-	-	1	-	..	-
Transformation processes	-	-	653	826	963	1073	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

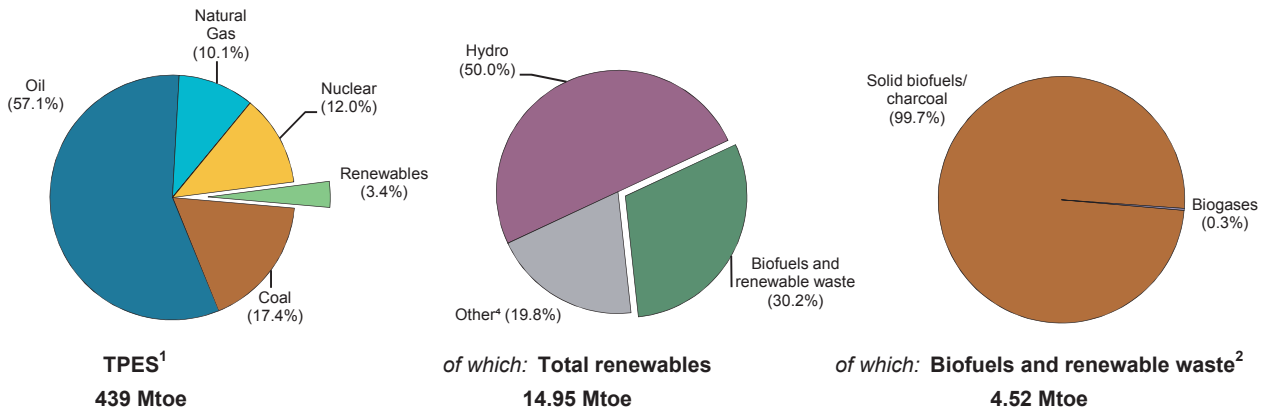


Figure 2. Contribution of renewables in 2016 provisional

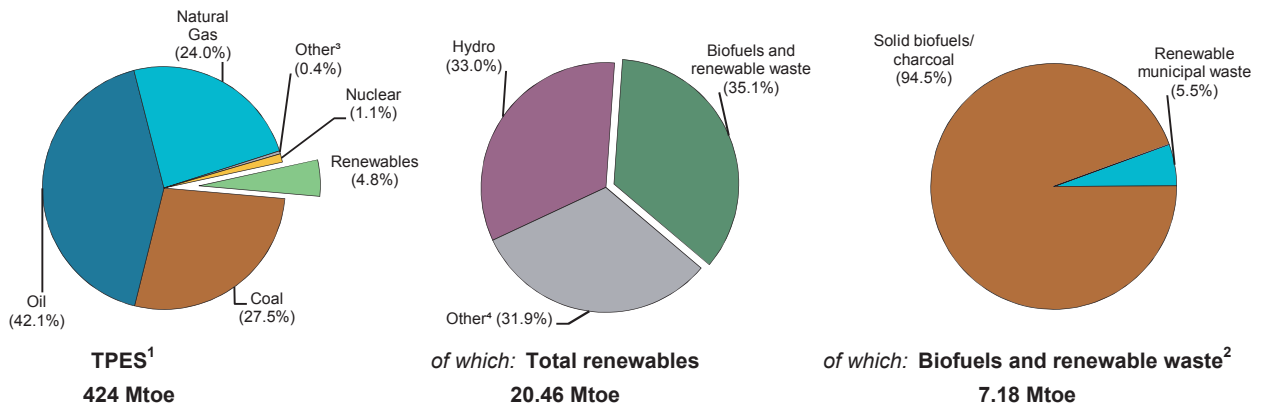
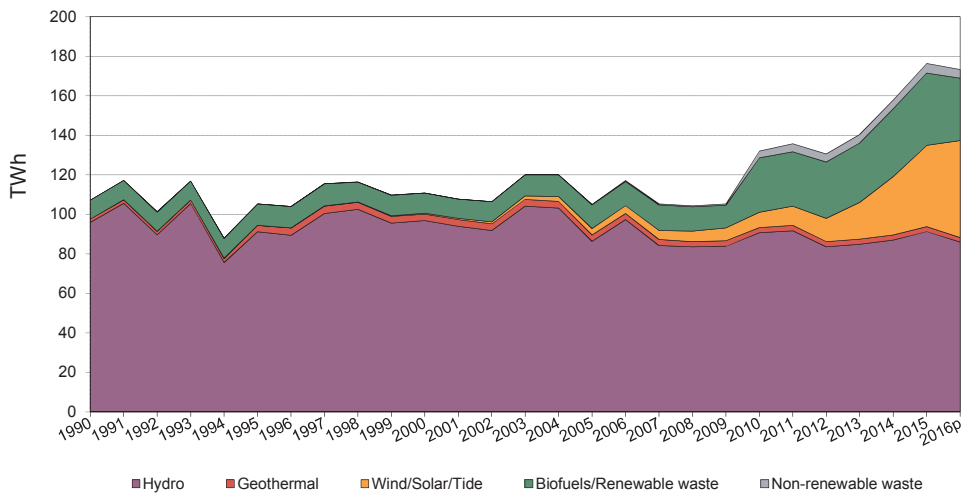


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	438.59	517.91	498.53	454.61	439.23	429.79	423.76	-1.2
of which: Renewables (Mtoe) ¹	14.95	15.91	18.95	19.93	21.27	22.87	20.46	1.6
Renewables/TPES(%)	3.4	3.1	3.8	4.4	4.8	5.3	4.8	2.9
GDP (billion 2010 US dollars)	4682.81	5348.93	5700.10	5894.24	5914.02	5986.14	6045.91	0.8
TPES/GDP ²	0.09	0.10	0.09	0.08	0.07	0.07	0.07	-2.0
TPES/GDP (year 2010 = 100)	107	111	100	88	85	82	80	-2.0
Population (millions)	123.61	126.83	128.04	127.33	127.12	126.98	126.76	-0.0
TPES/population (toe per capita)	3.55	4.08	3.89	3.57	3.46	3.38	3.34	-1.2
Electricity generation (TWh) ³	872.6	1088.1	1140.1	1059.6	1054.2	1035.3	1017.8	-0.4
of which: Renewables (TWh) ^{1,3}	98.20	99.19	120.07	129.32	148.22	165.49	161.51	3.1
Renew./Total Elec.(%) ^{1,4}	11.3	9.1	10.5	12.2	14.1	16.0	15.9	3.5
Road energy consumption (Mtoe)	59.7	74.4	65.5	65.7	63.1	63.1	..	..
of which: Liquid biofuels (Mtoe)	-	-	-	-	-	-	..	..
Liq. biofuels/road tr.(%) ⁵	-	-	-	-	-	-	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	38101	48463	56327	68079	78729	90334	4.2
Hydro	37830	46324	47736	48932	49597	50034	0.5
Hydro <1MW	-	-	-	-	-	-	-
Hydro 1-10MW	1378	1472	4369	4256	4194	4248	7.3
Hydro 10+MW	19447	20547	17993	17932	18054	18237	-0.8
Mixed plants	-	-	5625	5625	5625	5625	-
Pure pumped storage	17005	24305	19749	21119	21724	21924	-0.7
Geothermal	270	533	537	512	508	516	-0.2
Solar photovoltaic	1	330 e	3618 e	13599 e	23339 e	34150 e	36.2
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	84	2294	2645	2753	2808	26.4
Industrial waste	-	..	26	26	26	26	..
Municipal waste	-	1192	1010	1703	1752	1799	2.8
Solid biofuels	-	-	1100	652	739	978	-
Biogases	-	-	6	10	15	23	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	6319 e	6578 e	6578 e	6578 e	-
Cap. of solar collectors (MW _{th}) ⁶	-	-	4423 e	4605 e	4605 e	4605 e	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	32.10	26.11	26.74	23.55	22.88	22.28	x
Hydro	28.92	23.86	21.69	19.81	20.01	20.82	20.35
<i>of which: <1MW</i>	-	-	-	-	-	-	-
<i>of which: 1-10MW</i>	58.71	58.08	43.13	43.78	45.42	44.26	44.68
<i>of which: 10+MW</i>	46.85	43.20	41.69	39.33	41.17	43.02	40.66
<i>of which: pure pumped storage²</i>	6.00	5.44	x	x	x	x	x
Geothermal	73.61	71.70	56.26	57.88	57.92	57.11	57.60
Solar photovoltaic	14.98	11.99 e	11.99 e	11.99 e	11.99 e	11.99 e	11.99
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	14.63	19.71	18.49	20.89	20.98	20.58
Industrial waste	-	..	x	x	x	x	x
Municipal waste	-	-	42.97 e	24.45 e	25.09 e	27.11 e	28.38
Solid biofuels	-	-	x	x	x	x	x
Biogases	-	-	-	-	-	-	-
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	107147	110865	131958	140423	157780	176330	173270	2.8
Hydro	95835	96817	90682	84923	86942	91270	86059	-0.7
<i>of which: pumped storage</i>	<i>8943</i>	<i>11579</i>	<i>8470</i>	<i>6823</i>	<i>5146</i>	<i>6077</i>	<i>7482</i>	-2.7
Geothermal	1741	3348	2647	2596	2577	2582	2220	-2.5
Solar photovoltaic	1	347	3800	14279	24506	35858	43846	35.3
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	108	3962	4286	5038	5160	5203	27.4
Industrial waste	-	95	1517	2453	2491	2632	1899	20.6
Municipal waste renew.	-	-	1902	1824	1926	2136	2375	-
Municipal waste non-renew.	-	-	1902	1824	1926	2136	2375	-
Solid biofuels	9570	10150	25546	28238	32374	34556	29293	6.8
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	107147	110865	131958	140423	157780	176330	..	-
Hydro	95835	96817	90682	84923	86942	91270	..	-
<i>of which: pumped storage</i>	<i>8943</i>	<i>11579</i>	<i>8470</i>	<i>6823</i>	<i>5146</i>	<i>6077</i>	..	-
Geothermal	1741	3348	2647	2596	2577	2582	..	-
Solar photovoltaic	1	347	3800	14279	24506	35858	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	108	3962	4286	5038	5160	..	-
Industrial waste	-	95	1517	2453	2491	2632	..	-
Municipal waste renew.	-	-	1902	1824	1926	2136	..	-
Municipal waste non-renew.	-	-	1902	1824	1926	2136	..	-
Solid biofuels	9570	10150	25546	28238	32374	34556	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	53	148	24	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	53	148	24	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	53	148	24	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	53	148	24	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	1362	6098	5537	4377	4243	4014	4014 e	-2.6
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	1362	6098	5537	4377	4243	4014	4014 e	-2.6

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	7327	444	-	3084 e	2390	333	1670	425 e
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	7327	444	-	3084 e	2390	333	1670	425
Statistical differences	-	-	-	-	-	-	-22	-
Main activity electricity plants	-5910	-6	-	-9	-2050	-	-149	-83 e
Autoproducer electricity plants	-1416	-438	-	-3075 e	-170	-	-372	-342 e
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-114	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	171	333	1014	-
Industry	-	-	-	-	-	-	1014	-
Iron and steel	-	-	-	-	-	-	50	-
Chemical and petrochemical	-	-	-	-	-	-	135	-
Non-ferrous metals	-	-	-	-	-	-	32	-
Non-metallc minerals	-	-	-	-	-	-	523	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	274	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	171	333	-	-
Residential	-	-	-	-	-	307	-	-
Commercial and public services	-	-	-	-	98	25	-	-
Agriculture/forestry	-	-	-	-	73	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	85193	5160	-	35858 e	2582	-	2632	2136 e
<i>Electricity plants</i>	85193	5160	-	35858 e	2582	-	2632	2136 e
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
425 e	8871	-	-	-	-	-	24969	82.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
425	8871	-	-	-	-	-	24969	5.8%
-	65	-	-	-	-	-	43	x
-83 e	-2366	-	-	-	-	-	-10656	x
-342 e	-4227	-	-	-	-	-	-10382	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-21 e	8	-	-	-	-	-13	x
-	-	-	-	-	-	-	-114	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	2322	8	-	-	-	-	3848	1.3%
-	2310	-	-	-	-	-	3324	4.1%
-	-	-	-	-	-	-	50	0.2%
-	-	-	-	-	-	-	135	0.8%
-	-	-	-	-	-	-	32	2.1%
-	-	-	-	-	-	-	523	5.6%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	2310	-	-	-	-	-	2584	32.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	11	8	-	-	-	-	523	0.5%
-	11	8	-	-	-	-	326	0.8%
-	-	-	-	-	-	-	123	0.2%
-	-	-	-	-	-	-	73	16.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
2136 e	34556	-	-	-	-	-	170253	16.5%
2136 e	34556	-	-	-	-	-	170253	16.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	65986	129777	102688	100791	100025	100098	86492	-1.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	65986	129777	102688	100791	100025	100098	86492	-1.7
Statistical differences	-	-	-	-1	-	1	..	..
Transformation processes	62679	120526	95279	93447	92783	92941	..	-1.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	3307	9251	7409	7343	7242	7158	..	-1.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	3307	9251	7409	7343	7242	7158	..	-1.7
Solar thermal (TJ)								
Production	57820	37920	20002	16906	15071	13943	9946	-6.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	57820	37920	20002	16906	15071	13943	9946	-6.5
Statistical differences	-	-	-	-1	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	57820	37920	20002	16905	15071	13943	..	-6.5
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	57820	37920	20002	16905	15071	13943	..	-6.5
Industrial waste (TJ)								
Production	80	7380	27269	67381	67303	69952	55938	16.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	80	7380	27269	67381	67303	69952	55938	16.2
Statistical differences	-	-	-993	-234	-465	-915	..	..
Transformation processes	80	986	12868	26969	25869	26589	..	24.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	6394	13408	40178	40969	42448	..	13.5
<i>Industry</i>	-	6394	13408	40178	40969	42448	..	13.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	16256 e	15684 e	16260 e	17809 e	16453 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	16256 e	15684 e	16260 e	17809 e	16453 e	-
Statistical differences	-	-	-	-	-	1	..	..
Transformation processes	-	-	16256 e	15684 e	16260 e	17810 e	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	16256 e	15684 e	16260 e	17809 e	16453 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	16256 e	15684 e	16260 e	17809 e	16453 e	-
Statistical differences	-	-	-	-	-	1	..	-
Transformation processes	-	-	16256 e	15684 e	16260 e	17810 e	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	188798	190029	330427	352899	358284	371498	284063	4.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	188798	190029	330427	352899	358284	371498	284063	4.6
Statistical differences	1517	1086	894	321	627	2704	..	-
Transformation processes	82338	86696	229732	258021	261626	276982	..	8.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	107977	104419	101589	95199	97285	97220	..	-0.5
<i>Industry</i>	104799	103234	101042	94702	96794	96748	..	-0.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	3178	1185	547	497	491	472	..	-6.0
Charcoal (kt)								
Production	35	25	14	12	12	12	10	-4.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	35	25	14	12	12	12	10	-4.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	35	25	14	12	12	12	..	-4.8
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	35	25	14	12	12	12	..	-4.8
Biogases (TJ)								
Production	491	28	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	491	28	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	491	28	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

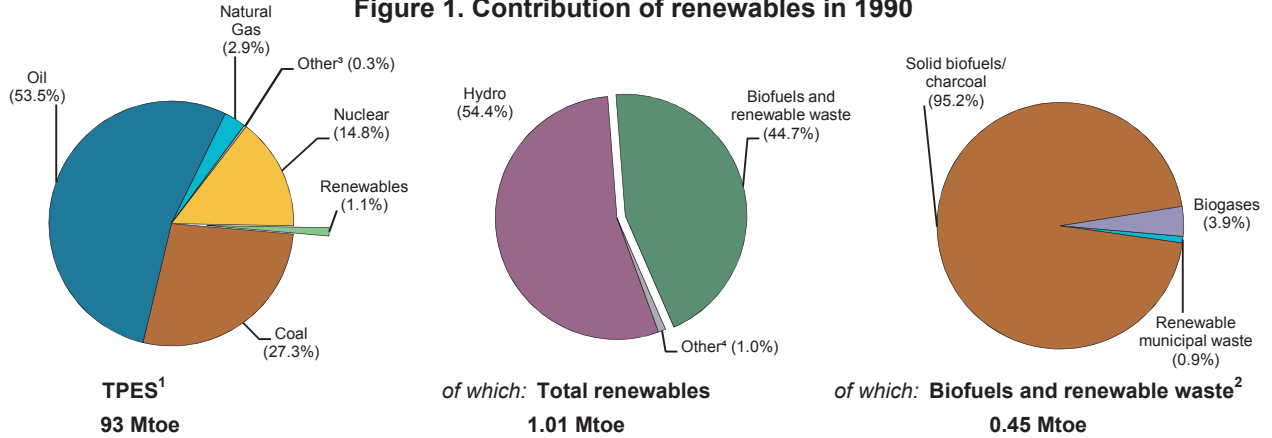


Figure 2. Contribution of renewables in 2016 provisional

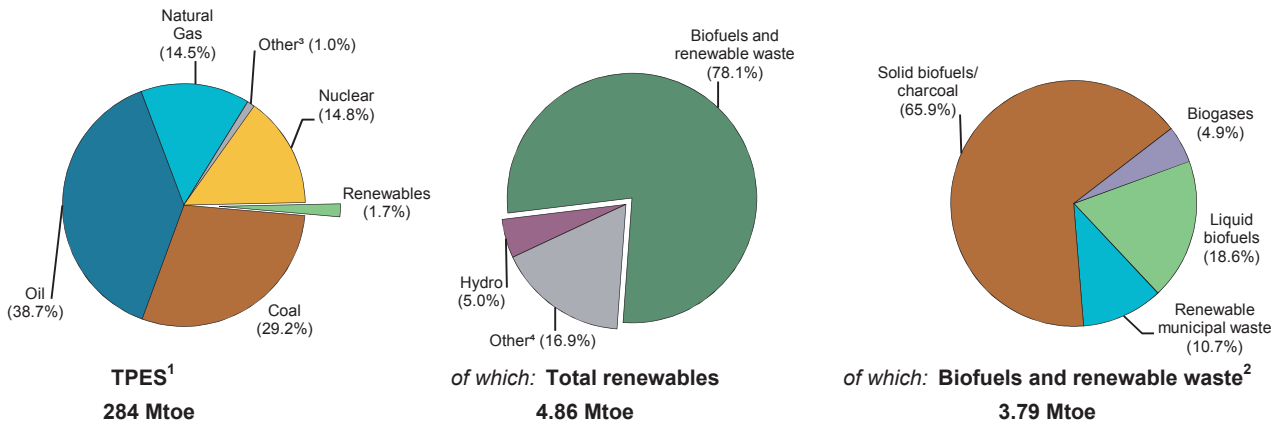
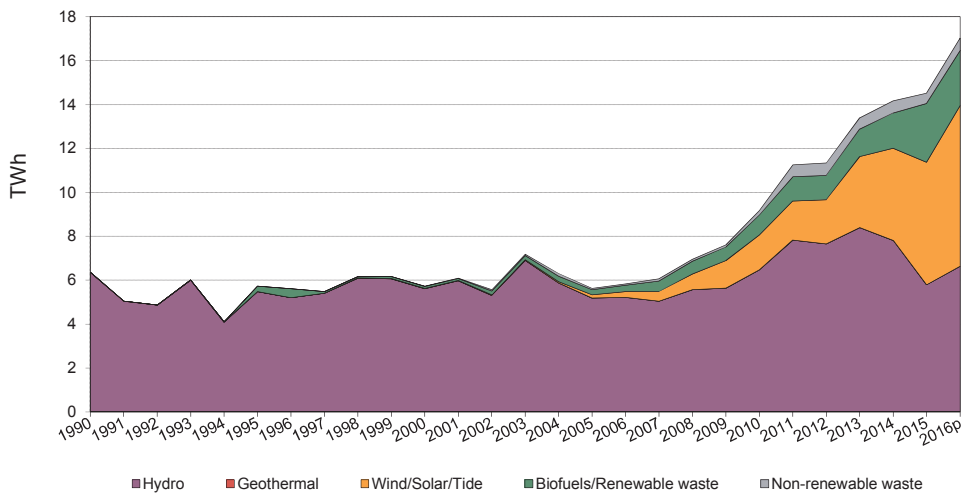


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	92.91	188.16	250.02	263.83	268.43	272.69	284.32	2.6
<i>of which: Renewables (Mtoe)</i> ¹	1.01	0.76	1.81	2.65	3.93	4.00	4.86	12.3
<i>Renewables/TPES(%)</i>	1.1	0.4	0.7	1.0	1.5	1.5	1.7	9.5
GDP (billion 2010 US dollars)	362.89	710.04	1094.50	1194.43	1234.34	1266.58	1302.40	3.9
TPES/GDP ²	0.26	0.26	0.23	0.22	0.22	0.22	0.22	-1.2
TPES/GDP (year 2010 = 100)	112	116	100	97	95	94	96	-1.2
Population (millions)	42.87	47.01	49.41	50.22	50.42	50.62	50.85	0.5
TPES/population (toe per capita)	2.17	4.00	5.06	5.25	5.32	5.39	5.59	2.1
Electricity generation (TWh) ³	105.4	288.5	496.7	537.9	545.9	549.2	586.8	4.5
<i>of which: Renewables (TWh)</i> ^{1,3}	6.36	4.11	6.19	8.78	8.55	10.41	12.68	7.3
<i>Renew./Total Elec.(%)</i> ^{1,4}	6.0	1.4	1.2	1.6	1.6	1.9	2.2	2.6
Road energy consumption (Mtoe)	10.6	22.2	28.5	30.2	30.4	31.7	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.33	0.36	0.37	0.42	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	1.2	1.2	1.2	1.3	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	2341	3219 e	6759	9074	10539	11930	9.1
Hydro	2340	3149	5525	6452	6467	6471	4.9
<i>Hydro <1MW</i>	-	4	19	13	14	11	7.0
<i>Hydro 1-10MW</i>	-	38	82	94	92	96	6.4
<i>Hydro 10+MW</i>	-	1507	1524	1645	1661	1664	0.7
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	1000	1600	3900	4700	4700	4700	7.4
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	1	4	650	1555	2481	3534	57.2
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	1	255	255	255	-
Wind	-	7	382	576	612	743	36.5
Industrial waste	-	-	21	7	74	104	-
Municipal waste	-	11 e	39	75	99	189	20.9
Solid biofuels	-	48 e	46	55	74	160	8.4
Biogases	-	-	95	99	121	113	-
Liquid biofuels	-	-	-	-	356	361	-
Solar collectors surface (1000 m ²)	-	1257 e	1381	1548	1580	1609	1.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	880 e	967	1084	1106	1126	1.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	31.02	20.30 e	15.48	16.85	15.35	13.90	x
Hydro	31.03	20.34	13.37	14.85	13.80	10.22	13.27
<i>of which: <1MW</i>	-	48.52	45.14	56.96	42.59	55.72	51.29
<i>of which: 1-10MW</i>	-	25.23	37.73	55.89	53.75	47.28	45.78
<i>of which: 10+MW</i>	-	29.61	24.99	26.12	15.57	11.62	21.72
<i>of which: pure pumped storage²</i>	19.15	11.42	8.17	9.97	12.31	8.87	9.59
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	10.59	15.08	13.57	11.78	11.76	12.53	12.54
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	21.66	22.03	22.22	21.97
Wind	-	27.21	24.41	22.76	21.37	18.45	21.66
Industrial waste	-	-	56.73	x	51.68	18.87	x
Municipal waste	-	37.64 e	60.86	55.96	41.69	29.69	42.49
Solid biofuels	-	10.94 e	65.12	103.70	41.06	47.56	77.10
Biogases	-	-	63.85	70.20	62.15	59.43	63.36
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	17.21	39.00	28.11

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	6362	5725	9168	13395	14173	14523	17031	7.1
Hydro	6361	5610	6472	8394	7820	5796	6633	1.1
<i>of which: pumped storage</i>	<i>1677</i>	<i>1600</i>	<i>2790</i>	<i>4105</i>	<i>5068</i>	<i>3650</i>	<i>3787</i>	<i>5.5</i>
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	1	5	772	1605	2557	3880	5140	54.3
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	484	492	496	495	-
Wind	-	17	817	1149	1146	1201	1683	33.3
Industrial waste	-	-	104	287	335	172	300	-
Municipal waste renew.	-	22	121	147	144	196	175	13.8
Municipal waste non-renew.	-	14	88	220	217	295	263	20.1
Solid biofuels	-	46	262	500	266	666	776	19.3
Biogases	-	11	532	609	659	588	608	28.5
Liquid biofuels	-	-	-	-	537	1233	958	-
of which:								
Electricity only plants	6362	5689	8837	12795	13603	14090	..	-
Hydro	6361	5610	6472	8394	7820	5796	..	-
<i>of which: pumped storage</i>	<i>1677</i>	<i>1600</i>	<i>2790</i>	<i>4105</i>	<i>5068</i>	<i>3650</i>	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	1	5	772	1605	2557	3880	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	484	492	496	..	-
Wind	-	17	817	1149	1146	1201	..	-
Industrial waste	-	-	103	168	227	114	..	-
Municipal waste renew.	-	-	1	41	50	133	..	-
Municipal waste non-renew.	-	-	1	62	76	200	..	-
Solid biofuels	-	46	241	385	158	553	..	-
Biogases	-	11	430	507	540	484	..	-
Liquid biofuels	-	-	-	-	537	1233	..	-
CHP plants	-	36	331	600	570	433	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	1	119	108	58	..	-
Municipal waste renew.	-	22	120	106	94	63	..	-
Municipal waste non-renew.	-	14	87	158	141	95	..	-
Solid biofuels	-	-	21	115	108	113	..	-
Biogases	-	-	102	102	119	104	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	3353 e	20102	36817	34920	22199	23933	13.1
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	2066	17286	10756	5123	4737	-
Municipal waste renew.	-	2012 e	9553	6725	6713	5139	5363	6.3
Municipal waste non-renew.	-	1341 e	6891	10086	10069	7708	8043	11.8
Solid biofuels	-	-	1077	2170 e	6805	3861	5421	-
Biogases	-	-	515	550 e	577	368	369	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	3896	4387	5660	5463	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	9	831	941	439	..	-
Municipal waste renew.	-	-	1331	639	743	568	..	-
Municipal waste non-renew.	-	-	964	957	1115	851	..	-
Solid biofuels	-	-	1077	1606 e	2313	3237	..	-
Biogases	-	-	515	354	548	368	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	3353 e	16206	32430	29260	16736	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	2057	16455	9815	4684	..	-
Municipal waste renew.	-	2012 e	8222	6086	5970	4571	..	-
Municipal waste non-renew.	-	1341 e	5927	9129	8954	6857	..	-
Solid biofuels	-	-	-	564 e	4492	624	..	-
Biogases	-	-	-	196 e	29	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	185	103	43	334	135	28	2118	389
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	185	103	43	334	135	28	2118	389
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-185	-103	-43	-291	-	-	-	-
Autoproducer electricity plants	-	-1	-	-42	-	-	-28	-35
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-20	-36
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-141	-123
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	135	28	1930	195
Industry	-	-	-	-	4	1	1851	16
Iron and steel	-	-	-	-	-	-	7	-
Chemical and petrochemical	-	-	-	-	-	-	260	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	839	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	11	-
Paper, pulp and print	-	-	-	-	-	-	358	2
Wood and wood products	-	-	-	-	-	-	6	-
Construction	-	-	-	-	-	-	4	9
Textile and leather	-	-	-	-	-	-	46	1
Non-specified	-	-	-	-	4	1	319	4
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	131	27	79	179
Residential	-	-	-	-	22	13	-	-
Commercial and public services	-	-	-	-	87	15	79	178
Agriculture/forestry	-	-	-	-	22	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	2146	1201	496	3880	-	-	172	196
<i>Electricity plants</i>	2146	1201	496	3880	-	-	114	133
<i>CHP plants</i>	-	-	-	-	-	-	58	63
Heat generated - TJ	-	-	-	-	-	-	5123	5139
<i>CHP plants</i>	-	-	-	-	-	-	439	568
<i>Heat plants</i>	-	-	-	-	-	-	4684	4571

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
583	1879	-	184	-	418	279	6678	13.0%
-	-	-	-	-	10	-	10	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	16	-	16	x
583	1879	-	184	-	444	279	6704	2.5%
-	-	-	-	-	392	-	392	x
-	-43	-	-35	-	-	-279	-979	x
-52	-93	-	-84	-	-	-	-335	x
-	-21	-	-24	-	-	-	-45	x
-55	-86	-	-	-	-	-	-197	x
-	-	-	-	-	-	-	-	-
-185	-25	-	-	-	-	-	-474	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
292	1611	-	42	-	418	-	4651	2.7%
24	583	-	39	-	-	-	2518	5.1%
-	-	-	-	-	-	-	7	0.1%
-	11	-	9	-	-	-	280	3.4%
-	-	-	-	-	-	-	-	-
-	4	-	-	-	-	-	843	14.9%
-	3	-	-	-	-	-	3	0.1%
-	1	-	-	-	-	-	1	0.0%
-	-	-	-	-	-	-	-	-
-	75	-	23	-	-	-	109	5.8%
3	248	-	1	-	-	-	612	31.1%
-	161	-	-	-	-	-	167	41.7%
13	-	-	-	-	-	-	26	3.0%
2	17	-	1	-	-	-	67	3.5%
5	63	-	4	-	-	-	400	12.9%
-	-	-	-	-	418	-	418	1.3%
-	-	-	-	-	418	-	418	1.3%
-	-	-	-	-	-	-	-	-
268	1028	-	3	-	-	-	1715	3.9%
-	106	-	-	-	-	-	141	0.7%
268	857	-	3	-	-	-	1487	7.0%
1	65	-	-	-	-	-	88	5.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
295	666	-	588	-	-	1233	10873	2.0%
200	553	-	484	-	-	1233	10440	2.1%
95	113	-	104	-	-	-	433	0.9%
7708	3861	-	368	-	-	-	22199	10.8%
851	3237	-	368	-	-	-	5463	3.0%
6857	624	-	-	-	-	-	16736	76.9%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	1400	3641	4542	5654	6940	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1400	3641	4542	5654	6940	-
Statistical differences	-	-	1	1	-	1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1401	3642	4542	5655	..	-
<i>Industry</i>	-	-	40	91	-	155	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	1361	3551	4542	5500	..	-
Solar thermal (TJ)								
Production	416	1745	1225	1164	1193	1192	1130	-2.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	416	1745	1225	1164	1193	1192	1130	-2.5
Statistical differences	1	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	417	1745	1225	1164	1193	1192	..	-2.5
<i>Industry</i>	-	-	18	26	-	47	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	417	1745	1207	1138	1193	1145	..	-2.8
Industrial waste (TJ)								
Production	11663	39228	74973	95926	78446	88702	87962	5.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	11663	39228	74973	95926	78446	88702	87962	5.6
Statistical differences	-72	-184	17	-	-	1	..	-
Transformation processes	-	-	3528	20640	14329	7901	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	11591	39044	71462	75286	64117	80802	..	5.0
<i>Industry</i>	11426	38823	65273	65798	62242	77496	..	4.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	165	221	6189	9488	1875	3306	..	19.8
Municipal waste - renewables (TJ)								
Production	160 e	4579 e	17460	14536	14781	16283	16991	8.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	160 e	4579 e	17460	14536	14781	16283	16991	8.8
Statistical differences	-	504	2054	120	-1	-	..	-
Transformation processes	-	2721	14433	9201	10502	8136	..	7.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	160 e	2362 e	5081	5455	4278	8147	..	8.6
<i>Industry</i>	-	-	-	153	50	661	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	160 e	2362 e	5081	5302	4228	7486	..	8.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	107 e	3053 e	16540	21805	22172	24425	25487	14.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	107 e	3053 e	16540	21805	22172	24425	25487	14.9
Statistical differences	-	335	1482	-	-1	-	..	..
Transformation processes	-	1814	10406	13802	15753	12203	..	13.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	107 e	1574 e	7616	8003	6418	12222	..	14.6
<i>Industry</i>	-	-	-	224	76	991	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	107 e	1574 e	7616	7779	6342	11231	..	14.0
Solid Biofuel excluding charcoal (TJ)								
Production	16950	8253	13792	39881	87847	78694	104643	16.2
Net imports ¹	972	1153	743	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	17922	9406	14535	39881	87847	78694	104643	15.2
Statistical differences	-	-	3	1857	1	1	..	..
Transformation processes	-	433	4583	8178	10119	11243	..	24.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	17922	8973	9955	33560	77729	67452	..	14.4
<i>Industry</i>	-	4518	7550	23667	42274	24414	..	11.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	17922	4455	2405	9893	35455	43038	..	16.3
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	739	1492	8316	9917	9330	7726	7746	11.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	739	1492	8316	9917	9330	7726	7746	11.6
Statistical differences	-	-	108	245	-	-	..	..
Transformation processes	-	112	5020	6044	5573	5965	..	30.3
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	739	1380	3404	4118	3757	1761	..	1.6
<i>Industry</i>	501	821	241	881	1404	1617	..	4.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	238	559	3163	3237	2353	144	..	-8.6

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	329	348	369	413	485	-
Net imports ¹	-	-	-	-	-	10	-	-
Stock changes	-	-	-	3	-16	-397	-3	-
Gross consumption	-	-	329	351	353	439	482	-
Statistical differences	-	-	-	-	16	387	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	329	351	369	413	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	329	351	369	413	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	192	317	246	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	192	317	246	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	192	317	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

LATVIA

Figure 1. Contribution of renewables in 1990

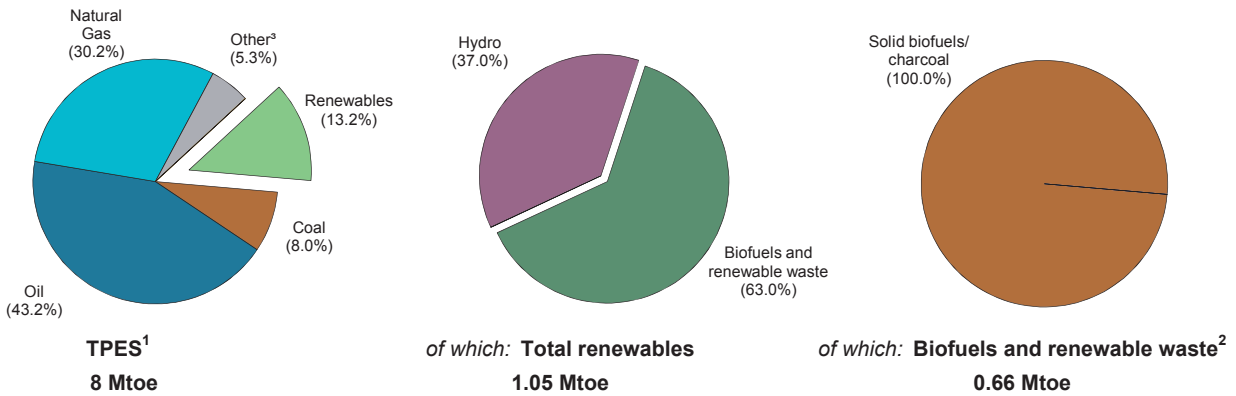


Figure 2. Contribution of renewables in 2016 provisional

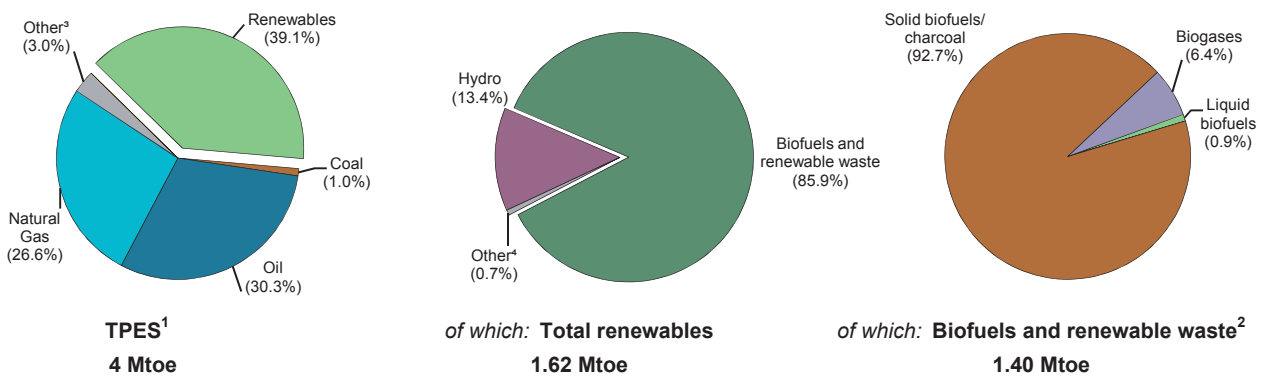


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

LATVIA

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	7.89	3.83	4.51	4.34	4.34	4.26	4.16	0.5
<i>of which: Renewables (Mtoe)</i> ¹	1.05	1.19	1.43	1.61	1.61	1.54	1.62	2.0
<i>Renewables/TPES(%)</i>	13.2	31.1	31.8	37.1	37.2	36.1	39.1	1.4
GDP (billion 2010 US dollars)	-	16.40	23.77	26.99	27.56	28.30	28.86	3.6
TPES/GDP ²	-	0.23	0.19	0.16	0.16	0.15	0.14	-3.0
TPES/GDP (year 2010 = 100)	-	123	100	85	83	79	76	-3.0
Population (millions)	2.66	2.37	2.10	2.01	1.99	1.98	1.96	-1.2
TPES/population (toe per capita)	2.96	1.62	2.15	2.16	2.18	2.16	2.12	1.7
Electricity generation (TWh) ³	6.6	4.1	6.6	6.2	5.1	5.5	6.4	2.8
<i>of which: Renewables (TWh)</i> ^{1,3}	4.50	2.82	3.64	3.53	2.80	2.78	3.48	1.3
<i>Renew./Total Elec.(%)</i> ^{1,4}	67.6	68.3	54.9	56.9	54.5	50.2	54.2	-1.4
Road energy consumption (Mtoe)	0.8	0.7	1.0	0.9	0.9	1.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.03	0.02	0.02	0.02	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	2.7	2.1	2.3	2.2	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	1487	1515	1622	1764	1780	1784	1.1
Hydro	1487	1513	1576	1589	1590	1589	0.3
<i>Hydro <1MW</i>	-	8	25	28	29	28	8.7
<i>Hydro 1-10MW</i>	-	-	1	1	1	1	-
<i>Hydro 10+MW</i>	1487	1505	1550	1560	1560	1560	0.2
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	2	30	67	69	69	26.6
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	5	55	63	66	-
Biogases	-	-	11	53	58	60	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	-	-	-	-	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	-	-	-	-	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	34.51	21.28	25.58	22.87	17.98	17.77	x
Hydro	34.51	21.27	25.50	20.92	14.31	13.36	19.27
<i>of which: <1MW</i>	-	35.96	31.52	21.65	25.17	28.73	27.39
<i>of which: 1-10MW</i>	-	-	67.11	53.54	50.13	42.61	52.27
<i>of which: 10+MW</i>	34.51	21.19	25.38	20.89	14.09	13.07	19.11
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	25.21	18.67	20.45	23.33	24.34	22.54
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	-	19.20	44.57	57.79	65.34	45.79
Biogases	-	-	58.83	61.73	68.89	74.53	62.51
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	4496	2823	3635	3534	2804	2776	3483	1.3
Hydro	4496	2819	3520	2912	1994	1860	2530	-0.7
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	1	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	4	49	120	141	147	128	24.2
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	9	215	319	378	427	-
Biogases	-	-	57	287	350	391	397	-
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	4496	2823	3577	3039	2137	2007	..	-
Hydro	4496	2819	3520	2912	1994	1860	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	4	49	120	141	147	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	2	7	2	-	-	-
Biogases	-	-	6	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	-	58	495	667	769	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	7	208	317	378	..	-
Biogases	-	-	51	287	350	391	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	732	3691	4290	7037	8515	9296	11476	7.3
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	732	3691	4237	6443	7754	8404	10524	6.8
Biogases	-	-	50	594	761	892	952	-
Liquid biofuels	-	-	3	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	456	3148	4530	5338	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	403	2554	3769	4446	..	-
Biogases	-	-	50	594	761	892	..	-
Liquid biofuels	-	-	3	-	-	-	-	-
Heat only plants	732	3691	3834	3889	3985	3958	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	732	3691	3834	3889	3985	3958	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	1458	-	7	13	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	1458	-	7	13	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	160	13	-	-	-	-	2	-
Imports	-	-	-	-	-	-	5	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	160	13	-	-	-	-	7	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-160	-12	-	-	-	-	-	-
Autoproducer electricity plants	-	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	-	7	-
Industry	-	-	-	-	-	-	7	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	7	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Residential	-	-	-	-	-	-	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	1860	147	-	-	-	-	-	-
<i>Electricity plants</i>	1860	147	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
6	2009	-	88	2	59	-	2339	100.0%
41	98	3	-	7	15	-	169	3.8%
-	-805	-8	-	-1	-53	-	-867	40.6%
-	-44	-1	-	-	-4	-	-49	x
48	1258	-6	88	8	17	-	1593	37.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-172	x
-	-	-	-	-	-	-	-	-
-	-187	-	-56	-	-	-	-243	x
-	-12	-	-23	-	-	-	-35	x
-	-106	-	-	-	-	-	-106	x
-	-30	-	-	-	-	-	-30	x
-	-17	8	-	-	-	-	-9	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
48	906	1	9	8	17	-	996	26.3%
48	358	-	1	-	-	-	414	52.5%
-	-	-	-	-	-	-	-	-
-	5	-	1	-	-	-	6	25.7%
-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	55	40.9%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	2	12.5%
-	-	-	-	-	-	-	-	-
-	6	-	-	-	-	-	6	7.8%
-	-	-	-	-	-	-	-	-
-	340	-	-	-	-	-	340	75.7%
-	1	-	-	-	-	-	1	2.7%
-	-	-	-	-	-	-	-	-
-	3	-	-	-	-	-	3	25.9%
-	-	-	-	8	17	-	25	2.4%
-	-	-	-	8	13	-	21	2.2%
-	-	-	-	-	4	-	4	5.2%
-	548	1	8	-	-	-	557	30.1%
-	457	1	-	-	-	-	458	41.4%
-	80	-	3	-	-	-	83	14.2%
-	11	-	5	-	-	-	16	10.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	378	-	391	-	-	-	2776	50.2%
-	-	-	-	-	-	-	2007	100.0%
-	378	-	391	-	-	-	769	21.8%
-	8404	-	892	-	-	-	9296	36.5%
-	4446	-	892	-	-	-	5338	28.2%
-	3958	-	-	-	-	-	3958	60.9%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Industrial waste (TJ)								
Production	-	-	105	84	168	84	113	-
Net imports ¹	-	-	-	308	196	224	85	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	105	392	364	308	198	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	105	392	364	308	..	-
<i>Industry</i>	-	-	105	392	364	308	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	334	85	171	256	256	-
Net imports ¹	-	-	761	1807	2046	1722	947	-
Stock changes	-	-	-19	-68	153	17	135	-
Gross consumption	-	-	1076	1824	2370	1995	1338	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1076	1824	2370	1995	..	-
<i>Industry</i>	-	-	1076	1824	2370	1995	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	28271	48151	66823	73335	85666	84121	86834	3.8
Net imports ¹	-	-8451	-22135	-25232	-27864	-29602	-32668	8.7
Stock changes	-690	-4	1018	5061	-1782	-1823	294	-
Gross consumption	27581	39696	45706	53164	56020	52696	54460	1.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	1729	5196	7458	11840	13717	14757	..	7.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	80	-	-	-	-	-	..	-
Final energy consumption	25772	34500	38248	41324	42303	37939	..	0.6
<i>Industry</i>	268	2467	9459	12880	14792	14992	..	12.8
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	25504	32033	28789	28444	27511	22947	..	-2.2
Charcoal (kt)								
Production	-	-	9	10	13	11	12	-
Net imports ¹	-	-	-8	-7	-10	-7	-10	-
Stock changes	-	-	1	-	-	-2	-	-
Gross consumption	-	-	2	3	3	2	2	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	2	3	3	2	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	2	3	3	2	..	-
Biogases (TJ)								
Production	-	-	558	2695	3136	3674	3762	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	558	2695	3136	3674	3762	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	439	2365	2780	3310	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	119	330	356	364	..	-
<i>Industry</i>	-	-	-	6	32	31	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	119	324	324	333	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	15	3	-	3	5	-
Net imports ¹	-	-	-5	7	10	9	8	-
Stock changes	-	-	4	-	-	-	-	-
Gross consumption	-	-	14	10	10	12	13	-
Statistical differences	-	-	-1	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	13	10	10	12	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	13	10	10	12	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	43	66	75	66	45	-
Net imports ¹	-	-	-25	-51	-56	-43	-41	-
Stock changes	-	-	2	2	1	-4	1	-
Gross consumption	-	-	20	17	20	19	5	-
Statistical differences	-	-	1	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	21	17	20	19	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	21	17	20	19	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

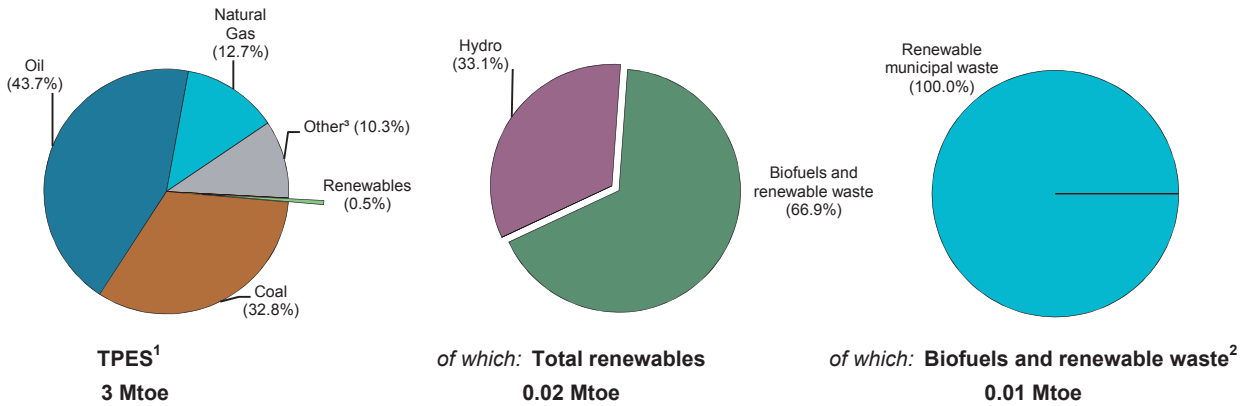


Figure 2. Contribution of renewables in 2016 provisional

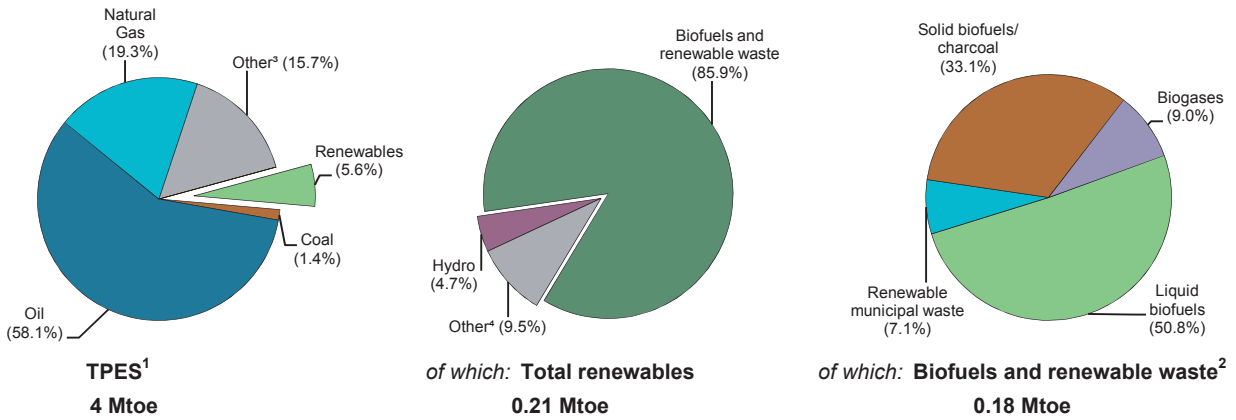
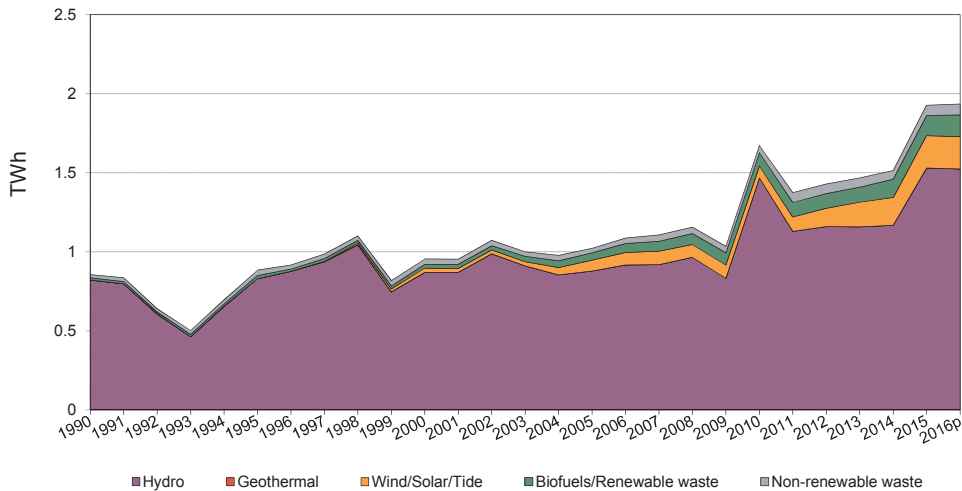


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	3.39	3.35	4.22	3.97	3.82	3.73	3.68	0.6
<i>of which: Renewables (Mtoe)</i> ¹	0.02	0.04	0.13	0.15	0.19	0.20	0.21	11.0
<i>Renewables/TPES(%)</i>	0.5	1.2	3.0	3.9	5.0	5.5	5.6	10.3
GDP (billion 2010 US dollars)	24.12	40.78	53.21	56.54	59.72	62.11	64.71	2.9
TPES/GDP ²	0.14	0.08	0.08	0.07	0.06	0.06	0.06	-2.3
TPES/GDP (year 2010 = 100)	177	104	100	88	81	76	72	-2.3
Population (millions)	0.38	0.44	0.51	0.55	0.56	0.57	0.58	1.8
TPES/population (toe per capita)	8.87	7.66	8.31	7.29	6.85	6.55	6.30	-1.2
Electricity generation (TWh) ³	0.6	0.4	3.2	1.8	1.9	1.3	0.8	3.9
<i>of which: Renewables (TWh)</i> ^{1,3}	0.08	0.17	0.27	0.37	0.40	0.43	0.45	6.2
<i>Renew./Total Elec.(%)</i> ^{1,4}	13.3	41.0	8.3	20.0	20.9	32.4	58.2	2.2
Road energy consumption (Mtoe)	0.9	1.6	2.2	2.2	2.1	2.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.04	0.06	0.07	0.08	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	1.9	2.6	3.4	4.2	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	1139	1155	1235	1320	1529	1543	1.9
Hydro	1133	1133	1134	1134	1330	1330	1.1
<i>Hydro <1MW</i>	1	1	2	2	2	2	4.7
<i>Hydro 1-10MW</i>	32	32	32	32	32	32	-
<i>Hydro 10+MW</i>	-	-	-	-	-	-	-
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	1100	1100	1100	1100	1296	1296	1.1
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	29	95	110	116	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	14	44	58	58	64	10.7
Industrial waste	-	-	-	-	-	-	-
Municipal waste	6	8	19	19	17	17	5.2
Solid biofuels	-	-	-	4	4	4	-
Biogases	-	-	9	10	10	12	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	29	48	52	56	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	20	34	36	39	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	8.59	9.43	15.48	12.70	11.30	14.26	x
Hydro	8.29	8.77	14.78	11.66	10.03	13.14	11.58
<i>of which: <1MW</i>	34.25	68.49	43.68	33.65	31.68	37.00	30.52
<i>of which: 1-10MW</i>	23.90	41.96	35.68	40.42	36.47	33.09	32.88
<i>of which: 10+MW</i>	-	-	-	-	-	-	-
<i>of which: pure pumped storage²</i>	7.81	7.75	14.12	10.78	9.34	12.61	10.96
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	8.32	8.86	9.83	10.21	8.38
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	22.02	14.29	16.34	15.72	18.17	16.35
Industrial waste	-	-	-	-	-	-	-
Municipal waste	64.69 e	73.48	44.80	56.89	59.88	71.40	61.12
Solid biofuels	-	-	-	5.58	59.95	67.52	44.35
Biogases	-	-	70.98	64.46	69.08	58.52	64.23
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	857	955	1674	1468	1515	1928	1936	4.5
Hydro	823	871	1468	1158	1169	1530	1525	3.6
<i>of which: pumped storage</i>	753	747	1360	1039	1061	1431	1413	4.1
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	21	74	95	104	98	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	27	55	83	80	102	107	9.0
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	13	18	28	36	34	40	42	5.4
Municipal waste non-renew.	21	34	46	59	55	66	70	4.6
Solid biofuels	-	-	-	2	21	24	25	-
Biogases	-	5	56	56	61	62	69	17.8
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	857	950	1618	1410	1433	1842	..	-
Hydro	823	871	1468	1158	1169	1530	..	-
<i>of which: pumped storage</i>	753	747	1360	1039	1061	1431	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	21	74	95	104	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	27	55	83	80	102	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	13	18	28	36	34	40	..	-
Municipal waste non-renew.	21	34	46	59	55	66	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	5	56	58	82	86	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	2	21	24	..	-
Biogases	-	5	56	56	61	62	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	4	114	186	538	623	630	37.2
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	4	81	139	461	543	550	36.0
Biogases	-	-	33	47	77	80	80	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	33	78	413	458	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	31	336	378	..	-
Biogases	-	-	33	47	77	80	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	4	81	108	125	165	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	4	81	108	125	165	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	9	9	-	9	-	2	14	12
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	9	9	-	9	-	2	14	12
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-8	-9	-	-	-	-	-	-12
Autoproducer electricity plants	-1	-	-	-9	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	2	14	-
Industry	-	-	-	-	-	-	14	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	14	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	2	-	-
Residential	-	-	-	-	-	2	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	99	102	-	104	-	-	-	40
<i>Electricity plants</i>	99	102	-	104	-	-	-	40
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
20	55	-	18	-	-	-	148	100.0%
-	30	-	-	7	76	-	113	2.7%
-	-21	-	-	-	-	-	-21	10.9%
-	-	-	-	-	-	-	-	-
20	64	-	18	7	76	-	240	6.4%
-	-	-	-	-	-	-	-	-
-20	-	-	-	-	-	-	-49	x
-	-	-	-	-	-	-	-10	x
-	-14	-	-	-	-	-	-14	x
-	-	-	-9	-	-	-	-9	x
-	-5	-	-	-	-	-	-5	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-5	-	-	-	-5	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	45	-	3	7	76	-	147	4.1%
-	24	-	-	-	-	-	38	5.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	5	-	-	-	-	-	19	12.6%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	19	-	-	-	-	-	19	84.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	7	76	-	83	4.2%
-	-	-	-	7	76	-	83	4.2%
-	-	-	-	-	-	-	-	-
-	21	-	3	-	-	-	26	2.8%
-	20	-	-	-	-	-	22	4.4%
-	-	-	1	-	-	-	1	0.3%
-	-	-	3	-	-	-	3	12.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
66	24	-	62	-	-	-	497	37.3%
66	-	-	-	-	-	-	411	41.7%
-	24	-	62	-	-	-	86	24.9%
-	543	-	80	-	-	-	623	26.6%
-	378	-	80	-	-	-	458	21.5%
-	165	-	-	-	-	-	165	77.5%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	38	68	73	79	79	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	38	68	73	79	79	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	38	68	73	79	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	38	68	73	79	..	-
Industrial waste (TJ)								
Production	-	268	597	641	640	569	569	5.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	268	597	641	640	569	569	5.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	268	597	641	640	569	..	5.1
<i>Industry</i>	-	268	597	641	640	569	..	5.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	510	407	421	463	443	516	529	1.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	510	407	421	463	443	516	529	1.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	510	407	421	463	443	516	..	1.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	444	769	692	762	728	849	871	0.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	444	769	692	762	728	849	871	0.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	444	769	692	762	728	849	..	0.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	-	637	2052	1929	2766	2302	2214	8.9
Net imports ¹	-	1	-40	43	-69	374	246	48.4
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	638	2012	1972	2697	2676	2460	10.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	5	95	177	672	785	..	40.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	633	1917	1795	2025	1891	..	7.6
<i>Industry</i>	-	-	1169	980	1116	1025	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	633	748	815	909	866	..	2.1
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	40	490	653	701	739	669	21.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	40	490	653	701	739	669	21.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	17	275	465	555	595	..	26.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	23	215	188	146	144	..	13.0
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	23	215	188	146	144	..	13.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	1	1	5	11	14	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1	1	5	11	14	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1	1	5	11	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	1	1	5	11	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	45	60	75	83	89	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	45	60	75	83	89	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	45	60	75	83	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	45	60	75	83	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

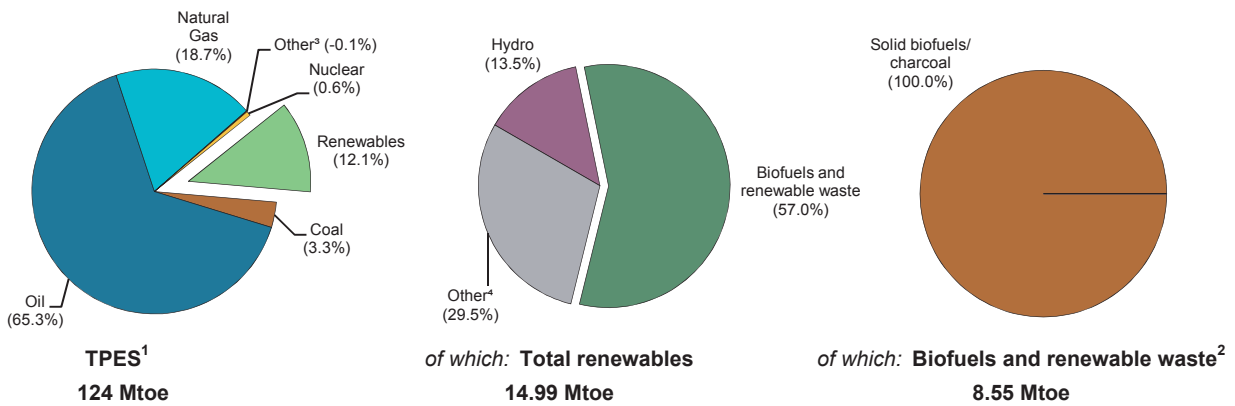


Figure 2. Contribution of renewables in 2016 provisional

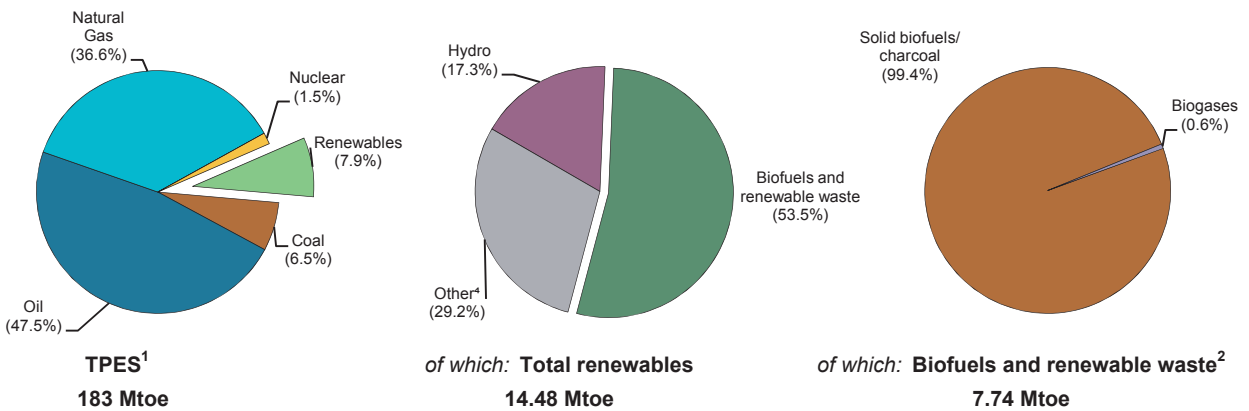
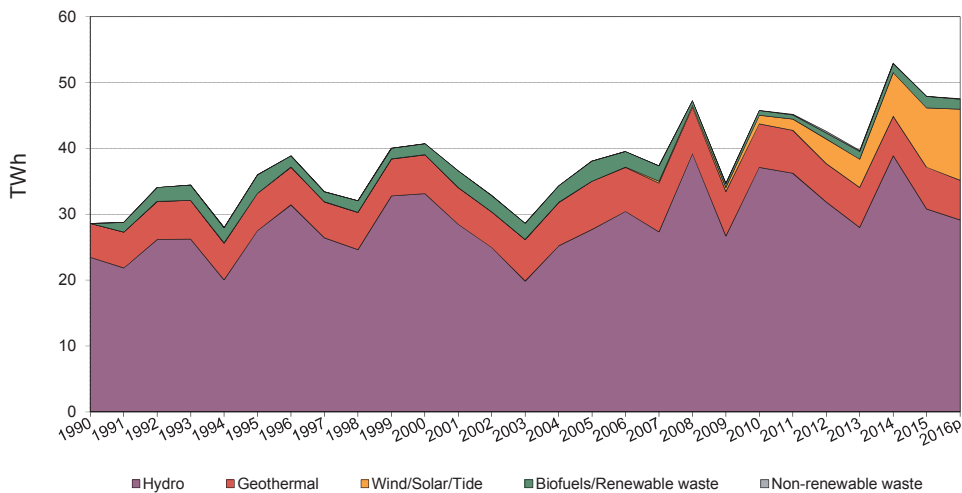


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	123.68	150.81	178.52	191.90	188.16	187.37	183.01	1.2
<i>of which: Renewables (Mtoe)</i> ¹	14.99	16.91	15.15	15.00	15.93	15.47	14.48	-1.0
<i>Renewables/TPES(%)</i>	12.1	11.2	8.5	7.8	8.5	8.3	7.9	-2.2
GDP (billion 2010 US dollars)	617.85	869.29	1049.93	1151.15	1177.00	1207.71	1235.52	2.2
TPES/GDP ²	0.20	0.17	0.17	0.17	0.16	0.16	0.15	-1.0
TPES/GDP (year 2010 = 100)	118	102	100	98	94	91	87	-1.0
Population (millions)	87.07	100.90	114.26	118.40	119.71	121.01	122.36	1.2
TPES/population (toe per capita)	1.42	1.49	1.56	1.62	1.57	1.55	1.50	0.0
Electricity generation (TWh) ³	115.8	205.7	275.5	297.3	301.5	311.1	317.9	2.8
<i>of which: Renewables (TWh)</i> ^{1,3}	28.60	40.73	45.75	39.54	52.89	47.90	47.46	1.0
<i>Renew./Total Elec.(%)</i> ^{1,4}	24.7	19.8	16.6	13.3	17.5	15.4	14.9	-1.8
Road energy consumption (Mtoe)	27.2	33.9	49.7	49.7	49.8	49.5	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	-	-	-	-	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	-	-	-	-	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	8546	10868	13531	15230	16610	17325	3.2
Hydro	7838	9653	11597	11633	12464	12223	1.6
<i>Hydro <1MW</i>	-	6	3	3	3	3	-4.5
<i>Hydro 1-10MW</i>	33	136	98	95	117	115	-1.1
<i>Hydro 10+MW</i>	7805	9511	11496	11535	12344	12105	1.6
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	700	855	965	823	813	906	0.4
Solar photovoltaic	5	14	29	82	116	173	18.2
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	3	17	519	2122	2569	3271	42.0
Industrial waste	-	-	16	54	42	29	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	321	384	478	569	685	5.2
Biogases	-	8	21	38	37	38	10.9
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	373	1666	2501	2810	3166	15.3
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	261	1166	1751	1967	2216	15.3

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	38.21	42.78	38.64	29.75	36.40	31.58	x
Hydro	34.19	39.18	36.55	27.48	35.62	28.78	31.79
<i>of which: <1MW</i>	-	28.54	39.36	38.05	37.66	43.29	40.75
<i>of which: 1-10MW</i>	48.43	37.60	45.57	46.90	40.75	45.00	42.71
<i>of which: 10+MW</i>	34.13	39.21	36.47	27.32	35.57	28.62	31.69
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	83.56	78.79	78.29	84.19	84.24	79.77	82.51
Solar photovoltaic	2.28	5.71	12.20	14.83	21.72	16.21	15.58
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	3.81	12.76	27.25	22.51	28.56	30.52	27.22
Industrial waste	-	-	34.10	29.96	20.85	11.07	26.88
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	58.86	18.14	24.35	23.85	26.65	22.58
Biogases	-	24.26	64.24	48.17	50.82	48.18	46.63
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	28604	40732	45795	39685	52970	47925	47565	1.0
Hydro	23478	33133	37131	28002	38893	30815	29138	-0.8
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	5124	5901	6618	6070	6000	6331	6033	0.1
Solar photovoltaic	1	7	31	106	221	246	418	29.1
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	1	19	1239	4185	6426	8745	10378	48.3
Industrial waste	-	-	48	142	77	28	107	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	1655	610	1019	1189	1599	1333	-1.3
Biogases	-	17	118	161	164	161	158	15.0
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	28604	40732	45689	39224	52512	47555	..	-
Hydro	23478	33133	37131	28002	38893	30815	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	5124	5901	6618	6070	6000	6331	..	-
Solar photovoltaic	1	7	31	106	221	246	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	1	19	1239	4185	6426	8745	..	-
Industrial waste	-	-	48	61	17	28	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	1655	610	754	900	1342	..	-
Biogases	-	17	12	46	55	48	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	-	106	461	458	370	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	81	60	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	265	289	257	..	-
Biogases	-	-	106	115	109	113	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2650	752	-	21	3213	217	11	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2650	752	-	21	3213	217	11	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-2584	-205	-	-1	-3193	-	-	-
Autoproducer electricity plants	-66	-547	-	-20	-20	-	-11	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	217	-	-
Industry	-	-	-	-	-	11	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	11	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	206	-	-
Residential	-	-	-	-	-	124	-	-
Commercial and public services	-	-	-	-	-	82	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	30815	8745	-	246	6331	-	28	-
<i>Electricity plants</i>	30815	8745	-	246	6331	-	28	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	8566	-	47	-	-	-	15477	8.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	8566	-	47	-	-	-	15477	8.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-5983	x
-	-1466	-	-14	-	-	-	-2144	x
-	-	-	-	-	-	-	-	-
-	-175	-	-33	-	-	-	-208	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	6925	-	-	-	-	-	7142	6.0%
-	887	-	-	-	-	-	898	2.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	786	-	-	-	-	-	786	52.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	101	-	-	-	-	-	112	0.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	6038	-	-	-	-	-	6244	22.3%
-	6038	-	-	-	-	-	6162	34.7%
-	-	-	-	-	-	-	82	2.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1599	-	161	-	-	-	47925	15.4%
-	1342	-	48	-	-	-	47555	16.1%
-	257	-	113	-	-	-	370	2.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	184464	212436	151847	131361	129902	134554	127758	-3.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	184464	212436	151847	131361	129902	134554	127758	-3.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	184464	212436	151847	131361	129902	134554	..	-3.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	727	1822	4858	7236	8064	9087	10337	11.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	727	1822	4858	7236	8064	9087	10337	11.3
Statistical differences	-	-	-1	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	727	1822	4857	7236	8064	9087	..	11.3
<i>Industry</i>	34	85	218	381	415	462	..	11.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	693	1737	4639	6855	7649	8625	..	11.3
Industrial waste (TJ)								
Production	-	-	533	1690	861	472	601	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	533	1690	861	472	601	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	533	1690	861	472	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	358132	373986	338040	371270	363107	358731	322342	-0.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	358132	373986	338040	371270	363107	358731	322342	-0.3
Statistical differences	-1	1	-	-1	1	-1	..	-
Transformation processes	-	31321	41080	53856	71283	68740	..	5.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	358131	342666	296960	317413	291825	289990	..	-1.1
<i>Industry</i>	81669	57690	37649	61991	37708	37150	..	-2.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	276462	284976	259311	255422	254117	252840	..	-0.8
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	357	1298	1970	1939	1961	1912	12.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	357	1298	1970	1939	1961	1912	12.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	357	1298	1970	1939	1961	..	12.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

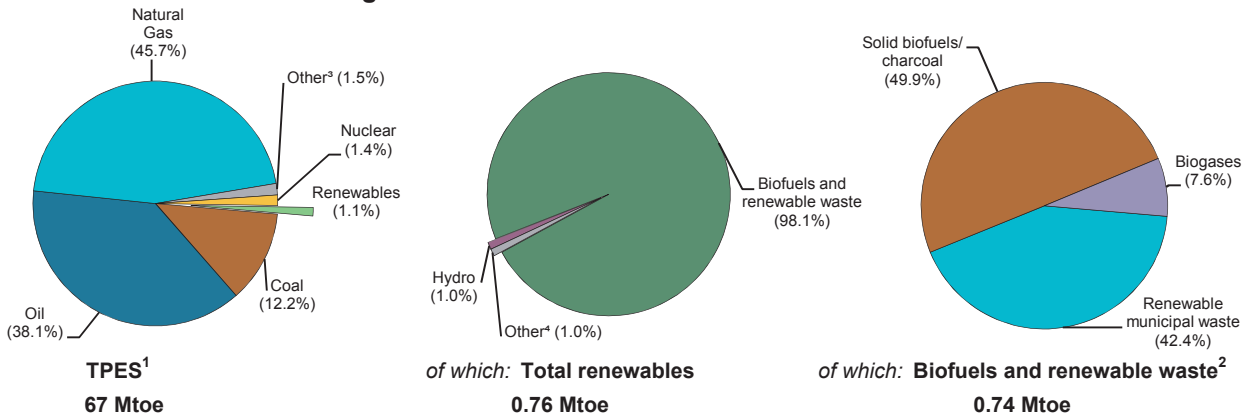


Figure 2. Contribution of renewables in 2016 provisional

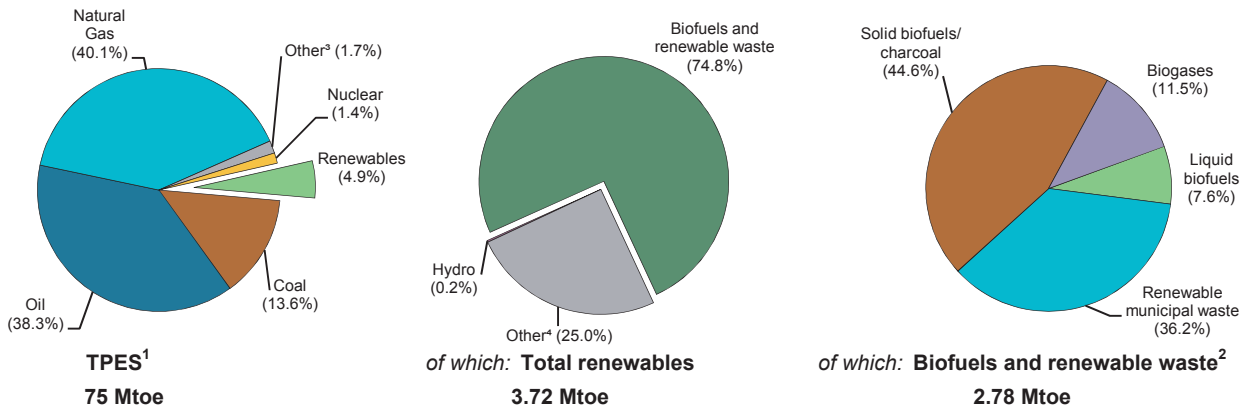
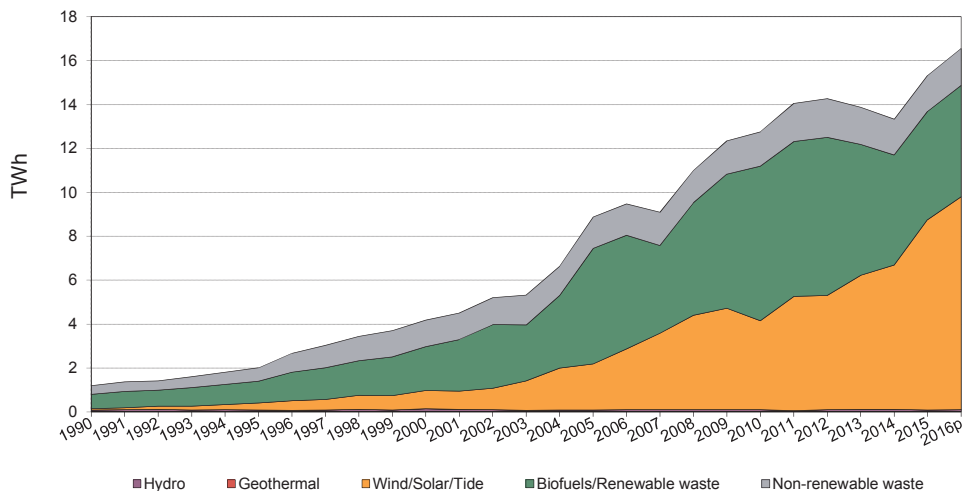


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	67.20	75.43	83.48	77.34	72.93	73.83	75.21	-0.0
<i>of which: Renewables (Mtoe)</i> ¹	0.76	1.35	3.25	3.44	3.44	3.65	3.72	6.5
<i>Renewables/TPES(%)</i>	1.1	1.8	3.9	4.4	4.7	4.9	4.9	6.5
GDP (billion 2010 US dollars)	530.53	734.69	836.39	839.72	851.64	868.26	886.85	1.2
TPES/GDP ²	0.13	0.10	0.10	0.09	0.09	0.09	0.08	-1.2
TPES/GDP (year 2010 = 100)	127	103	100	92	86	85	85	-1.2
Population (millions)	14.95	15.92	16.61	16.80	16.86	16.93	17.03	0.4
TPES/population (toe per capita)	4.50	4.74	5.03	4.60	4.33	4.36	4.42	-0.4
Electricity generation (TWh) ³	72.0	89.6	119.3	101.7	103.4	110.1	114.9	1.6
<i>of which: Renewables (TWh)</i> ^{1,3}	0.81	2.97	11.20	12.18	11.71	13.70	14.87	10.6
<i>Renew./Total Elec.(%)</i> ^{1,4}	1.1	3.3	9.4	12.0	11.3	12.4	12.9	8.9
Road energy consumption (Mtoe)	8.8	10.4	11.1	10.5	9.8	9.9	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.23	0.30	0.35	0.30	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	2.1	2.8	3.6	3.0	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	308	1022	3855	4871	5161	6130	12.7
Hydro	37	37	37	37	37	37	-
<i>Hydro <1MW</i>	-	-	-	-	-	-	-
<i>Hydro 1-10MW</i>	-	-	-	-	-	-	-
<i>Hydro 10+MW</i>	37	37	37	37	37	37	-
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	1	13	90	746	1048	1515	37.3
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	50	447	2237	2713	2865	3391	14.5
Industrial waste	-	-	-	-	-	-	-
Municipal waste	196	394	586	649	649	649	3.4
Solid biofuels	5	72	688	496	325	299	10.0
Biogases	19	59	200	230	237	239	9.8
Liquid biofuels	-	-	17	-	-	-	-
Solar collectors surface (1000 m ²)	73	276	576	633	644	647	5.8
<i>Cap. of solar collectors (MW_{th})</i> ⁶	51	193	403	443	451	453	5.9

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	44.48	46.69	37.79	32.53	29.49	28.54	x
Hydro	26.22	43.94	32.40	35.27	34.62	28.60	29.66
<i>of which: <1MW</i>	-	-	-	-	-	-	-
<i>of which: 1-10MW</i>	-	-	-	-	-	-	-
<i>of which: 10+MW</i>	26.22	43.94	32.40	35.27	34.62	28.60	29.66
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	4.79	6.75	7.09	7.46	8.55	8.45	7.89
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	12.79	21.17	20.38	23.68	23.10	25.42	24.14
Industrial waste	-	-	-	-	-	-	-
Municipal waste	54.34	71.87	64.81	66.39	62.17	63.86	65.78
Solid biofuels	78.69	68.92	69.65	66.71	73.72	72.43	69.59
Biogases	54.80	55.24	58.67	48.63	48.43	49.48	50.72
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	36.37	-	-	-	8.07

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	1200	4181	12761	13881	13334	15329	16552	9.0
Hydro	85	142	105	114	112	93	100	-2.2
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	8	56	487	785	1122	1555	39.0
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	56	829	3994	5627	5797	7550	8142	15.3
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	539	1272	1763	2076	1909	1997	2059	3.1
Municipal waste non-renew.	394	1209	1564	1698	1626	1634	1684	2.1
Solid biofuels	34	435	4197	2899	2100	1897	2029	10.1
Biogases	92	286	1028	980	1005	1036	983	8.0
Liquid biofuels	-	-	54	-	-	-	-	-
of which:								
Electricity only plants	141	3011	7463	7952	8177	10533	..	-
Hydro	85	142	105	114	112	93	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	8	56	487	785	1122	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	56	829	3994	5627	5797	7550	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	834	384	-	-	-	-	-
Municipal waste non-renew.	-	793	341	-	-	-	-	-
Solid biofuels	-	291	2447	1669	1437	1725	..	-
Biogases	-	114	82	55	46	43	..	-
Liquid biofuels	-	-	54	-	-	-	-	-
CHP plants	1059	1170	5298	5929	5157	4796	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	539	438	1379	2076	1909	1997	..	-
Municipal waste non-renew.	394	416	1223	1698	1626	1634	..	-
Solid biofuels	34	144	1750	1230	663	172	..	-
Biogases	92	172	946	925	959	993	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	3377	6344	11752	17792	19146	22644	22529	8.2
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	1806	3126	4992	8964	9747	11689	11419	8.4
Municipal waste non-renew.	1318	2971	4427	7334	8303	9563	9343	7.4
Solid biofuels	233	203	2051	1337	1050	1344	1719	14.3
Biogases	20	44	282	157	46	48	48	0.5
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	3377	1610	4758	17728	18787	21906	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	1806	699	1285	8964	9747	11689	..	-
Municipal waste non-renew.	1318	664	1140	7334	8303	9563	..	-
Solid biofuels	233	203	2051	1273	691	606	..	-
Biogases	20	44	282	157	46	48	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	4734	6994	64	359	738	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	2427	3707	-	-	-	-	-
Municipal waste non-renew.	-	2307	3287	-	-	-	-	-
Solid biofuels	-	-	-	64	359	738	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	8	649	-	96	58	27	-	841
Imports	-	-	-	-	-	-	-	167
Exports	-	-	-	-	-	-	-	-35
Stock changes	-	-	-	-	-	-	-	-
TPES	8	649	-	96	58	27	-	974
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-8	-548	-	-3	-	-	-	-
Autoproducer electricity plants	-	-102	-	-94	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-930
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	58	27	-	44
Industry	-	-	-	-	-	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	58	27	-	44
Residential	-	-	-	-	-	22	-	-
Commercial and public services	-	-	-	-	-	5	-	44
Agriculture/forestry	-	-	-	-	58	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	93	7550	-	1122	-	-	-	1997
<i>Electricity plants</i>	93	7550	-	1122	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	1997
Heat generated - TJ	-	-	-	-	-	-	-	11689
<i>CHP plants</i>	-	-	-	-	-	-	-	11689
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
688	1363	-	327	c	1440	-	5497	11.5%
137	90	33	-	147	-	-	574	0.3%
-28	-274	-27	-	-6	-1272	-	-1642	1.0%
-	-	-	-	1	11	-	12	x
797	1179	6	327	142	179	-	4442	6.0%
-	-	-	-	-	-	-	-	-
-	-286	-	-6	-	-	-	-851	x
-	-151	-	-8	-	-	-	-355	x
-	-38	-	-11	-	-	-	-49	x
-761	-30	-	-122	-	-	-	-1843	x
-	-21	-	-	-	-	-	-21	x
-	-	-	-	-	-	-	-	-
-	-	-	-60	-	-	-	-60	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
36	653	6	121	142	179	-	1266	2.2%
-	129	-	22	-	11	-	162	1.2%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	15	-	-	-	15	0.7%
-	-	-	4	-	-	-	4	0.7%
-	23	-	-	-	-	-	23	42.7%
-	3	-	-	-	11	-	14	2.5%
-	-	-	-	-	-	-	-	-
-	103	-	2	-	-	-	105	24.4%
-	-	-	-	142	156	-	298	2.9%
-	-	-	-	142	155	-	297	3.0%
-	-	-	-	-	1	-	1	0.2%
36	524	6	99	-	11	-	805	4.0%
-	439	6	-	-	-	-	467	4.9%
36	14	-	44	-	-	-	143	2.2%
-	59	-	55	-	11	-	183	5.1%
-	-	-	-	-	-	-	-	-
-	13	-	-	-	-	-	13	13.8%
1634	1897	-	1036	-	-	-	15329	13.9%
-	1725	-	43	-	-	-	10533	16.7%
1634	172	-	993	-	-	-	4796	10.2%
9563	1344	-	48	-	-	-	22644	16.3%
9563	606	-	48	-	-	-	21906	18.2%
-	738	-	-	-	-	-	738	3.9%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	318	993	1502	2448	2843	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	318	993	1502	2448	2843	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	318	993	1502	2448	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	318	993	1502	2448	..	-
Solar thermal (TJ)								
Production	100	454	994	1106	1128	1137	1147	6.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	100	454	994	1106	1128	1137	1147	6.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	100	454	994	1106	1128	1137	..	6.3
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	100	454	994	1106	1128	1137	..	6.3
Industrial waste (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	13205	25512	34208	33445	33251	35208	36624	2.2
Net imports ¹	-	-	-	7244	7014	5562	5562	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	13205	25512	34208	40689	40265	40770	42186	3.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	12808	24090	31492	38600	38255	38936	..	3.3
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	397	1422	2716	2089	2010	1834	..	1.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	397	1422	2716	2089	2010	1834	..	1.7

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	9635	24255	30335	27364	28325	28806	29965	1.2
Net imports ¹	-	-	-	5927	5976	4551	4551	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	9635	24255	30335	33291	34301	33357	34516	2.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	9345	22902	27927	31582	32588	31857	..	2.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	290	1353	2408	1709	1713	1500	..	0.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	290	1353	2408	1709	1713	1500	..	0.7
Solid Biofuel excluding charcoal (TJ)								
Production	15414	26079	50605	50311	54014	57092	59440	5.4
Net imports ¹	-	-4232	12289	2302	-5982	-7739	-7727	4.1
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	15414	21847	62894	52613	48032	49353	51713	5.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	740	5448	41148	28983	22077	22006	..	9.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	14674	16399	21746	23630	25955	27347	..	3.5
<i>Industry</i>	1308	1765	2749	2776	4484	5384	..	7.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	13366	14634	18997	20854	21471	21963	..	2.7
Charcoal (kt)								
Production	5	6	6	6	-	-	-	-
Net imports ¹	4	3	3	3	9	9	9	7.6
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	9	9	9	9	9	9	9	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	9	9	9	9	9	9	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	9	9	9	9	9	9	..	-
Biogases (TJ)								
Production	2376	5211	11984	12777	13094	13693	13444	6.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2376	5211	11984	12777	13094	13693	13444	6.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	717	2887	8196	8132	8121	8633	..	7.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	1659	2324	3788	4645	4973	5060	..	5.3
<i>Industry</i>	421	807	959	1124	1056	901	..	0.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1238	1517	2829	3521	3917	4159	..	7.0

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	c	414	c	c	c	..
Net imports ¹	-	-	201	-224	185	218	191	-
Stock changes	-	-	7	4	14	2	c	-
Gross consumption	-	-	208	194	199	220	191	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	208	194	199	220	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	208	194	199	220	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	382	1375	1720	1629	1462	-
Net imports ¹	-	-	-339	-1043	-1512	-1439	-1301	-
Stock changes	-	-	64	-112	71	12	-61	-
Gross consumption	-	-	107	220	279	202	100	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	107	220	279	202	..	-
<i>Industry</i>	-	-	-	12	15	13	..	-
<i>Transport</i>	-	-	107	197	250	176	..	-
<i>Other</i>	-	-	-	11	14	13	..	-
Other liquid biofuels (kt)								
Production	-	-	30	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	30	-	-	-	-	-
Statistical differences	-	-	1	-	-	-	..	-
Transformation processes	-	-	14	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	17	-	-	-	..	-
<i>Industry</i>	-	-	17	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

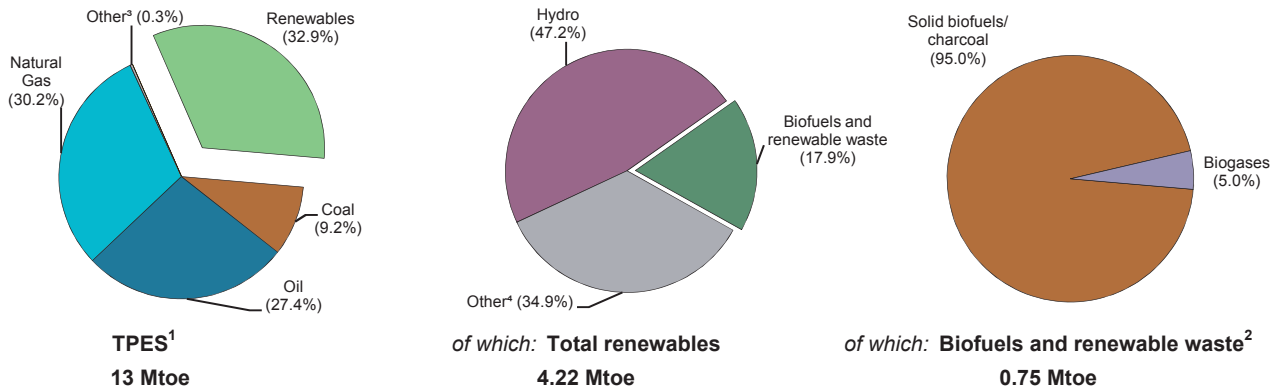


Figure 2. Contribution of renewables in 2016 provisional

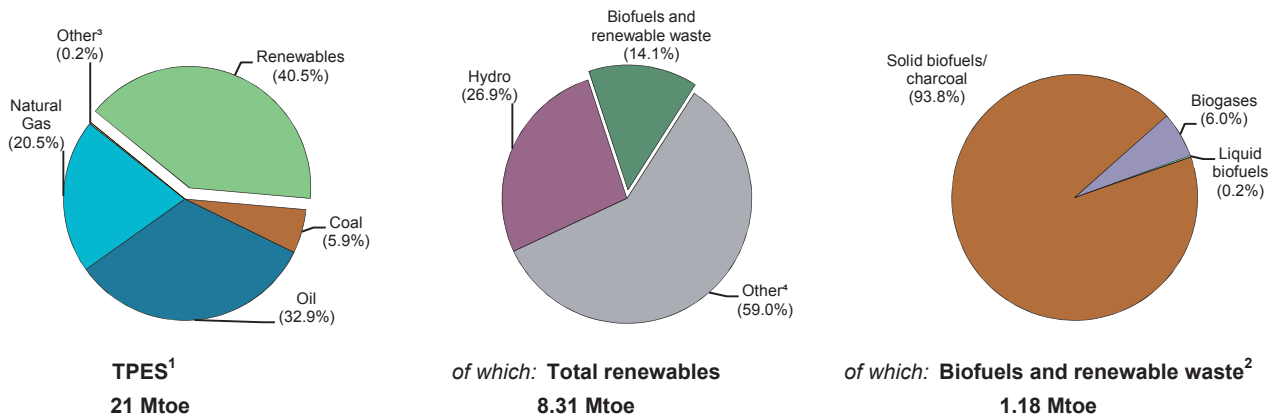
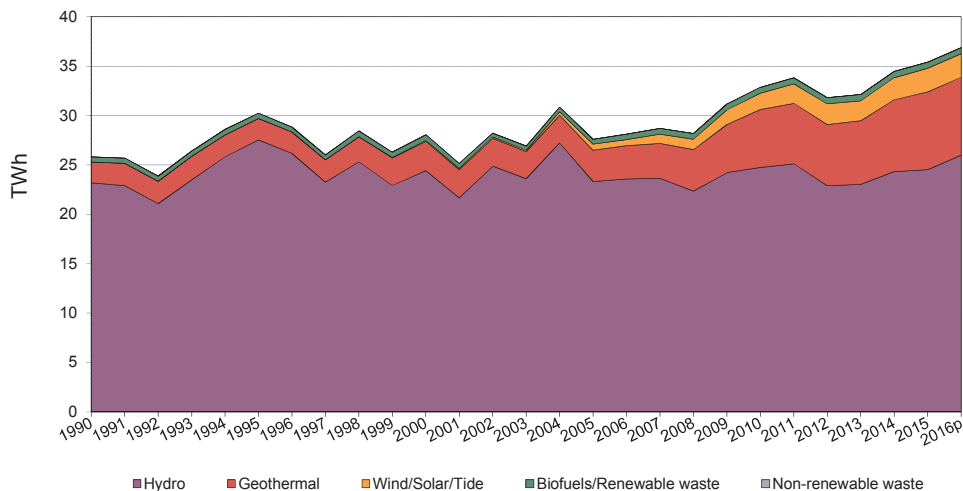


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	12.84	17.10	18.38	19.32	20.49	20.63	20.52	1.1
<i>of which: Renewables (Mtoe)</i> ¹	4.22	5.19	7.12	7.50	8.15	8.37	8.31	3.0
<i>Renewables/TPES(%)</i>	32.9	30.3	38.7	38.8	39.8	40.6	40.5	1.8
GDP (billion 2010 US dollars)	82.70	111.73	146.58	157.21	162.02	167.41	174.01	2.8
TPES/GDP ²	0.16	0.15	0.13	0.12	0.13	0.12	0.12	-1.6
TPES/GDP (year 2010 = 100)	124	122	100	98	101	98	94	-1.6
Population (millions)	3.37	3.87	4.36	4.46	4.53	4.62	4.67	1.2
TPES/population (toe per capita)	3.81	4.42	4.21	4.33	4.52	4.46	4.40	-0.0
Electricity generation (TWh) ³	32.3	39.2	44.9	43.3	43.5	44.2	43.8	0.7
<i>of which: Renewables (TWh)</i> ^{1,3}	25.81	28.06	32.86	32.13	34.46	35.40	36.87	1.7
<i>Renew./Total Elec.(%)</i> ^{1,4}	80.0	71.5	73.2	74.3	79.2	80.1	84.2	1.0
Road energy consumption (Mtoe)	2.5	3.5	4.1	4.2	4.2	4.3	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.00	0.00	0.00	0.00	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	0.1	0.1	0.1	0.1	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	4956	5732	6630	6890	7131	7170	1.5
Hydro	4619	5193	5254	5329	5329	5340	0.2
<i>Hydro <1MW</i>	-	3	9	9	9	9	7.6
<i>Hydro 1-10MW</i>	-	112	98	103	103	103	-0.6
<i>Hydro 10+MW</i>	-	5078	5147	5217	5217	5228	0.2
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	261	418	731	813	979	986	5.9
Solar photovoltaic	-	-	3	7	19	38	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	36	524	623	683	683	21.7
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	57	68	77	77	77	77	0.8
Biogases	19	17	41	41	44	46	6.9
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	128	128	128	128	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	90	90	90	90	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	59.46	55.89	56.58	53.23	55.16	56.36	x
Hydro	57.30	53.71	53.75	49.36	52.09	52.45	51.51
<i>of which: <1MW</i>	-	-	58.74	70.17	78.32	88.52	76.07
<i>of which: 1-10MW</i>	-	-	46.91	46.90	51.17	49.67	50.12
<i>of which: 10+MW</i>	-	-	53.87	49.37	52.06	52.44	51.50
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	93.23	79.78	91.81	90.23	84.92	90.94	91.69
Solar photovoltaic	-	-	14.42	12.02	10.40	10.19	12.36
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	38.11	35.66	37.09	37.01	39.38	38.84
Industrial waste	-	-	-	-	-	-	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	72.10	80.22	54.85	57.51	56.15	55.08	56.30
Biogases	84.07	73.85	65.05	67.61	64.13	61.46	66.22
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	25814	28062	32861	32130	34457	35400	36873	1.7
Hydro	23183	24433	24737	23041	24317	24535	25985	0.4
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	2131	2922	5879	6427	7283	7855	7880	6.4
Solar photovoltaic	-	-	4	7	17	34	52	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	120	1637	2024	2214	2356	2326	20.4
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	360	478	370	388	379	372	357	-1.8
Biogases	140	109	234	243	247	248	273	5.9
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	25284	27509	32367	31609	33940	34884	..	-
Hydro	23183	24433	24737	23041	24317	24535	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	2074	2880	5825	6359	7212	7784	..	-
Solar photovoltaic	-	-	4	7	17	34	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	120	1637	2024	2214	2356	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	27	76	164	178	180	175	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	530	553	494	521	517	516	..	-
Geothermal	57	42	54	68	71	71	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	360	478	370	388	379	372	..	-
Biogases	113	33	70	65	67	73	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	1610	1610	1468	1214	1321	1363	1363 e	-1.0
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	1610	1610	1468	1214	1321	1363	1363 e	-1.0

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2110	203	-	3	4867	9	-	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2110	203	-	3	4867	9	-	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-2109	-203	-	-	-4651	-	-	-
Autoproducer electricity plants	-1	-	-	-3	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-41	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	175	9	-	-
Industry	-	-	-	-	97	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	97	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	79	9	-	-
Residential	-	-	-	-	7	9	-	-
Commercial and public services	-	-	-	-	54	-	-	-
Agriculture/forestry	-	-	-	-	17	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	24535	2356	-	34	7855	-	-	-
<i>Electricity plants</i>	24535	2356	-	34	7784	-	-	-
<i>CHP plants</i>	-	-	-	-	71	-	-	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	1102	-	70	3	-	-	8367	50.6%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1102	-	70	3	-	-	8367	40.6%
-	-	-	-	-	-	-	-	-
-	-	-	-38	-	-	-	-7001	x
-	-	-	-7	-	-	-	-11	x
-	-	-	-	-	-	-	-	-
-	-90	-	-19	-	-	-	-150	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1012	-	6	3	-	-	1205	8.6%
-	859	-	1	-	-	-	957	22.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	1	-	-	-	1	0.1%
-	-	-	-	-	-	-	97	34.5%
-	859	-	-	-	-	-	859	84.2%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	3	-	-	3	0.1%
-	-	-	-	3	-	-	3	0.1%
-	-	-	-	-	-	-	-	-
-	153	-	5	-	-	-	246	7.0%
-	153	-	-	-	-	-	169	11.5%
-	-	-	5	-	-	-	59	4.8%
-	-	-	-	-	-	-	17	2.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	372	-	248	-	-	-	35400	80.1%
-	-	-	175	-	-	-	34884	83.8%
-	372	-	73	-	-	-	516	20.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	61811	81636	152237	174871	196424	203813	196464 e	6.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	61811	81636	152237	174871	196424	203813	196464 e	6.3
Statistical differences	1	1	-	1	2	-1	..	..
Transformation processes	54714	73512	142971	167181	189093	196468	..	6.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	7098	8125	9266	7691	7333	7344	..	-0.7
<i>Industry</i>	4632	5712	5747	4194	4052	4052	..	-2.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2466	2413	3519	3497	3281	3292	..	2.1
Solar thermal (TJ)								
Production	-	-	353	364	364	364	364 e	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	353	364	364	364	364 e	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	353	364	364	364	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	353	364	364	364	..	-
Industrial waste (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	30008	45754	47688	45554	45797	46147	46147 e	0.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	30008	45754	47688	45554	45797	46147	46147 e	0.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	4059	5162	3976	3905	3917	3787	..	-2.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	25949	40592	43712	41649	41880	42360	..	0.3
<i>Industry</i>	19632	33835	37073	35183	35457	35973	..	0.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	6317	6757	6639	6466	6423	6387	..	-0.4
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	1592	1347	2788	2887	2935	2940	2940 e	5.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1592	1347	2788	2887	2935	2940	2940 e	5.3
Statistical differences	1	-	-1	-	-	-	..	-
Transformation processes	1518	1193	2534	2634	2682	2687	..	5.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	75	154	253	253	253	253	..	3.4
<i>Industry</i>	39	39	39	39	39	39	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	36	115	214	214	214	214	..	4.2

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

NEW ZEALAND

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	2	4	3	4	4	-
Net imports ¹	-	-	2	1	2	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	4	5	5	4	4	-
Statistical differences	-	-	-	-	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	4	5	4	4	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	4	5	4	4	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	1	-	1	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1	-	1	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1	-	1	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	1	-	1	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

NORWAY

Figure 1. Contribution of renewables in 1990

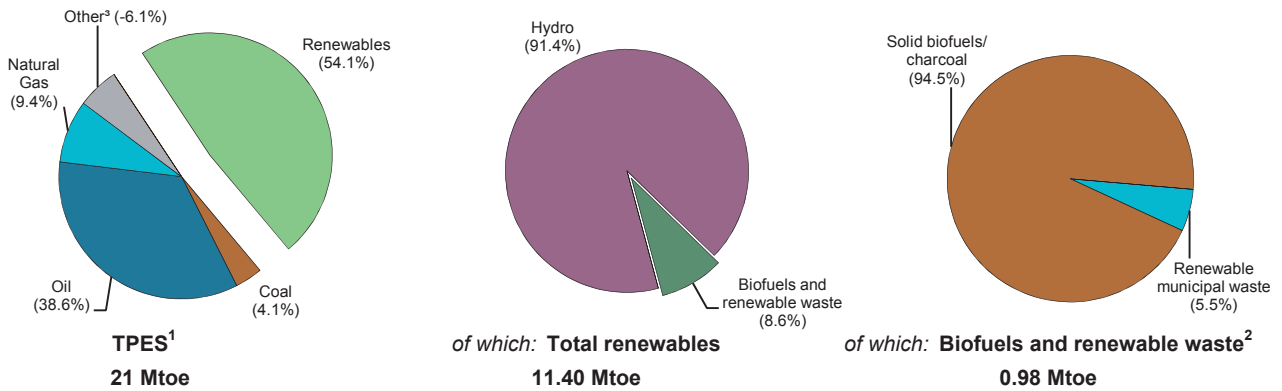


Figure 2. Contribution of renewables in 2016 provisional

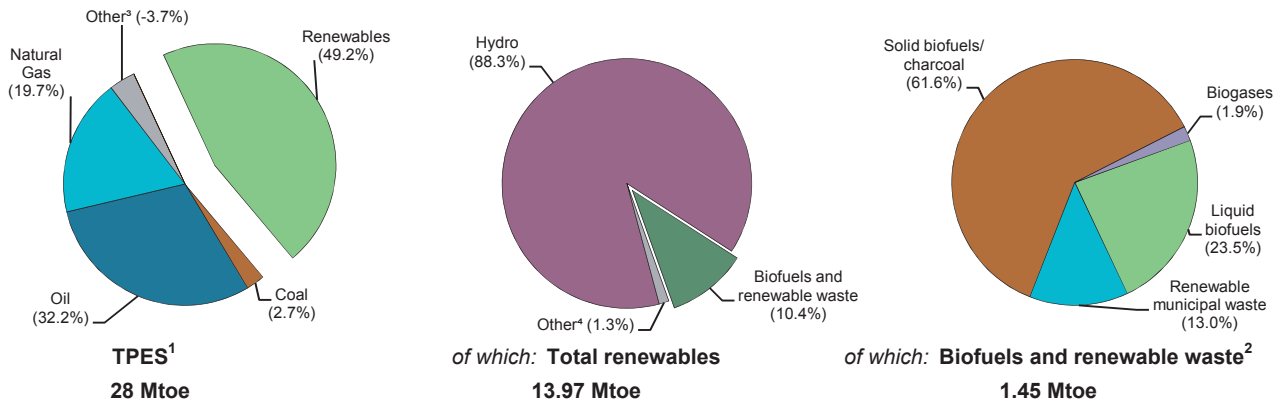
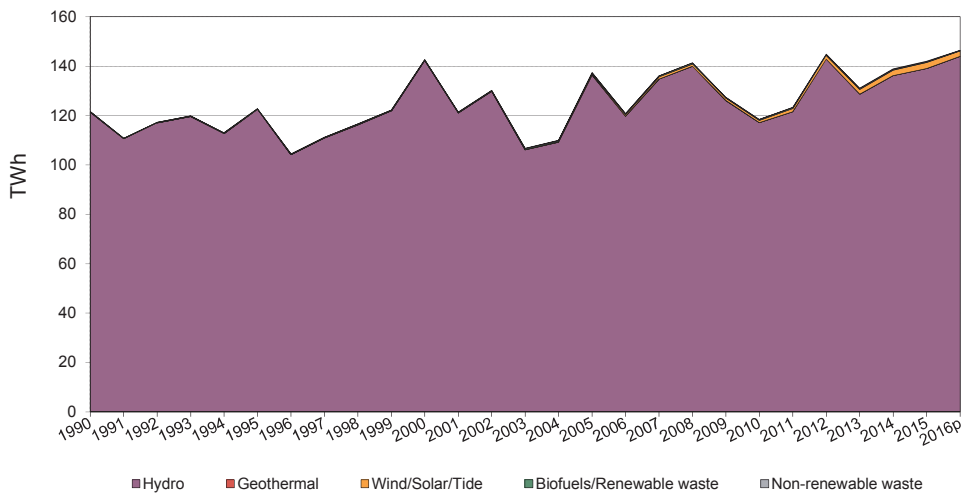


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

NORWAY

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	21.07	26.16	33.90	32.61	27.80	29.62	28.38	0.5
<i>of which: Renewables (Mtoe)</i> ¹	11.40	13.49	11.68	12.60	13.06	13.42	13.97	0.2
<i>Renewables/TPES(%)</i>	54.1	51.6	34.4	38.6	47.0	45.3	49.2	-0.3
GDP (billion 2010 US dollars)	255.70	367.06	428.53	449.01	457.63	465.00	470.01	1.6
TPES/GDP ²	0.08	0.07	0.08	0.07	0.06	0.06	0.06	-1.0
TPES/GDP (year 2010 = 100)	104	90	100	92	77	80	76	-1.0
Population (millions)	4.24	4.49	4.89	5.08	5.14	5.19	5.24	1.0
TPES/population (toe per capita)	4.97	5.83	6.93	6.42	5.41	5.71	5.42	-0.5
Electricity generation (TWh) ³	121.6	142.5	123.2	133.4	141.2	143.9	149.0	0.3
<i>of which: Renewables (TWh)</i> ^{1,3}	121.36	142.11	117.98	130.37	137.92	140.63	145.73	0.2
<i>Renew./Total Elec.(%)</i> ^{1,4}	99.8	99.7	95.7	97.7	97.7	97.7	97.8	-0.1
Road energy consumption (Mtoe)	2.6	3.0	3.6	3.5	3.6	3.7	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.12	0.13	0.13	0.15	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	3.3	3.7	3.6	4.0	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	26951	28206 e	30269	32034	32282	32422	0.9
Hydro	26884	28126	29693	31033	31240	31372	0.7
<i>Hydro <1MW</i>	42 e	48	48	61	61	61	1.6
<i>Hydro 1-10MW</i>	800 e	843	1395	1606	1606	1996	5.9
<i>Hydro 10+MW</i>	24975 e	25875	26924	28015	28222	27882	0.5
<i>Mixed plants</i>	1067	1360	1326	1351	1351	1433	0.3
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	6 e	..	..	..	..	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	13	425	818	859	867	32.3
Industrial waste	-	-	10	10	10	10	-
Municipal waste	26 e	26 e	49	77	77	77	7.5
Solid biofuels	41 e	35 e	79	79	79	79	5.6
Biogases	-	-	13	17	17	17	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	..	..	..	-	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	..	..	..	-	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	51.52	57.72 e	44.68	46.72	49.11	49.98	x
Hydro	51.54	57.75	45.04	47.34	49.76	50.58	49.48
<i>of which: <1MW</i>	-	55.65	40.43	44.52	47.31	48.29	40.75
<i>of which: 1-10MW</i>	-	58.46	40.57	49.72	52.84	43.40	43.10
<i>of which: 10+MW</i>	55.37 e	60.56	47.33	49.27	51.68	53.25	51.95
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	..	..	..	..	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	27.22	23.61	26.25	29.45	33.11	28.50
Industrial waste	-	-	12.56	12.56	11.42	45.66	22.83
Municipal waste	25.47 e	26.34 e	43.10	47.14	64.49	53.96	47.79
Solid biofuels	51.23 e	73.71 e	35.26	24.57	1.73	1.16	18.50
Biogases	-	-	11.42	8.73	18.13	4.70	9.94
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	121624	142606	118484	131092	138882	141947	146457	0.2
Hydro	121382	142289	117152	128699	136182	139013	144005	0.1
<i>of which: pumped storage</i>	237	471	402	545	742	1099	574	1.2
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	..	..	..	..	..	..	..
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	31	879	1881	2216	2515	2116	30.2
Industrial waste	-	-	11	11	10	40	11	-
Municipal waste renew.	29	30	93	152	220	182	147	10.4
Municipal waste non-renew.	29	30	92	166	215	182	146	10.4
Solid biofuels	184	226	244	170	12	8	19	-14.3
Biogases	-	-	13	13	27	7	13	-
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	121566	142546	118293	130772	138421	141578	..	-
Hydro	121382	142289	117152	128699	136182	139013	..	-
<i>of which: pumped storage</i>	237	471	402	545	742	1099	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	..	..	..	..	..	-	..
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	31	879	1881	2216	2515	..	-
Industrial waste	-	-	11	11	10	40	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	184	226	244	170	12	8	..	-
Biogases	-	-	7	11	1	2	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	58	60	191	320	461	369	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	29	30	93	152	220	182	..	-
Municipal waste non-renew.	29	30	92	166	215	182	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	6	2	26	5	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	3669 e	4051	11477	16763	16293	17703	14640	8.4
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	1798 e	1939 e	4081	6588	6441	6779	4955	6.0
Municipal waste non-renew.	1798 e	1940 e	4081	6586	6444	6779	4954	6.0
Solid biofuels	73 e	160	3237	3350	3144	3913	4462	23.1
Biogases	-	12	78	46	141	118	86	13.1
Liquid biofuels	-	-	-	193	123	114	183	-
<i>of which:</i>								
CHP plants	1421	1777	5546	9296	8820	9486	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	711 e	888 e	2766	4646	4407	4733	..	-
Municipal waste non-renew.	710 e	889 e	2766	4645	4407	4733	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	14	5	6	20	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	2248 e	2274	5931	7467	7473	8217	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	1087 e	1051 e	1315	1942	2034	2046	..	-
Municipal waste non-renew.	1088 e	1051 e	1315	1941	2037	2046	..	-
Solid biofuels	73 e	160	3237	3350	3144	3913	..	-
Biogases	-	12	64	41	135	98	..	-
Liquid biofuels	-	-	-	193	123	114	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	740 e	868 e	2502	2644	2261	2164	2077	5.6
Heat pumps ²	56	309	1877	2319	1682	1954	2067	12.6
(-) Input to heat pumps	25	130	641	839	734	774	652	10.6
Other sources ³	709 e	689 e	1266	1164	1313	984	662	-0.2

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	11861	216	-	-	-	-	10	229
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	11861	216	-	-	-	-	10	229
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-11391	-216	-	-	-	-	-	-
Autoproducer electricity plants	-470	-	-	-	-	-	-10	-
Main activity CHP plants	-	-	-	-	-	-	-	-158
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-61
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	-	-	10
Industry	-	-	-	-	-	-	-	10
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	3
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	7
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Residential	-	-	-	-	-	-	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	137914	2515	-	-	-	-	40	182
<i>Electricity plants</i>	137914	2515	-	-	-	-	40	-
<i>CHP plants</i>	-	-	-	-	-	-	-	182
Heat generated - TJ	-	-	-	-	-	-	-	6779
<i>CHP plants</i>	-	-	-	-	-	-	-	4733
<i>Heat plants</i>	-	-	-	-	-	-	-	2046

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
229	915	-	45	-	-	4	13509	6.5%
-	31	-	-	10	121	10	172	2.1%
-	-18	-	-	-	-	-	-18	0.0%
-	-	-	-	-	-	-	-	-
229	928	-	45	10	121	13	13662	46.1%
-	-	-	1	-	-	-	1	x
-	-	-	-	-	-	-	-11607	x
-	-1	-	-	-	-	-	-481	x
-158	-	-	-1	-	-	-	-317	x
-	-	-	-	-	-	-	-	-
-61	-151	-	-5	-	-	-4	-282	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-13	-	-	-	-13	x
10	775	-	26	10	121	10	962	4.7%
10	246	-	3	-	-	-	269	4.6%
-	1	-	-	-	-	-	1	0.1%
3	74	-	3	-	-	-	83	5.7%
-	-	-	-	-	-	-	-	-
7	21	-	-	-	-	-	35	11.9%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	2	0.5%
-	64	-	-	-	-	-	64	16.6%
-	74	-	-	-	-	-	74	51.2%
-	5	-	-	-	-	-	5	1.8%
-	-	-	-	-	-	-	-	-
-	6	-	-	-	-	-	6	11.3%
-	-	-	9	10	121	10	150	3.0%
-	-	-	9	10	121	10	150	4.0%
-	-	-	-	-	-	-	-	-
-	529	-	14	-	-	-	543	7.4%
-	484	-	-	-	-	-	484	12.5%
-	40	-	14	-	-	-	54	2.0%
-	5	-	-	-	-	-	5	1.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
182	8	-	7	-	-	-	140848	97.9%
-	8	-	2	-	-	-	140479	97.9%
182	-	-	5	-	-	-	369	90.4%
6779	3913	-	118	-	-	114	17703	65.0%
4733	-	-	20	-	-	-	9486	97.4%
2046	3913	-	98	-	-	114	8217	47.0%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Industrial waste (TJ)								
Production	-	471	115	112	103	410	410	-0.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	471	115	112	103	410	410	-0.9
Statistical differences	-	-471	-	-	-	-	..	-
Transformation processes	-	-	115	112	103	410	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	2258 e	2688	5969	8452	9293	9582	7915	8.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2258 e	2688	5969	8452	9293	9582	7915	8.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	2258 e	2489 e	5060	7902	8893	9158	..	9.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	199	909	550	400	424	..	5.2
<i>Industry</i>	-	199	909	550	400	424	..	5.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	2257 e	2690	5845	8455	9293	9582	9787	8.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2257 e	2690	5845	8455	9293	9582	9787	8.8
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	2257 e	2489 e	4936	7905	8893	9158	..	9.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	201	909	550	400	424	..	5.1
<i>Industry</i>	-	201	909	550	400	424	..	5.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	38669	50008	51643	44138	35322	38307	35528	-1.8
Net imports ¹	-	207	1621	-57	24	548	1926	6.7
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	38669 e	50215	53264	44081	35346	38855	37454	-1.7
Statistical differences	-	-	-	-	-	-18	..	..
Transformation processes	1072 e	1459	6026	6514	5160	6364	..	10.3
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	37597	48756	47238	37567	30186	32473	..	-2.7
<i>Industry</i>	15977	24603	16367	13870	9546	10315	..	-5.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	21620	24153	30871	23697	20640	22158	..	-0.6
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	1078	1243	1105	1032	1866	1160	3.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1078	1243	1105	1032	1866	1160	3.7
Statistical differences	-	-	-44	-116	77	47	..	..
Transformation processes	-	14	165	181	393	255	..	21.3
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	522	289	242	564	..	..
Final energy consumption	-	1064	512	519	474	1094	..	0.2
<i>Industry</i>	-	-	-	178	83	109	..	-
<i>Transport</i>	-	-	-	38	48	378	..	-
<i>Other</i>	-	1064	512	303	343	607	..	-3.7

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	7	17	15	16	49	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	7	17	15	16	49	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	7	17	15	16	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	7	17	15	16	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	-	33	-	-	-	-
Net imports ¹	-	-	126	98	130	138	332	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	126	131	130	138	332	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	126	131	130	138	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	126	131	130	138	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	7	4	4	-	-
Net imports ¹	-	-	1	3	4	11	21	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1	10	8	15	21	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	7	4	4	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1	3	4	11	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	1	3	4	11	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

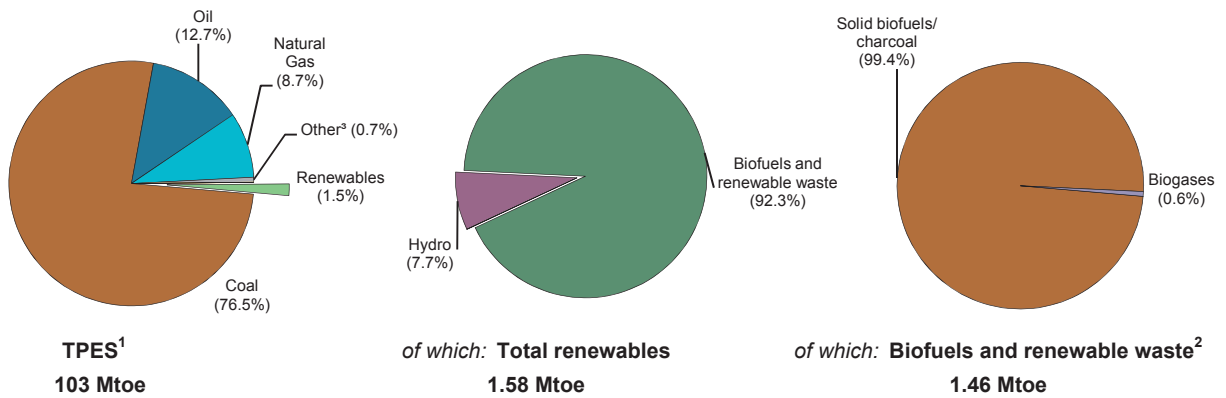


Figure 2. Contribution of renewables in 2016 provisional

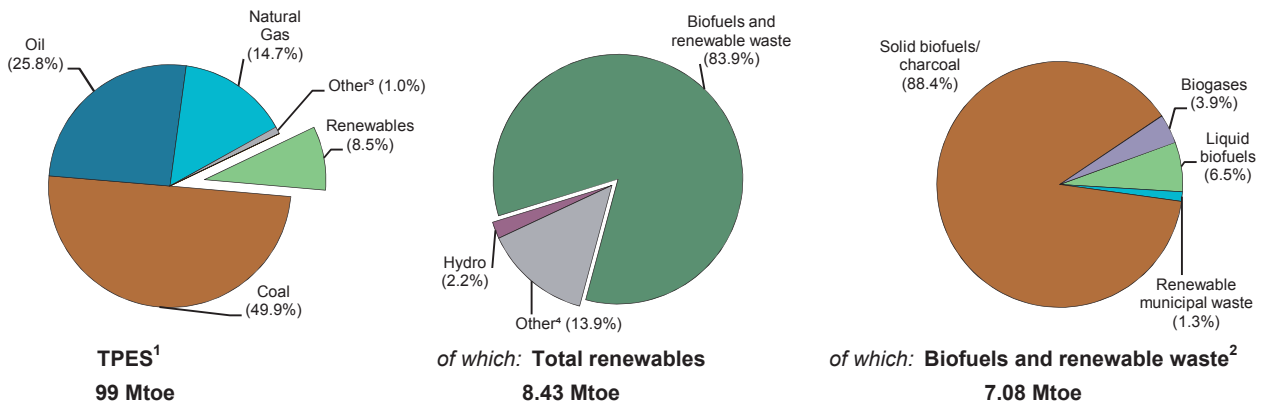
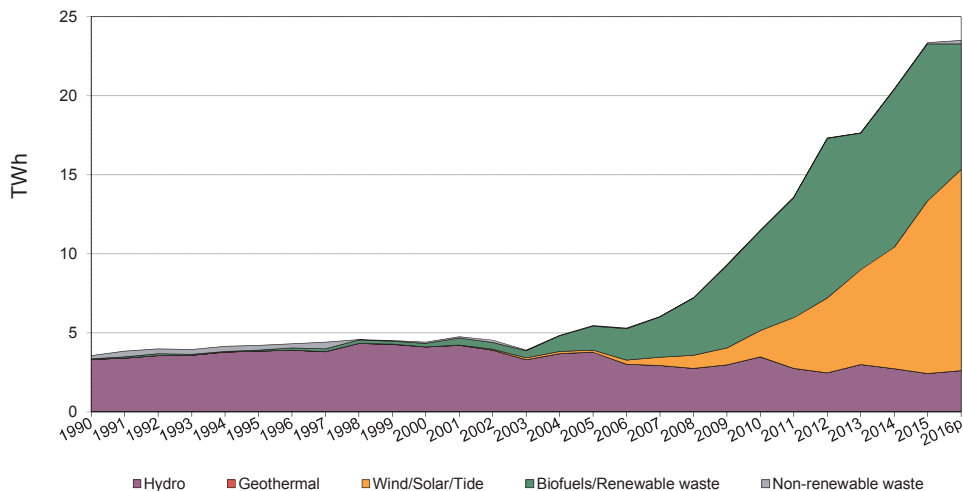


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	103.11	88.77	100.42	97.61	94.04	94.93	99.21	0.7
<i>of which: Renewables (Mtoe)</i> ¹	1.58	3.80	7.27	8.57	8.61	8.99	8.43	5.1
<i>Renewables/TPES(%)</i>	1.5	4.3	7.2	8.8	9.2	9.5	8.5	4.4
GDP (billion 2010 US dollars)	226.66	326.20	479.32	518.57	535.59	556.18	571.08	3.6
TPES/GDP ²	0.45	0.27	0.21	0.19	0.18	0.17	0.17	-2.8
TPES/GDP (year 2010 = 100)	217	130	100	90	84	81	83	-2.8
Population (millions)	38.03	38.26	38.52	38.50	38.48	38.46	38.43	0.0
TPES/population (toe per capita)	2.71	2.32	2.61	2.54	2.44	2.47	2.58	0.7
Electricity generation (TWh) ³	134.4	143.2	157.1	164.0	158.5	164.3	166.2	0.9
<i>of which: Renewables (TWh)</i> ^{1,3}	1.47	2.33	10.89	17.07	19.84	22.68	22.81	15.3
<i>Renew./Total Elec.(%)</i> ^{1,4}	1.1	1.6	6.9	10.4	12.5	13.8	13.7	14.2
Road energy consumption (Mtoe)	6.0	8.9	16.3	14.8	14.9	15.9	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.87	0.75	0.71	0.78	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	5.3	5.1	4.7	4.9	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	1888	2199	3587	6524	7046	8338	9.3
Hydro	1888	2183	2342	2355	2364	2370	0.5
<i>Hydro <1MW</i>	31	57	78	88	89	91	3.2
<i>Hydro 1-10MW</i>	130	145	185	189	185	188	1.7
<i>Hydro 10+MW</i>	306	307	297	296	308	309	0.0
<i>Mixed plants</i>	216	308	376	376	376	376	1.3
<i>Pure pumped storage</i>	1205	1366	1406	1406	1406	1406	0.2
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	2	27	108	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	4	1108	3429	3836	4886	60.6
Industrial waste	-	3	3	3	3	3	-
Municipal waste	-	-	-	-	-	15	-
Solid biofuels	-	-	53	582	629	740	-
Biogases	-	9	81	153	187	216	23.6
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	656	1470	1730	1900	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	459	1029	1211	1330	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	21.59	22.94	36.61	30.90	33.12	31.99	x
Hydro	20.03	21.52	17.00	14.53	13.20	11.73	12.97
<i>of which: <1MW</i>	33.88	59.68	45.18	45.65	41.30	41.14	42.48
<i>of which: 1-10MW</i>	26.34	33.22	44.84	38.97	34.84	29.97	36.21
<i>of which: 10+MW</i>	38.24	51.54	72.43	55.61	48.03	37.34	47.36
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	8.46	2.91	5.99	6.42
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	14.27	17.15	19.99	22.84	25.37	21.93
Industrial waste	-	x	134.36	87.52	142.51	x	x
Municipal waste	-	-	-	-	-	26.02	26.02
Solid biofuels	-	-	x	x	x	139.25	x
Biogases	-	39.32	56.14	51.46	49.83	47.90	50.02
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	3571	4419	11501	17659	20444	23361	23505	11.0
Hydro	3313	4116	3488	2997	2734	2435	2622	-2.8
<i>of which: pumped storage</i>	1896	2010	568	558	551	603	482	-8.5
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	1	7	57	124	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	5	1664	6004	7676	10858	12585	63.1
Industrial waste	203	77	35	23	37	41	34	-5.0
Municipal waste renew.	-	-	-	-	-	-	12	-
Municipal waste non-renew.	-	-	10	11	13	34	179	-
Solid biofuels	55	190	5905	7932	9161	9026	6897	25.2
Biogases	-	31	398	690	816	906	1049	24.6
Liquid biofuels	-	-	1	1	-	4	3	-
of which:								
Electricity only plants	3313	4152	5394	11216	12309	15307	..	-
Hydro	3313	4116	3488	2997	2734	2435	..	-
<i>of which: pumped storage</i>	1896	2010	568	558	551	603	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	-	1	7	57	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	5	1664	6004	7676	10858	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	242	2214	1892	1957	..	-
Biogases	-	31	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	258	267	6107	6443	8135	8054	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	203	77	35	23	37	41	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	10	11	13	34	..	-
Solid biofuels	55	190	5663	5718	7269	7069	..	-
Biogases	-	-	398	690	816	906	..	-
Liquid biofuels	-	-	1	1	-	4	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	13980	2064	10988	16383	14609	13586	13320	12.4
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	2966	225	82	153	160	271	341	2.6
Municipal waste renew.	-	-	-	-	13	7	8	-
Municipal waste non-renew.	-	-	251	242	178	433	1000	-
Solid biofuels	11004	1802	10548	15611	13960	12420	11391	12.2
Biogases	10	37	106	377	298	436	560	18.5
Liquid biofuels	-	-	1	-	-	19	20	-
<i>of which:</i>								
CHP plants	11011	1567	9415	14700	13052	12188	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	2902	220	17	85	89	201	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	251	242	97	333	..	-
Solid biofuels	8109	1347	9052	14008	12579	11211	..	-
Biogases	-	-	94	365	287	424	..	-
Liquid biofuels	-	-	1	-	-	19	..	-
Heat only plants	2969	497	1573	1683	1557	1398	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	64	5	65	68	71	70	..	-
Municipal waste renew.	-	-	-	-	13	7	..	-
Municipal waste non-renew.	-	-	-	-	81	100	..	-
Solid biofuels	2895	455	1496	1603	1381	1209	..	-
Biogases	10	37	12	12	11	12	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	122	133	80	99	99	-
Heat pumps ²	-	-	3	5	4	3	3	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	119	128	76	96	96	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	158	934	-	5	22	45	406	40
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	158	934	-	5	22	45	406	40
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-157	-934	-	-	-	-	-	-
Autoproducer electricity plants	-	-	-	-5	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-14	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-2	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	22	45	389	40
Industry	-	-	-	-	-	-	386	40
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	22	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	360	40
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	3	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	1	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	22	45	3	-
Residential	-	-	-	-	16	40	-	-
Commercial and public services	-	-	-	-	6	5	3	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	1832	10858	-	57	-	-	41	-
<i>Electricity plants</i>	1832	10858	-	57	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	41	-
Heat generated - TJ	-	-	-	-	-	-	271	7
<i>CHP plants</i>	-	-	-	-	-	-	201	-
<i>Heat plants</i>	-	-	-	-	-	-	70	7

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
117	6267	-	229	112	822	2	9159	13.5%
-	660	-	-	43	186	-	889	1.8%
-	-155	-	-	-1	-371	-	-527	2.5%
-	-	-	-	1	-11	-	-10	x
117	6773	-	229	154	627	2	9512	10.0%
-	-	-	-	-1	-	-	-1	x
-	-441	-	-	-	-	-	-1532	x
-	-	-	-	-	-	-	-5	x
-	-1517	-	-	-	-	-	-1517	x
-17	-291	-	-150	-	-	-2	-474	x
-	-29	-	-	-	-	-	-29	x
-3	-7	-	-	-	-	-	-12	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
97	4488	-	78	153	627	-	5939	9.0%
96	1358	-	12	-	-	-	1892	13.4%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	24	0.9%
-	-	-	-	-	-	-	-	-
96	15	-	1	-	-	-	512	19.9%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	2	0.3%
-	1	-	-	-	-	-	1	0.3%
-	27	-	8	-	-	-	35	1.9%
-	646	-	2	-	-	-	651	41.5%
-	548	-	1	-	-	-	549	62.1%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	116	-	-	-	-	-	117	16.5%
-	-	-	-	153	627	-	780	4.7%
-	-	-	-	153	627	-	780	4.9%
-	-	-	-	-	-	-	-	-
1	3131	-	66	-	-	-	3268	10.9%
-	2518	-	-	-	-	-	2574	13.7%
1	156	-	56	-	-	-	227	2.9%
-	456	-	9	-	-	-	465	14.2%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
34	9026	-	906	-	-	4	22758	13.9%
-	1957	-	-	-	-	-	14704	86.0%
34	7069	-	906	-	-	4	8054	5.5%
433	12420	-	436	-	-	19	13586	4.8%
333	11211	-	424	-	-	19	12188	6.5%
100	1209	-	12	-	-	-	1398	1.5%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	124	563	778	847	909	930	14.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	124	563	778	847	909	930	14.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	124	563	778	847	909	..	14.2
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	124	563	778	847	909	..	14.2
Solar thermal (TJ)								
Production	-	-	420	1035	1455	1885	2295	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	420	1035	1455	1885	2295	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	420	1035	1455	1885	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	420	1035	1455	1885	..	-
Industrial waste (TJ)								
Production	32311	4306	11760	14761	16993	16997	20025	9.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-29	-	-	-	-	-	-
Gross consumption	32311	4277	11760	14761	16993	16997	20025	9.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	5265	889	442	381	470	693	..	-1.6
Energy industry own use	5222	229	2	2	2	2	..	-27.1
Losses	-	-	-	-	-	-	..	-
Final energy consumption	21824	3159	11316	14378	16521	16302	..	11.6
<i>Industry</i>	21320	3155	11295	13990	16442	16157	..	11.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	504	4	21	388	79	145	..	27.0
Municipal waste - renewables (TJ)								
Production	-	32 e	123	1391	1544	1673	3784	30.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	4 e	-	-	-	-	-	-
Gross consumption	-	36 e	123	1391	1544	1673	3784	29.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	16	9	..	-
Energy industry own use	-	4 e	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	32 e	123	1391	1528	1664	..	30.1
<i>Industry</i>	-	-	123	1391	1528	1664	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	32 e	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	32 e	4884	4122	4555	4920	12681	39.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	4 e	-	-	-	-	-	-
Gross consumption	-	36 e	4884	4122	4555	4920	12681	38.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	367	337	343	859	..	-
Energy industry own use	-	4 e	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	32 e	4517	3785	4212	4061	..	38.1
<i>Industry</i>	-	-	4512	3752	4060	4011	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	32 e	5	33	152	50	..	3.0
Solid Biofuel excluding charcoal (TJ)								
Production	60643	150485	245606	286243	258723	262431	241800	3.8
Net imports ¹	-	-	-	-	24112	21175	20029	-
Stock changes	-	-292	-	-	-	-	-	-
Gross consumption	60643	150193	245606	286243	282835	283606	261829	4.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	14571	3461	65114	87694	96989	95657	..	24.8
Energy industry own use	6	6	349	122	39	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	46066	146726	180143	198427	185807	187949	..	1.7
<i>Industry</i>	7191	26112	38280	53207	54491	56853	..	5.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	38875	120614	141863	145220	131316	131096	..	0.6
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	393	1211	4797	7593	8685	9581	11420	14.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	393	1211	4797	7593	8685	9581	11420	14.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	14	443	2778	4887	5732	6314	..	19.4
Energy industry own use	-	27	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	379	741	2019	2706	2953	3267	..	10.4
<i>Industry</i>	-	63	150	297	507	521	..	15.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	379	678	1869	2409	2446	2746	..	9.8

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	153	191	143	174	195	-
Net imports ¹	-	-	117	38	62	64	66	-
Stock changes	-	-	-3	-3	1	1	-1	
Gross consumption	-	-	267	226	206	239	260	-
Statistical differences	-	-	-1	-	-	-1	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	266	226	206	238	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	266	226	206	238	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	380	642	739	930	898	-
Net imports ¹	-	-	385	8	-88	-209	-561	-
Stock changes	-	-	-3	20	-3	-12	-8	
Gross consumption	-	-	762	670	648	709	329	-
Statistical differences	-	-	-1	-	-	-	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	761	670	648	709	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	761	670	648	709	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	2	2	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	
Gross consumption	-	-	-	-	-	2	2	-
Statistical differences	-	-	-	-	-	-	..	
Transformation processes	-	-	-	-	-	2	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

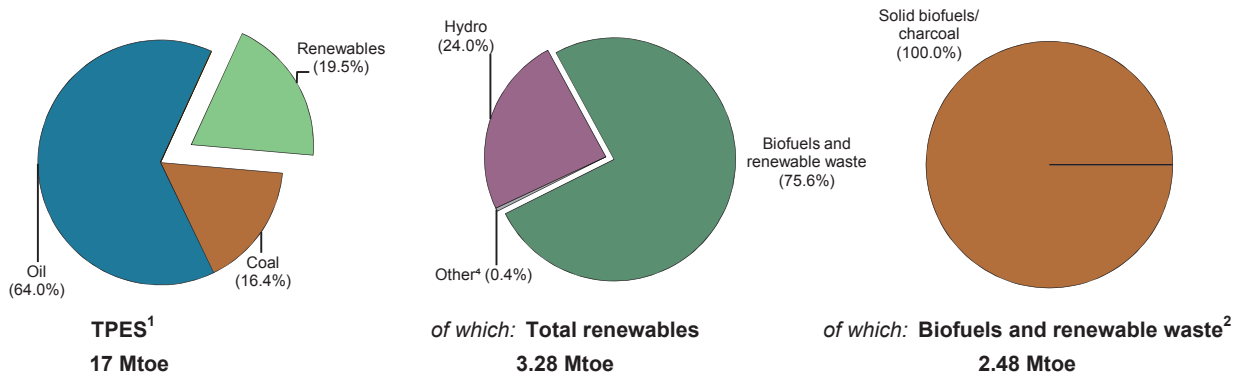


Figure 2. Contribution of renewables in 2016 provisional

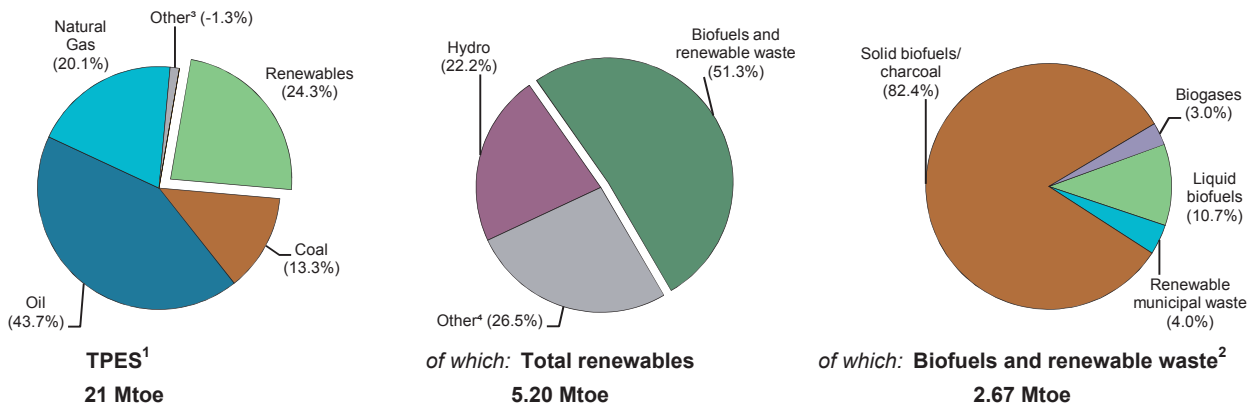
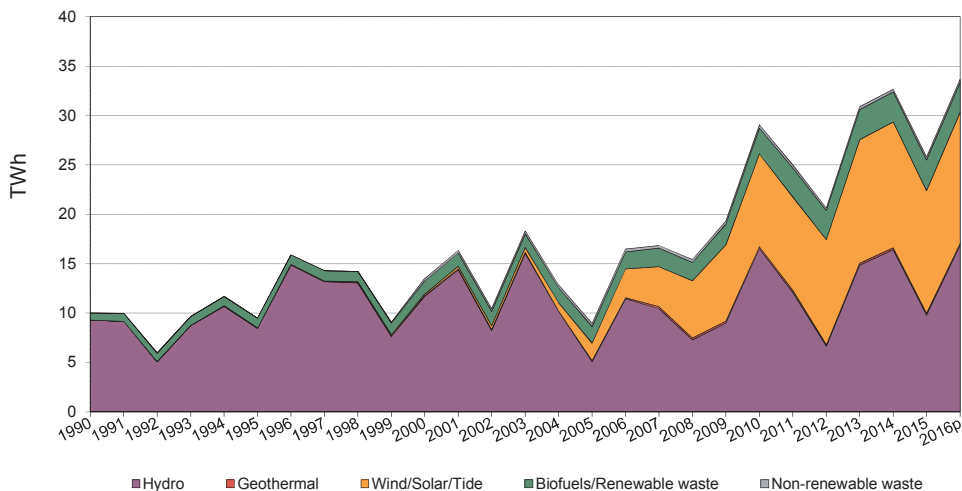


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	16.78	24.59	23.50	21.50	21.17	21.97	21.43	-0.9
<i>of which: Renewables (Mtoe)</i> ¹	3.28	3.76	5.46	5.30	5.51	4.97	5.20	2.0
<i>Renewables/TPES(%)</i>	19.5	15.3	23.2	24.7	26.0	22.6	24.3	2.9
GDP (billion 2010 US dollars)	166.59	221.37	238.30	221.99	223.97	227.54	230.72	0.3
TPES/GDP ²	0.10	0.11	0.10	0.10	0.09	0.10	0.09	-1.1
TPES/GDP (year 2010 = 100)	102	113	100	98	96	98	94	-1.1
Population (millions)	10.00	10.29	10.57	10.46	10.40	10.36	10.33	0.0
TPES/population (toe per capita)	1.68	2.39	2.22	2.06	2.04	2.12	2.07	-0.9
Electricity generation (TWh) ³	28.3	43.4	53.7	50.5	52.0	51.3	56.6	1.7
<i>of which: Renewables (TWh)</i> ^{1,3}	9.84	12.87	28.35	29.47	31.56	24.37	29.90	5.4
<i>Renew./Total Elec.(%)</i> ^{1,4}	34.7	29.7	52.8	58.3	60.7	47.5	52.8	3.7
Road energy consumption (Mtoe)	3.0	5.6	6.1	5.1	5.2	5.3	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.31	0.26	0.26	0.32	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	5.1	5.1	5.0	6.2	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	3550	4917	9657	11196	11626	12196	6.2
Hydro	3356	4535	5106	5661	5715	6168	2.1
<i>Hydro <1MW</i>	8	27	34	32	32	31	0.9
<i>Hydro 1-10MW</i>	72	236	343	341	356	363	2.9
<i>Hydro 10+MW</i>	2614	3610	3635	3921	3911	3985	0.7
<i>Mixed plants</i>	662	662	1094	1367	1416	1789	6.9
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	1	14	25	25	25	25	3.9
Solar photovoltaic	-	1	134	296	415	447	50.2
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	1	-	-
Wind	1	83	3796	4610	4856	4937	31.3
Industrial waste	-	-	12	15	15	3	-
Municipal waste	-	64	77	76	77	79	1.4
Solid biofuels	192 e	219	482	458	456	471	5.2
Biogases	-	1	25	55	66	66	32.2
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	150	238	752	1024	1079	1121	10.9
<i>Cap. of solar collectors (MW_{th})</i> ⁶	105	167	526	717	755	785	10.9

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	32.15	31.38	34.37	31.51	32.06	24.16	x
Hydro	31.64	29.49	36.99	29.98	32.78	18.14	23.84
<i>of which: <1MW</i>	21.75	30.86	34.82	35.98	38.66	27.77	31.67
<i>of which: 1-10MW</i>	85.76	38.94	36.60	36.64	42.09	22.63	29.56
<i>of which: 10+MW</i>	37.50	33.03	46.93	36.50	41.29	22.53	28.87
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	45.66	65.23	90.00	89.76	93.78	92.95	87.89
Solar photovoltaic	-	11.42	18.00	18.48	17.26	20.33	18.70
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	0.30	-	0.30
Wind	11.42	23.11	27.61	29.75	28.47	26.84	27.24
Industrial waste	-	-	36.78	6.67	6.95	29.47	13.78
Municipal waste	-	91.68 e	85.54	85.81	71.30	84.38	80.80
Solid biofuels	40.97 e	54.05	52.71	62.71	63.34	61.03	61.10
Biogases	-	22.83	45.49	51.80	47.93	50.84	47.83
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	9998	13517	29079	30904	32652	25810	33669	5.9
Hydro	9303	11715	16547	14868	16412	9799	16880	2.3
<i>of which: pumped storage</i>	159	392	399	1138	843	1139	3454	14.6
Geothermal	4	80	197	197	205	204	171	4.9
Solar photovoltaic	1	1	211	479	627	796	818	52.1
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	1	168	9182	12014	12111	11607	12474	30.9
Industrial waste	-	-	39	9	9	8	7	-
Municipal waste renew.	-	257	289	286	240	292	305	1.1
Municipal waste non-renew.	-	257	288	286	240	292	305	1.1
Solid biofuels	689	1037	2226	2516	2530	2518	2422	5.4
Biogases	-	2	100	249	278	294	287	36.4
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	9309	12485	27504	29105	30864	24064	..	-
Hydro	9303	11715	16547	14868	16412	9799	..	-
<i>of which: pumped storage</i>	159	392	399	1138	843	1139	..	-
Geothermal	4	80	197	197	205	204	..	-
Solar photovoltaic	1	1	211	479	627	796	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	1	168	9182	12014	12111	11607	..	-
Industrial waste	-	-	34	-	-	-	-	-
Municipal waste renew.	-	257	289	286	240	292	..	-
Municipal waste non-renew.	-	257	288	286	240	292	..	-
Solid biofuels	-	7	666	736	765	795	..	-
Biogases	-	-	90	239	264	279	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	689	1032	1575	1799	1788	1746	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	5	9	9	8	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	689	1030	1560	1780	1765	1723	..	-
Biogases	-	2	10	10	14	15	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	745	998	-	68	187	80	24	97
Imports	-	-	-	-	-	-	34	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	745	998	-	68	187	80	58	97
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-743	-998	-	-39	-185	-	-	-
Autoproducer electricity plants	-1	-	-	-29	-	-	-	-97
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-2	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	2	80	56	-
Industry	-	-	-	-	-	-	56	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	1	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	55	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	2	80	-	-
Residential	-	-	-	-	-	48	-	-
Commercial and public services	-	-	-	-	2	32	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	8660	11608	-	796	204	-	8	292
<i>Electricity plants</i>	8660	11608	-	796	204	-	-	292
<i>CHP plants</i>	-	-	-	-	-	-	8	-
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
97	2603	-	83	-	317	4	5303	100.0%
-	48	29	-	24	44	-	179	0.7%
-	-312	-4	-	-	-34	-	-350	4.5%
-	-	-	-	-3	-6	-	-9	x
97	2338	25	83	21	321	4	5122	23.3%
-	-	-	-	1	1	-	2	x
-	-248	-	-	-	-2	-	-2215	x
-97	-50	-	-71	-	-	-	-345	x
-	-	-	-	-	-	-	-	-
-	-308	-	-4	-	-	-	-314	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-13	6	-	-	-	-	-7	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	1719	30	8	21	320	4	2240	13.8%
-	949	1	8	-	11	-	1025	23.1%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	2	0.5%
-	-	-	-	-	-	-	-	-
-	64	-	-	-	2	-	121	10.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	3	-	3	3.0%
-	23	-	1	-	2	-	26	5.8%
-	815	-	7	-	-	-	822	60.8%
-	43	-	-	-	-	-	43	40.4%
-	-	-	-	-	5	-	5	3.4%
-	2	1	-	-	-	-	3	1.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	21	302	4	327	5.9%
-	-	-	-	21	300	4	325	6.2%
-	-	-	-	-	3	-	3	1.2%
-	769	30	-	-	6	-	887	17.9%
-	756	8	-	-	-	-	812	32.0%
-	11	22	-	-	2	-	69	3.5%
-	3	-	-	-	2	-	5	1.5%
-	-	-	-	-	2	-	2	2.1%
-	-	-	-	-	1	-	1	2.9%
292	2518	-	294	-	-	-	24672	48.1%
292	795	-	279	-	-	-	22926	52.0%
-	1723	-	15	-	-	-	1746	24.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	134	2921	7560	7551	7889	7829	6220	6.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	134	2921	7560	7551	7889	7829	6220	6.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	134	2879	7518	7499	7834	7765	..	6.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	42	42	52	55	64	..	2.8
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	42	42	52	55	64	..	2.8
Solar thermal (TJ)								
Production	458	770	2013	3046	3218	3360	3515	10.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	458	770	2013	3046	3218	3360	3515	10.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	458	770	2013	3046	3218	3360	..	10.3
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	458	770	2013	3046	3218	3360	..	10.3
Industrial waste (TJ)								
Production	-	-	2629	1963	2680	1011	993	-
Net imports ¹	-	-	-	1087	1014	1407	1407	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	2629	3050	3694	2418	2400	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	343	101	91	79	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	2286	2949	3603	2339	..	-
<i>Industry</i>	-	-	2286	2949	3603	2339	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	3648 e	4015	4049	3423	4078	4441	0.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	3648 e	4015	4049	3423	4078	4441	0.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	3648 e	4015	4049	3423	4078	..	0.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	3647 e	4015	4048	3422	4077	4441	0.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	3647 e	4015	4048	3422	4077	4441	0.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	3647 e	4015	4048	3422	4077	..	0.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	103699	108637	117488	111457	111814	108984	99391	0.0
Net imports ¹	-	-	-9375	-13812	-13439	-11071	-8184	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	103699	108637	108113	97645	98375	97913	91207	-0.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	6253	7551	18060	20724	25485	25940	..	8.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	97446	101086	90053	76921	72890	71973	..	-2.2
<i>Industry</i>	49297	52937	60247	44407	40484	39761	..	-1.9
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	48149	48149	29806	32514	32406	32212	..	-2.6
Charcoal (kt)								
Production	-	-	-	12	8	8	19	-
Net imports ¹	-	-	-	31	35	35	27	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	43	43	43	46	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	43	43	43	..	-
<i>Industry</i>	-	-	-	1	1	1	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	42	42	42	..	-
Biogases (TJ)								
Production	-	48	1287	2763	3432	3457	3302	33.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	48	1287	2763	3432	3457	3302	33.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	48	1287	2736	3078	3121	..	32.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	27	354	336	..	-
<i>Industry</i>	-	-	-	27	354	336	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	3	3	37	40	-
Stock changes	-	-	-	-	-	-5	3	-
Gross consumption	-	-	-	3	3	32	43	-
Statistical differences	-	-	-	-	-	1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	3	3	33	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	3	3	33	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	317	306	335	359	334	-
Net imports ¹	-	-	18	-14	-29	11	-50	-
Stock changes	-	-	30	14	-2	-7	4	-
Gross consumption	-	-	365	306	304	363	288	-
Statistical differences	-	-	-	-1	-	1	..	-
Transformation processes	-	-	-	1	1	2	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	365	304	303	362	..	-
<i>Industry</i>	-	-	14	9	9	13	..	-
<i>Transport</i>	-	-	345	289	288	342	..	-
<i>Other</i>	-	-	6	6	6	7	..	-
Other liquid biofuels (kt)								
Production	-	-	5	5	6	4	3	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	1	-
Gross consumption	-	-	5	5	6	4	4	-
Statistical differences	-	-	-	-1	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	5	4	5	4	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	5	4	5	4	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

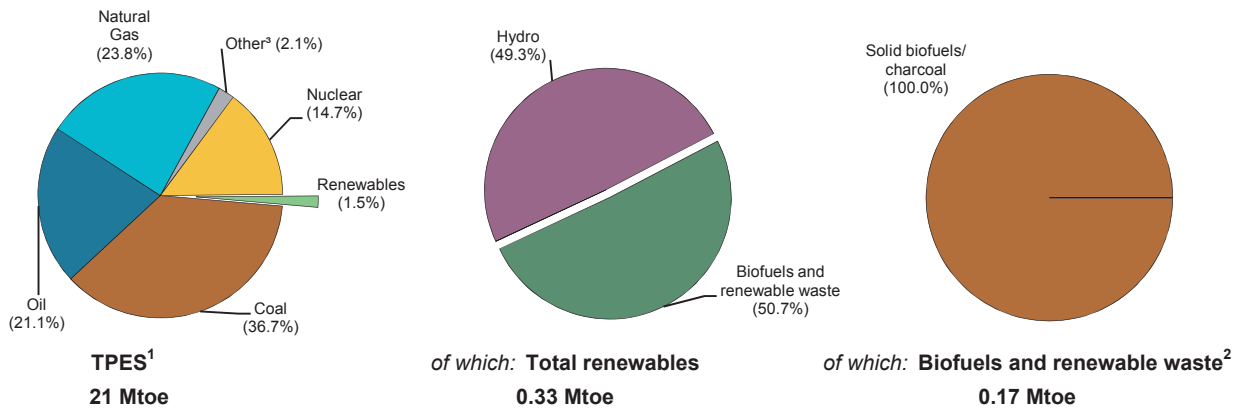


Figure 2. Contribution of renewables in 2016 provisional

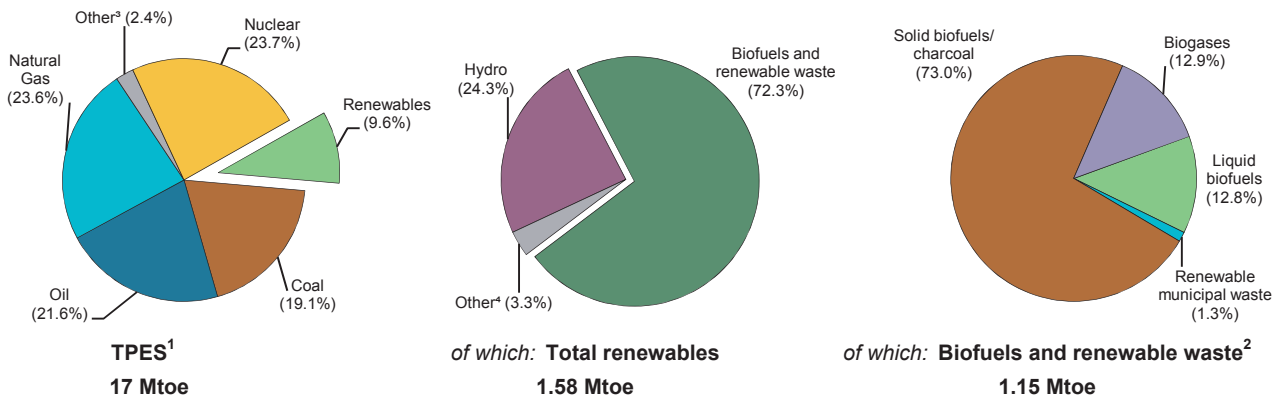


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	21.33	17.74	17.83	16.95	15.95	16.39	16.52	-0.4
<i>of which: Renewables (Mtoe)</i> ¹	0.33	0.49	1.32	1.41	1.42	1.58	1.58	7.6
<i>Renewables/TPES(%)</i>	1.5	2.8	7.4	8.3	8.9	9.6	9.6	8.1
GDP (billion 2010 US dollars)	51.10	55.49	89.50	94.94	97.38	101.12	104.44	4.0
TPES/GDP ²	0.42	0.32	0.20	0.18	0.16	0.16	0.16	-4.3
TPES/GDP (year 2010 = 100)	210	161	100	90	82	81	79	-4.3
Population (millions)	5.30	5.40	5.43	5.41	5.42	5.42	5.44	0.0
TPES/population (toe per capita)	4.03	3.29	3.28	3.13	2.94	3.02	3.04	-0.5
Electricity generation (TWh) ³	25.5	30.8	27.5	28.5	27.1	26.6	25.9	-1.1
<i>of which: Renewables (TWh)</i> ^{1,3}	1.88	4.62	5.94	6.35	6.23	6.04	6.42	2.1
<i>Renew./Total Elec.(%)</i> ^{1,4}	7.4	15.0	21.6	22.3	22.9	22.7	24.8	3.2
Road energy consumption (Mtoe)	1.3	1.3	2.1	2.0	2.0	2.0	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.10	0.10	0.13	0.14	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	4.6	4.9	6.6	7.2	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	..	2420	2723	3280	3312	3316	2.1
Hydro	..	2420	2516	2523	2523	2522	0.3
<i>Hydro <1MW</i>	-	-	26	24	24	18	-
<i>Hydro 1-10MW</i>	-	-	66	48	48	57	-
<i>Hydro 10+MW</i>	1508	1535	1535	1531	..
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	..	735 e	916	916	916	916	1.5
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	19	533	533	533	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	3	5	3	3	-
Industrial waste	2	3	11	11	..
Municipal waste	-	-	5	5	11	11	-
Solid biofuels	-	-	169	176	153	145	-
Biogases	-	-	9	35	78	91	-
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	-	-	123	160	166	171	-
<i>Cap. of solar collectors (MW_{th})</i> ⁶	-	-	86	112	116	120	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	..	23.62	26.65	23.30	22.43	21.82	x
Hydro	..	23.47	25.63	23.37	20.19	18.73	20.23
<i>of which: <1MW</i>	-	-	24.15	18.55	21.40	23.47	19.34
<i>of which: 1-10MW</i>	-	-	8.48	23.31	24.73	16.02	19.04
<i>of which: 10+MW</i>	38.99	35.03	30.19	27.95	30.11
<i>of which: pure pumped storage²</i>	..	5.59 e	4.91	3.96	3.15	3.38	3.85
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	10.18	12.59	12.79	10.84	10.96
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	22.83	13.70	22.83	22.83	20.24
Industrial waste	62.79	49.47	14.53	15.57	41.03
Municipal waste	-	-	79.91	73.06	34.25	34.25	64.84
Solid biofuels	-	-	40.93	43.91	68.34	86.52	58.64
Biogases	-	-	43.13	69.47	70.10	67.87	64.35
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	2515	5007	6358	6695	6507	6337	6691	1.8
Hydro	2515	4975	5649	5166	4462	4137	4727	-0.3
<i>of which: pumped storage</i>	635	360	394	318	253	271	247	-2.3
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	17	588	597	506	532	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	6	6	6	6	6	-
Industrial waste	-	32	11	13	14	15	13	-5.5
Municipal waste renew.	-	-	22	21	22	22	17	-
Municipal waste non-renew.	-	-	13	11	11	11	8	-
Solid biofuels	-	-	606	677	916	1099	890	-
Biogases	-	-	34	213	479	541	498	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	2515	5007	5674	5884	5247	4770	..	-
Hydro	2515	4975	5649	5166	4462	4137	..	-
<i>of which: pumped storage</i>	635	360	394	318	253	271	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	17	588	597	506	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	6	6	6	6	..	-
Industrial waste	-	32	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	7	11	4	..	-
Biogases	-	-	2	117	171	117	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	-	684	811	1260	1567	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	11	13	14	15	..	-
Municipal waste renew.	-	-	22	21	22	22	..	-
Municipal waste non-renew.	-	-	13	11	11	11	..	-
Solid biofuels	-	-	606	670	905	1095	..	-
Biogases	-	-	32	96	308	424	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	2892 e	4440	7524	5251	5594	4617	3.0
Geothermal	-	-	139	102	120	121	-	-
Solar thermal	-	-	1	1	1	1	-	-
Industrial waste	-	2892 e	72	130	42	4	4	-33.7
Municipal waste renew.	-	-	52	27	-	-	-	-
Municipal waste non-renew.	-	-	50	80	7	23	20	-
Solid biofuels	-	-	4056	7067	4752	4972	4161	-
Biogases	-	-	70	117	329	473	432	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	2518	5114	3395	3638	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	14	33	19	2	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	2454	4964	3047	3163	..	-
Biogases	-	-	50	117	329	473	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	2892 e	1922	2410	1856	1956	..	-
Geothermal	-	-	139	102	120	121	..	-
Solar thermal	-	-	1	1	1	1	..	-
Industrial waste	-	2892 e	58	97	23	2	..	-
Municipal waste renew.	-	-	52	27	-	-	-	-
Municipal waste non-renew.	-	-	50	80	7	23	..	-
Solid biofuels	-	-	1602	2103	1705	1809	..	-
Biogases	-	-	20	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	67	47	9	9	-	-
Heat pumps ²	-	-	3	12	8	5	-	-
(-) Input to heat pumps	-	-	4	4	7	4	-	-
Other sources ³	-	-	68	39	8	8	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	332	1	-	44	7	5	165	15
Imports	-	-	-	-	-	-	1	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	332	1	-	44	7	5	166	15
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-325	-	-	-13	-	-	-	-
Autoproducer electricity plants	-7	-	-	-31	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-4	-15
Main heat plants	-	-	-	-	-4	-	-	-
Autoproducer heat plants	-	-	-	-	-2	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	1	5	161	-
Industry	-	-	-	-	-	-	161	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	18	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	143	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	1	5	-	-
Residential	-	-	-	-	-	5	-	-
Commercial and public services	-	-	-	-	1	1	-	-
Agriculture/forestry	-	-	-	-	1	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	3866	6	-	506	-	-	15	22
<i>Electricity plants</i>	3866	6	-	506	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	15	22
Heat generated - TJ	-	-	-	-	121	1	4	-
<i>CHP plants</i>	-	-	-	-	-	-	2	-
<i>Heat plants</i>	-	-	-	-	121	1	2	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
25	890	-	149	54	96	-	1783	27.1%
-	-	-	-	-	100	-	101	0.7%
-	-11	-	-	-31	-74	-	-116	2.0%
-	1	-	-	-	-1	-	-	x
25	879	-	149	23	121	-	1767	10.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-338	x
-	-3	-	-28	-	-	-	-69	x
-	-194	-	-21	-	-	-	-215	x
-11	-178	-	-60	-	-	-	-268	x
-	-52	-	-	-	-	-	-56	x
-1	-6	-	-	-	-	-	-9	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-1	-	-	-	-	-	-1	x
13	445	-	39	23	121	-	808	8.1%
-	407	-	-	-	-	-	568	16.8%
-	4	-	-	-	-	-	4	0.4%
-	-	-	-	-	-	-	18	4.6%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	143	32.9%
-	-	-	-	-	-	-	-	-
-	5	-	-	-	-	-	5	2.4%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	347	-	-	-	-	-	347	65.8%
-	37	-	-	-	-	-	37	65.7%
-	1	-	-	-	-	-	1	3.5%
-	-	-	-	-	-	-	-	-
-	12	-	-	-	-	-	12	8.8%
-	-	-	-	23	121	-	144	6.6%
-	-	-	-	23	121	-	144	7.2%
-	-	-	-	-	-	-	-	-
13	38	-	39	-	-	-	96	2.8%
-	24	-	-	-	-	-	29	1.5%
13	2	-	15	-	-	-	32	2.5%
-	11	-	25	-	-	-	37	24.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
11	1099	-	541	-	-	-	6066	22.8%
-	4	-	117	-	-	-	4499	49.1%
11	1095	-	424	-	-	-	1567	9.0%
23	4972	-	473	-	-	-	5594	15.3%
-	3163	-	473	-	-	-	3638	14.7%
23	1809	-	-	-	-	-	1956	16.3%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	348	273	296	297	55	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	348	273	296	297	55	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	278	204	240	242	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	70	69	56	55	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	70	69	56	55	..	-
Solar thermal (TJ)								
Production	-	-	179	235	242	230	225	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	179	235	242	230	225	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	1	1	1	1	..	-
Energy industry own use	-	-	-	1	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	178	233	241	229	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	178	233	241	229	..	-
Industrial waste (TJ)								
Production	321	13473	731	5165	5072	6905	6000	-4.4
Net imports ¹	-	-	41	-478	47	30	..	-
Stock changes	-	-	-3	114	-10	4	..	-
Gross consumption	321	13473	769	4801	5109	6939	6000	-4.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	3888	164	242	155	184	..	-18.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	53	30	7	-	..	-
Final energy consumption	321	9585	552	4529	4947	6755	..	-2.3
<i>Industry</i>	321	9573	546	4516	4947	6755	..	-2.3
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	12	6	13	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	908	648	485	625	620	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-7	5	-	-	-	-
Gross consumption	-	-	901	653	485	625	620	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	549	504	485	625	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	352	149	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	352	149	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	705	451	1235	1043	1000	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	3	-	-	-	-
Gross consumption	-	-	705	454	1235	1043	1000	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	373	381	297	493	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	4	-	-	-	..	-
Final energy consumption	-	-	328	73	938	550	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	328	73	938	550	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	6965	4169 e	30999	32180	31798	37254	35000	15.7
Net imports ¹	-	-	-915	-425	-481	-466	..	-
Stock changes	-	-346 e	260	22	158	26	..	-
Gross consumption	6965	3823 e	30344	31777	31475	36814	35000	16.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	12495	19545	16063	18134	..	-
Energy industry own use	-	-	-	4	26	10	..	-
Losses	-	-	127	6	11	28	..	-
Final energy consumption	6965	3823	17722	12222	15375	18642	..	11.1
<i>Industry</i>	6965	3798	15717	10398	13529	17055	..	10.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	25 e	2005	1824	1846	1587	..	31.9
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	1	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	1	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	1	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	1	-	-	..	-
Biogases (TJ)								
Production	-	-	600	2300	4025	6223	6200	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	600	2300	4025	6223	6200	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	375	2072	3857	4574	..	-
Energy industry own use	-	-	-	-	10	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	225	228	158	1649	..	-
<i>Industry</i>	-	-	21	2	2	3	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	204	226	156	1646	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	97	104	106	112	117	-
Net imports ¹	-	-	-46	-66	-63	-64	-69	-
Stock changes	-	-	-4	-3	5	-	-	-
Gross consumption	-	-	47	35	48	48	48	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	47	35	48	48	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	47	35	48	48	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	113	105	101	106	110	-
Net imports ¹	-	-	-36	-15	19	29	25	-
Stock changes	-	-	-3	-	-1	-1	2	-
Gross consumption	-	-	74	90	119	134	137	-
Statistical differences	-	-	1	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	75	90	119	134	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	75	90	119	134	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

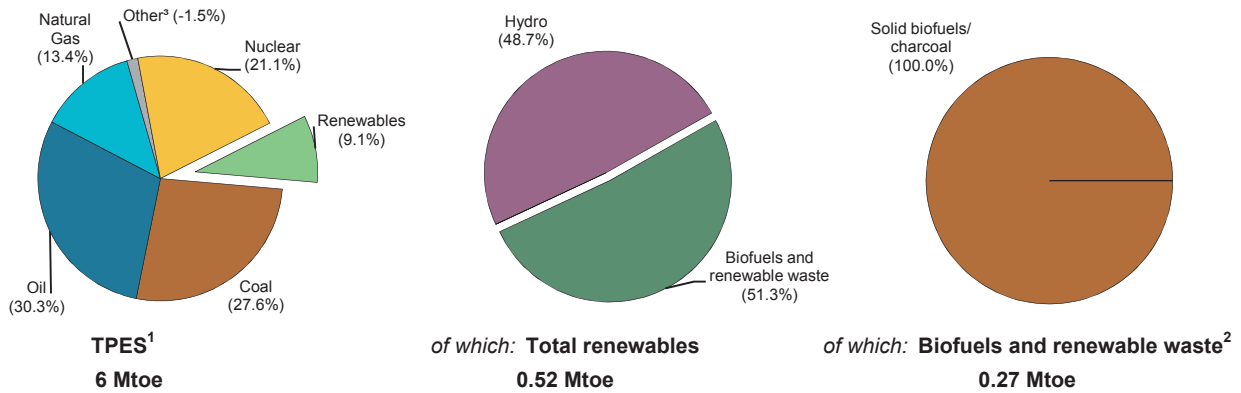


Figure 2. Contribution of renewables in 2016 provisional

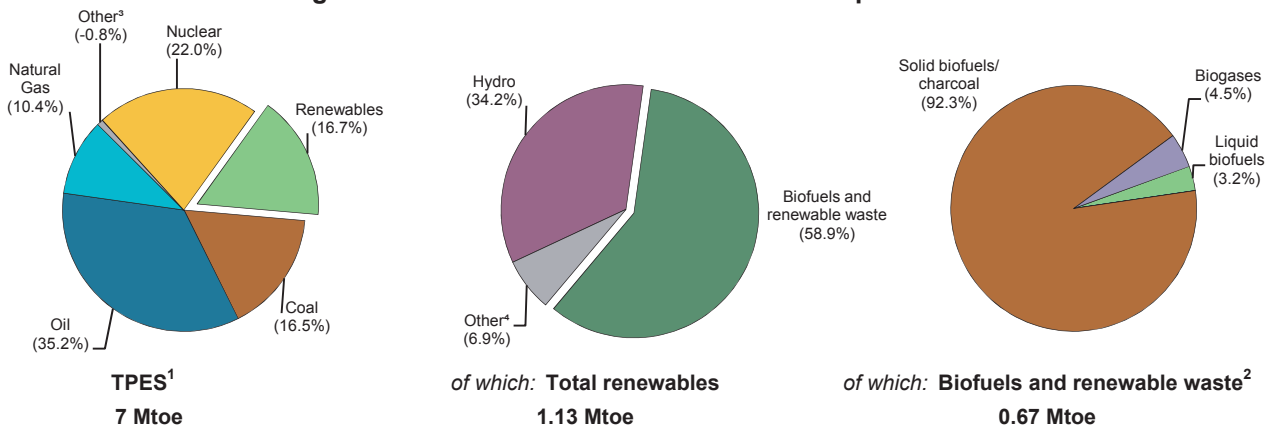
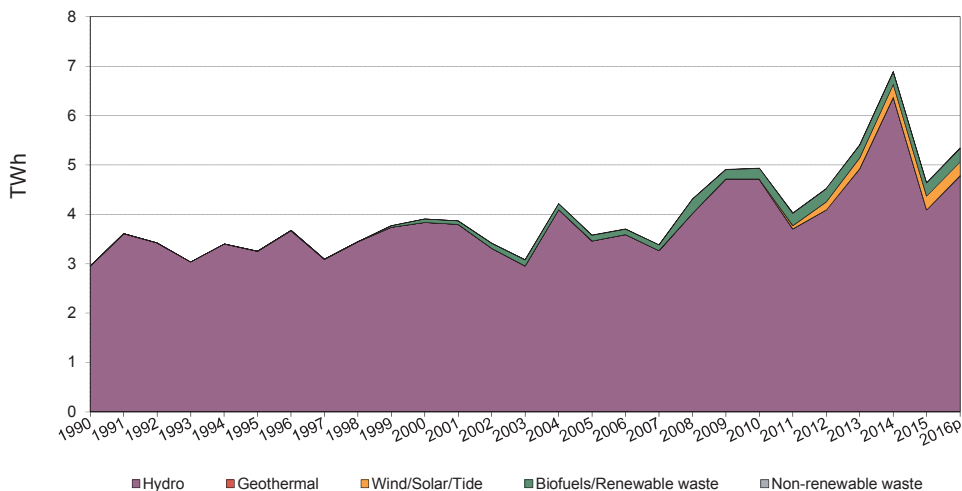


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	5.71	6.41	7.33	6.85	6.65	6.57	6.77	0.3
of which: Renewables (Mtoe) ¹	0.52	0.79	1.12	1.17	1.20	1.06	1.13	2.3
Renewables/TPES(%)	9.1	12.3	15.3	17.1	18.1	16.1	16.7	2.0
GDP (billion 2010 US dollars)	30.86	36.94	48.01	46.52	47.96	49.07	50.29	1.9
TPES/GDP ²	0.19	0.17	0.15	0.15	0.14	0.13	0.13	-1.6
TPES/GDP (year 2010 = 100)	121	114	100	97	91	88	88	-1.6
Population (millions)	2.00	1.99	2.05	2.06	2.06	2.06	2.07	0.2
TPES/population (toe per capita)	2.86	3.22	3.58	3.33	3.23	3.19	3.28	0.1
Electricity generation (TWh) ³	12.4	13.6	16.3	15.8	17.2	14.8	16.2	1.1
of which: Renewables (TWh) ^{1,3}	2.95	3.90	4.75	5.11	6.61	4.36	5.06	1.6
Renew./Total Elec.(%) ^{1,4}	23.7	28.7	29.2	32.3	38.5	29.4	31.2	0.5
Road energy consumption (Mtoe)	0.9	1.2	1.8	1.8	1.8	1.7	..	..
of which: Liquid biofuels (Mtoe)	-	-	0.05	0.06	0.04	0.03	..	..
Liq. biofuels/road tr.(%) ⁵	-	-	2.6	3.4	2.5	1.7	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	755	860	1315	1551	1587	1603	4.2
Hydro	755	843	1254	1299	1296	1295	2.9
Hydro <1MW	-	95	118	120	119	119	1.5
Hydro 1-10MW	-	32	42	41	38	38	1.2
Hydro 10+MW	-	716	914	958	959	958	2.0
Mixed plants	-	-	-	-	-	-	-
Pure pumped storage	-	-	180	180	180	180	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	12	187	223	238	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	-	-	4	4	5	-
Industrial waste	-	-	2	2	2	2	-
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	15	33	30	30	30	4.7
Biogases	-	2	14	28	31	32	20.3
Liquid biofuels	-	-	-	1	1	1	-
Solar collectors surface (1000 m ²)	-	-	178	229	236	239	-
Cap. of solar collectors (MW _{th}) ⁶	-	-	125	160	165	167	-

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	44.60	51.83	42.86	39.82	49.58	33.08	x
Hydro	44.60	51.93	42.81	43.27	56.07	36.06	41.27
<i>of which: <1MW</i>	-	20.33	17.60	17.67	23.51	16.69	16.85
<i>of which: 1-10MW</i>	-	60.96	58.16	53.86	75.28	45.90	52.91
<i>of which: 10+MW</i>	-	55.72	51.49	50.65	66.61	41.47	48.89
<i>of which: pure pumped storage²</i>	-	-	11.71	18.64	17.41	17.95	15.01
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	-	12.23	13.13	13.15	13.15	13.14
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	-	-	12.05	12.01	13.76	12.61
Industrial waste	-	-	26.01	41.97	41.48	42.87	36.51
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	44.08	41.35	45.21	47.49	49.96	45.88
Biogases	-	67.39	79.38	57.46	47.78	47.20	56.31
Biodiesels	-	-	-	11.26	44.18	46.70	34.05
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	2950	3904	4938	5409	6892	4645	5346	2.0
Hydro	2950	3834	4703	4923	6366	4090	4782	1.4
<i>of which: pumped storage</i>	-	-	185	294	274	283	279	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	13	215	257	274	267	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	-	4	4	6	6	-
Industrial waste	-	-	5	7	7	8	9	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	58	120	118	125	131	137	5.5
Biogases	-	12	97	141	129	132	142	16.7
Liquid biofuels	-	-	-	1	4	4	3	-
of which:								
Electricity only plants	2950	3834	4723	5146	6631	4373	..	-
Hydro	2950	3834	4703	4923	6366	4090	..	-
<i>of which: pumped storage</i>	-	-	185	294	274	283	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	-	13	215	257	274	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	-	-	4	4	6	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	7	4	4	3	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	-	70	215	263	261	272	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	5	7	7	8	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	58	120	118	125	131	..	-
Biogases	-	12	90	137	125	129	..	-
Liquid biofuels	-	-	-	1	4	4	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	149	277	964	1347	1326	1585	1621	11.7
Geothermal	-	-	23	23	19	21	18	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	14	-	106	130	120	129	14.9
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	149	263	747	848	812	1127	1188	9.9
Biogases	-	-	194	367	353	304	277	-
Liquid biofuels	-	-	-	3	12	13	9	-
<i>of which:</i>								
CHP plants	-	-	732	993	1060	1210	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	106	130	120	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	538	517	565	773	..	-
Biogases	-	-	194	367	353	304	..	-
Liquid biofuels	-	-	-	3	12	13	..	-
Heat only plants	149	277	232	354	266	375	..	-
Geothermal	-	-	23	23	19	21	..	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	14	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	149	263	209	331	247	354	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	327	1	-	24	43	11	43	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	327	1	-	24	43	11	43	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-314	-1	-	-1	-	-	-	-
Autoproducer electricity plants	-13	-	-	-23	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-8	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-2	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	42	11	35	-
Industry	-	-	-	-	-	-	35	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	2	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	33	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	42	11	-	-
Residential	-	-	-	-	27	11	-	-
Commercial and public services	-	-	-	-	11	-	-	-
Agriculture/forestry	-	-	-	-	4	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	3808	6	-	274	-	-	8	-
<i>Electricity plants</i>	3808	6	-	274	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	8	-
Heat generated - TJ	-	-	-	-	21	-	120	-
<i>CHP plants</i>	-	-	-	-	-	-	120	-
<i>Heat plants</i>	-	-	-	-	21	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
-	590	-	30	-	-	-	1069	31.4%
-	-	-	-	7	25	-	32	0.6%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	590	-	30	7	25	-	1101	16.8%
-	-	-	-	-	-1	-	-1	x
-	-	-	-	-	-	-	-316	x
-	-	-	-1	-	-	-	-37	x
-	-29	-	-23	-	-1	-	-61	x
-	-13	-	-4	-	-	-	-17	x
-	-10	-	-	-	-	-	-12	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	538	-	2	7	23	-	658	13.7%
-	75	-	-	-	-	-	110	9.0%
-	-	-	-	-	-	-	-	-
-	21	-	-	-	-	-	23	14.4%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	35	19.6%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	1	0.7%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	2	3.0%
-	9	-	-	-	-	-	9	5.4%
-	35	-	-	-	-	-	35	67.5%
-	-	-	-	-	-	-	-	-
-	2	-	-	-	-	-	2	9.5%
-	4	-	-	-	-	-	4	5.7%
-	-	-	-	7	23	-	30	1.7%
-	-	-	-	7	23	-	30	1.7%
-	-	-	-	-	-	-	-	-
-	463	-	2	-	-	-	518	31.2%
-	463	-	-	-	-	-	501	45.1%
-	-	-	2	-	-	-	13	2.8%
-	-	-	-	-	-	-	4	5.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	131	-	132	-	4	-	4363	29.5%
-	-	-	3	-	-	-	4091	42.0%
-	131	-	129	-	4	-	272	5.4%
-	1127	-	304	-	13	-	1585	18.3%
-	773	-	304	-	13	-	1210	17.1%
-	354	-	-	-	-	-	375	23.6%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	1161	1488	1548	1814	1850	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	1161	1488	1548	1814	1850	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	83	78	62	65	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	1078	1410	1486	1749	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	1078	1410	1486	1749	..	-
Solar thermal (TJ)								
Production	-	-	341	437	452	457	457	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	341	437	452	457	457	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	341	437	452	457	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	341	437	452	457	..	-
Industrial waste (TJ)								
Production	-	14	975	1453	1809	1802	1876	38.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	14	975	1453	1809	1802	1876	38.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	14	21	310	321	330	..	23.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	954	1143	1488	1472	..	-
<i>Industry</i>	-	-	954	1143	1488	1472	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	9917	19021	25917	25796	22300	24709	25801	1.8
Net imports ¹	1260	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	11177	19021	25917	25796	22300	24709	25801	1.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	159	848	1793	1878	1754	2187	..	6.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	11018	18173	24124	23918	20546	22522	..	1.4
<i>Industry</i>	2500	3128	2831	2287	3259	3126	..	-0.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	8518	15045	21293	21631	17287	19396	..	1.7
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	152	1273	1454	1290	1242	1263	15.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	152	1273	1454	1290	1242	1263	15.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	124	1166	1357	1203	1163	..	16.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	28	107	97	87	79	..	7.2
<i>Industry</i>	-	-	11	14	15	15	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	28	96	83	72	64	..	5.7

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	5	9	9	9	9	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	5	9	9	9	9	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	5	9	9	9	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	5	9	9	9	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	19	2	-	-	-	-
Net imports ¹	-	-	29	58	42	28	17	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	48	60	42	28	17	-
Statistical differences	-	-	-1	-	-	-1	..	-
Transformation processes	-	-	-	-	1	1	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	47	60	41	26	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	47	60	41	26	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

SPAIN

Figure 1. Contribution of renewables in 1990

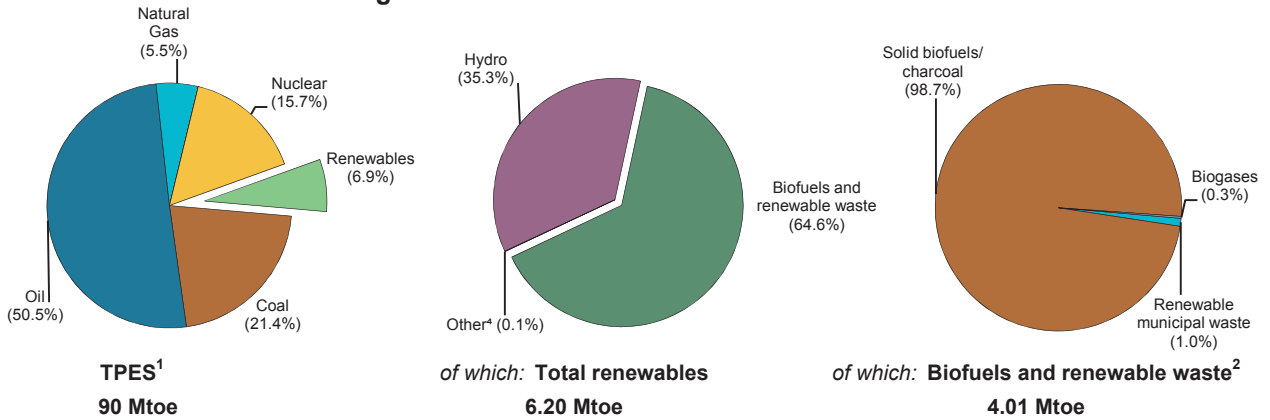


Figure 2. Contribution of renewables in 2016 provisional

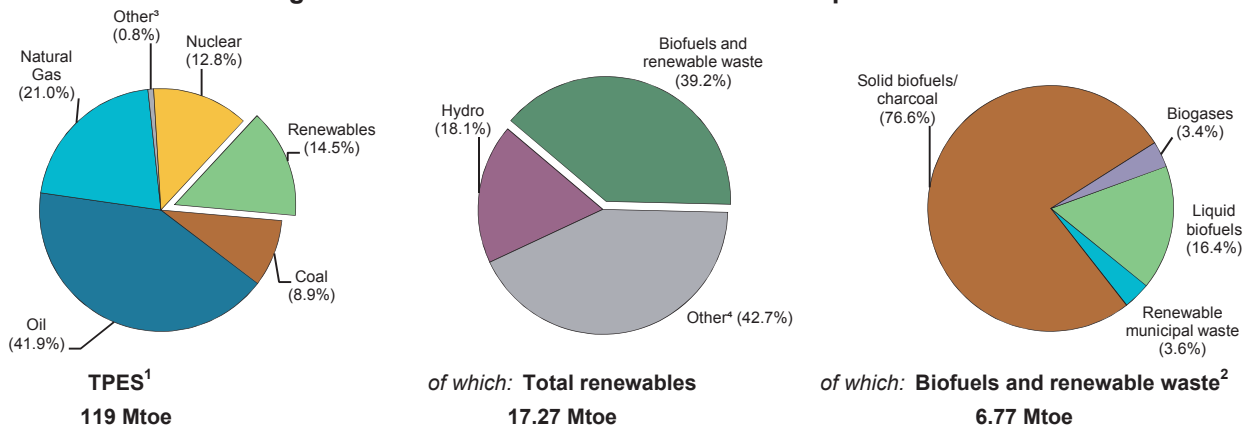
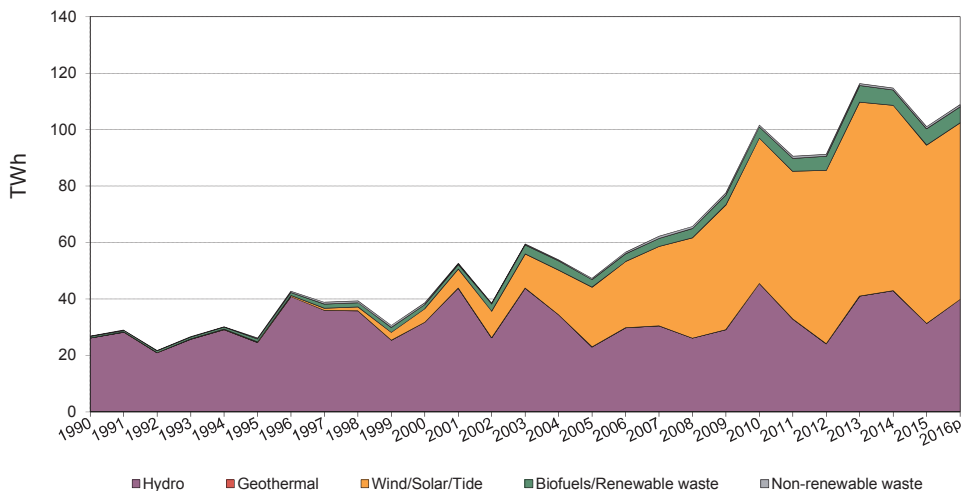


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

SPAIN

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	90.07	121.86	127.75	117.11	114.56	118.92	119.04	-0.1
<i>of which: Renewables (Mtoe)</i> ¹	6.20	6.81	15.05	17.74	17.77	16.62	17.27	6.0
<i>Renewables/TPES(%)</i>	6.9	5.6	11.8	15.2	15.5	14.0	14.5	6.1
GDP (billion 2010 US dollars)	873.15	1149.49	1431.59	1352.28	1370.93	1414.86	1460.64	1.5
TPES/GDP ²	0.10	0.11	0.09	0.09	0.08	0.08	0.08	-1.6
TPES/GDP (year 2010 = 100)	116	119	100	97	94	94	91	-1.6
Population (millions)	39.34	40.55	46.56	46.59	46.46	46.41	46.47	0.9
TPES/population (toe per capita)	2.29	3.00	2.74	2.51	2.47	2.56	2.56	-1.0
Electricity generation (TWh) ³	151.2	220.9	298.3	281.4	274.9	277.8	271.2	1.3
<i>of which: Renewables (TWh)</i> ^{1,3}	26.03	34.49	97.78	111.41	110.27	97.09	104.61	7.2
<i>Renew./Total Elec.(%)</i> ^{1,4}	17.2	15.6	32.8	39.6	40.1	34.9	38.6	5.8
Road energy consumption (Mtoe)	17.7	26.2	29.5	25.1	25.5	26.7	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	0.07	1.44	0.89	0.95	0.96	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	0.3	4.9	3.5	3.7	3.6	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	15804	20472	44854	50389	50486	51337	6.3
Hydro	15657	17960	18535	19185	19223	20053	0.7
<i>Hydro <1MW</i>	-	228	273	280	280	280	1.4
<i>Hydro 1-10MW</i>	-	1339	1653	1668	1668	1673	1.5
<i>Hydro 10+MW</i>	-	11040	11349	12128	12133	12133	0.6
<i>Mixed plants</i>	2640	2935	2811	2654	2687	2687	-0.6
<i>Pure pumped storage</i>	2418	2418	2449	2455	2455	3280	2.1
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	3	12	3921	4785	4854	4856	49.2
Solar thermal	-	-	732	2300	2300	2300	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	2	2206	20693	22958	22925	22943	16.9
Industrial waste	-	-	-	50	50	50	-
Municipal waste	27	94	223	234	234	234	6.3
Solid biofuels	115	150	545	657	677	677	10.6
Biogases	-	50	205	220	223	224	10.5
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	281	403	2373	3094	3350	3591	15.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	197	282	1661	2166	2345	2514	15.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	19.41 e	21.55 e	25.87	26.34	25.95	22.48	x
Hydro	19.09	20.22	28.03	24.43	25.52	17.86	20.59
<i>of which: <1MW</i>	-	25.27	36.80	30.69	29.92	26.84	26.55
<i>of which: 1-10MW</i>	-	34.46	54.92	38.06	36.59	29.72	32.26
<i>of which: 10+MW</i>	-	24.52	33.67	28.76	31.13	21.76	24.73
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	22.83	17.12	18.70	19.87	19.33	19.43	19.66
Solar thermal	-	-	11.87	23.67	27.07	27.76	23.90
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	79.91	24.46	24.42	27.67	25.90	24.54	25.13
Industrial waste	-	-	..	..	..	-	-
Municipal waste	67.65 e	81.00 e	67.47	66.52	66.95	74.96	72.47
Solid biofuels	45.86 e	64.00	52.53	72.00	64.42	67.68	65.14
Biogases	-	72.60 e	47.22	50.50	46.44	50.03	47.24
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	26876	38652	101642	116275	114756	101083	108810	6.7
Hydro	26184	31807	45511	41052	42970	31368	39854	1.4
<i>of which: pumped storage</i>	714	3551	3207	4187	3801	3228	3470	-0.1
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	6	18	6425	8327	8218	8266	8137	46.5
Solar thermal	-	-	761	4770	5455	5593	5506	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	14	4727	44271	55646	52013	49325	48914	15.7
Industrial waste	50	274	..	..	..	-	-	-
Municipal waste renew.	80	334	659	682	686	768	734	5.0
Municipal waste non-renew.	80	333	659	682	686	768	734	5.1
Solid biofuels	462	841	2508	4143	3821	4014	4038	10.3
Biogases	-	318	848	973	907	981	893	6.7
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	26271	37973	100324	114848	113622	99764	..	-
Hydro	26184	31807	45511	41052	42970	31368	..	-
<i>of which: pumped storage</i>	714	3551	3207	4187	3801	3228	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	6	18	6425	8327	8218	8266	..	-
Solar thermal	-	-	761	4770	5455	5593	..	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	14	4727	44271	55646	52013	49325	..	-
Industrial waste	50	274	..	..	..	-	-	-
Municipal waste renew.	-	334	659	682	686	672	..	-
Municipal waste non-renew.	-	333	659	682	686	672	..	-
Solid biofuels	17	176	1342	2905	2856	3126	..	-
Biogases	-	304	696	784	738	742	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	605	679	1318	1427	1134	1319	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	80	-	-	-	-	96	..	-
Municipal waste non-renew.	80	-	-	-	-	96	..	-
Solid biofuels	445	665	1166	1238	965	888	..	-
Biogases	-	14	152	189	169	239	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	2420	4242	-	711	19	2473	-	252
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	2420	4242	-	711	19	2473	-	252
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-2356	-4241	-	-708	-	-2196	-	-26
Autoproducer electricity plants	-64	-1	-	-3	-	-	-	-188
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-36
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	19	277	-	2
Industry	-	-	-	-	-	2	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	1	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	19	275	-	2
Residential	-	-	-	-	11	221	-	-
Commercial and public services	-	-	-	-	4	52	-	2
Agriculture/forestry	-	-	-	-	4	1	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	28140	49325	-	8266	-	5593	..	768
<i>Electricity plants</i>	28140	49325	-	8266	-	5593	..	672
<i>CHP plants</i>	-	-	-	-	-	-	-	96
Heat generated - TJ	-	-	-	-	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
252	5259	-	262	252	983	-	17125	51.0%
-	-	-	-	18	500	-	518	0.4%
-	-	-	-	-107	-808	-	-915	3.0%
-	-	-	-	28	112	-	140	x
252	5259	-	262	191	788	-	16869	14.2%
-	-	-	-	1	-	-	1	x
-26	-780	-	-76	-	-	-	-10409	x
-188	-247	-	-93	-	-	-	-784	x
-	-	-	-	-	-	-	-	-
-36	-176	-	-32	-	-	-	-280	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-132	26	-	-	-	-	-106	x
-	-	-	-	-	-	-	-	-
-	-	-	-1	-	-	-	-1	x
-	-	-	-	-	-	-	-	-
2	3925	26	59	192	790	-	5292	6.6%
-	1288	-	46	-	10	-	1346	7.5%
-	-	-	-	-	-	-	-	-
-	5	-	8	-	-	-	13	0.5%
-	-	-	-	-	-	-	-	-
-	204	-	3	-	-	-	207	6.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	2	-	2	0.5%
-	195	-	7	-	2	-	205	9.0%
-	495	-	26	-	-	-	521	31.0%
-	311	-	-	-	-	-	311	68.8%
-	14	-	-	-	6	-	20	2.2%
-	3	-	-	-	-	-	3	0.9%
-	59	-	3	-	-	-	62	4.9%
-	-	-	-	190	773	-	963	3.3%
-	-	-	-	190	770	-	960	3.6%
-	-	-	-	-	3	-	3	0.1%
2	2638	26	13	2	7	-	2984	10.7%
-	2489	26	-	-	1	-	2748	18.5%
2	80	-	11	1	3	-	155	1.6%
-	68	-	1	1	-	-	75	3.3%
-	-	-	-	1	4	-	5	2.2%
-	-	-	1	-	-	-	1	0.2%
768	4014	-	982	-	-	-	97856	35.2%
672	3126	-	743	-	-	-	96537	38.9%
96	888	-	239	-	-	-	1319	4.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	154	225	670	758	789	789	813	8.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	154	225	670	758	789	789	813	8.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	154	225	670	758	789	789	..	8.7
<i>Industry</i>	-	-	1	3	3	3	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	154	225	669	755	786	786	..	8.7
Solar thermal (TJ)								
Production	-	1303	20198	88434	100519	103575	102378	33.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1303	20198	88434	100519	103575	102378	33.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	12515	78422	89685	91961	..	-
Energy industry own use	-	-	4	3	3	3	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	1303	7679	10009	10831	11611	..	15.7
<i>Industry</i>	-	4	73	94	97	98	..	23.8
<i>Transport</i>	-	-	-	3	3	3	..	-
<i>Other</i>	-	1299	7606	9912	10731	11510	..	15.7
Industrial waste (TJ)								
Production	853 e	3134 e	..	..	..	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	853 e	3134 e	..	..	..	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	353 e	3134 e	..	..	..	-	-	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	500 e	..	..	..	..	-	..	..
<i>Industry</i>	500 e	..	..	..	..	-	..	..
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	1697 e	4803 e	7293	8362	8549	10551	10170	5.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1697 e	4803 e	7293	8362	8549	10551	10170	5.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	1663 e	4803 e	7293	8362	8549	10450	..	5.3
Energy industry own use	34 e	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	101	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	101	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	1696 e	4802 e	7293	8362	8549	10551	10156	5.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1696 e	4802 e	7293	8362	8549	10551	10156	5.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	1662 e	4802 e	7293	8362	8549	10450	..	5.3
Energy industry own use	34 e	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	101	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	101	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	165624 e	151702 e	195340	217914	216066	220234	217088	2.5
Net imports ¹	-	-	-	6300	4810	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	165624 e	151702 e	195340	224214	220876	220234	217088	2.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	2345 e	11882 e	32657	56336	53607	55858	..	10.9
Energy industry own use	-	126	9789	11101	10919	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	163279	139694	152894	156777	156350	164376	..	1.1
<i>Industry</i>	76453	53880	45877	46482	45222	53916	..	0.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	86826	85814	107017	110295	111128	110460	..	1.7
Charcoal (kt)								
Production	-	-	36	36	36	36	36	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	36	36	36	36	36	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	36	36	36	36	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	36	36	36	36	..	-
Biogases (TJ)								
Production	425	5492	11600	20072	14791	10954	9665	4.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	425	5492	11600	20072	14791	10954	9665	4.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	4442	8562	10237	8737	8450	..	4.4
Energy industry own use	-	-	816	4597	1825	30	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	425	1050	2222	5238	4229	2474	..	5.9
<i>Industry</i>	425	648	2025	2576	2094	1937	..	7.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	402	197	2662	2135	537	..	1.9

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

SPAIN

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	..	420	362	384	391	261	..
Net imports ¹	-	-	-65	-75	-133	-138	-64	-
Stock changes	-	-	6	-23	43	44	5	-
Gross consumption	-	..	361	264	294	297	202	..
Statistical differences	-	..	-1	-	-	1	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	360	264	294	298	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	360	261	291	295	..	-
<i>Other</i>	-	-	-	3	3	3	..	-
Biodiesel (kt)								
Production	-	80 e	841	720	1212	1113	1360	19.2
Net imports ¹	-	-	516	124	-218	-348	-417	-
Stock changes	-	-	-14	-19	-112	129	164	-
Gross consumption	-	80 e	1343	825	882	892	1107	17.4
Statistical differences	-	-	1	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	80	1344	825	882	894	..	17.5
<i>Industry</i>	-	-	-	6	8	11	..	-
<i>Transport</i>	-	80	1344	815	870	875	..	17.3
<i>Other</i>	-	-	-	4	4	8	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

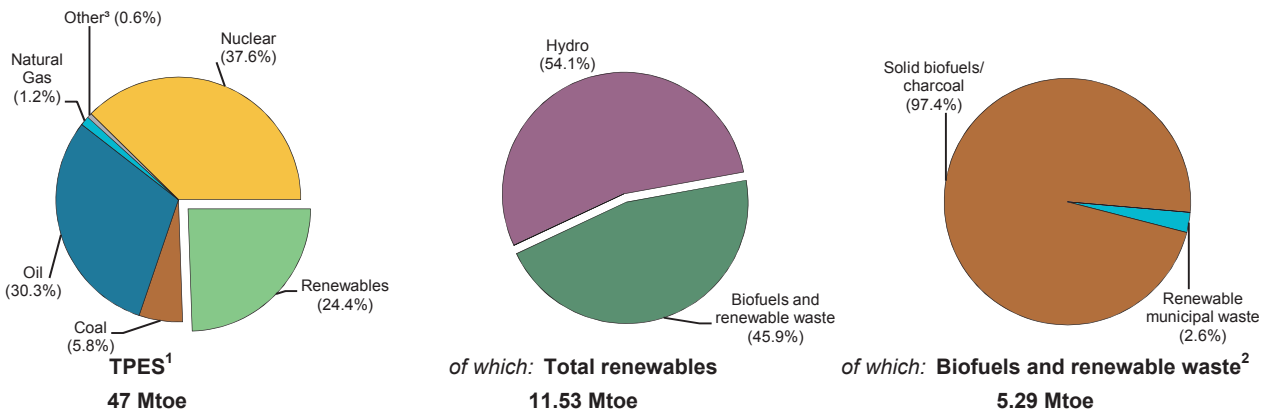


Figure 2. Contribution of renewables in 2016 provisional

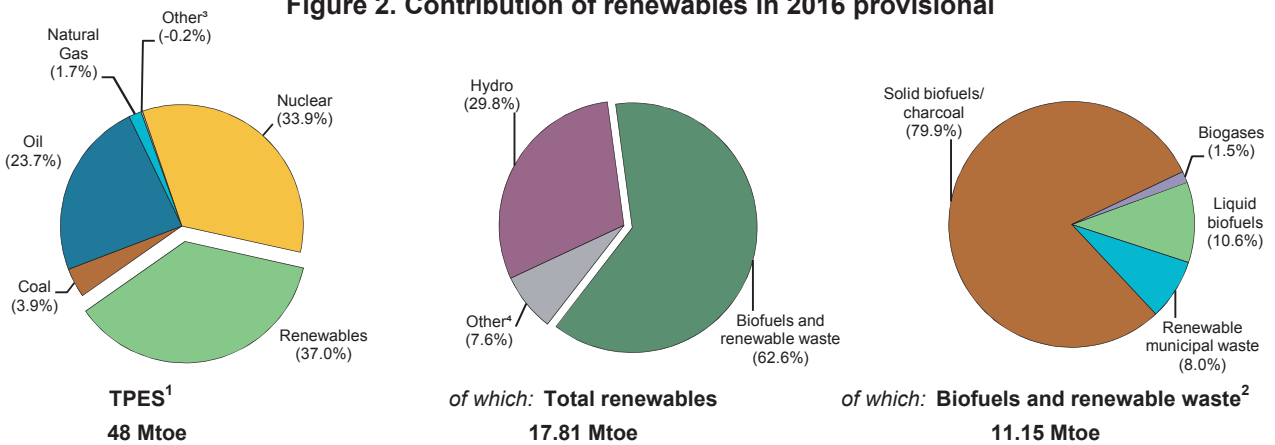
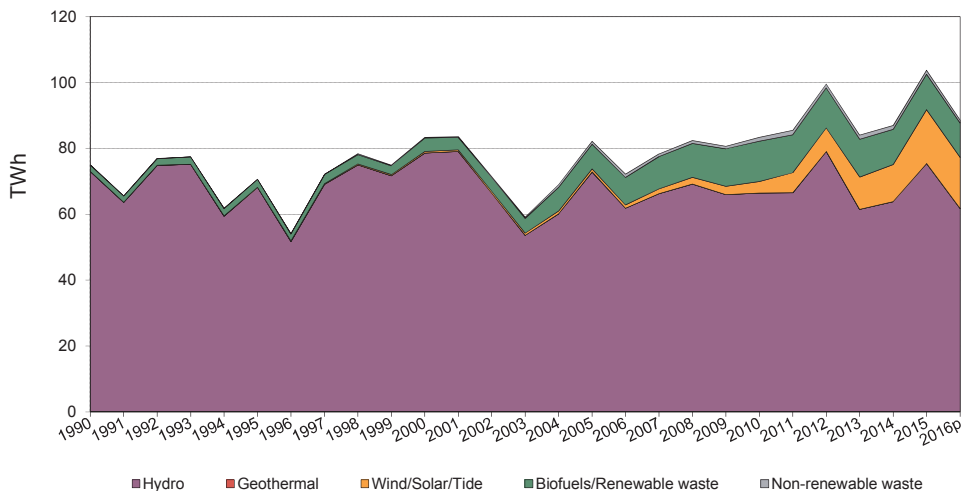


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
 2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
 3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
 4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	47.20	47.56	50.90	49.40	48.22	45.45	48.20	0.1
<i>of which: Renewables (Mtoe)</i> ¹	11.53	14.74	17.00	17.08	17.32	19.19	17.81	1.2
<i>Renewables/TPES(%)</i>	24.4	31.0	33.4	34.6	35.9	42.2	37.0	1.1
GDP (billion 2010 US dollars)	321.07	396.53	488.38	506.16	519.34	540.56	557.73	2.2
TPES/GDP ²	0.15	0.12	0.10	0.10	0.09	0.08	0.09	-2.0
TPES/GDP (year 2010 = 100)	141	115	100	94	89	81	83	-2.0
Population (millions)	8.56	8.87	9.38	9.60	9.70	9.80	9.92	0.7
TPES/population (toe per capita)	5.51	5.36	5.43	5.15	4.97	4.64	4.86	-0.6
Electricity generation (TWh) ³	146.0	145.2	148.5	153.0	153.6	161.9	154.8	0.4
<i>of which: Renewables (TWh)</i> ^{1,3}	74.45	83.14	82.10	82.69	85.74	102.44	87.72	0.3
<i>Renew./Total Elec.(%)</i> ^{1,4}	51.0	57.2	55.3	54.0	55.8	63.3	56.7	-0.1
Road energy consumption (Mtoe)	6.1	6.7	7.3	7.1	7.4	7.5	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.40	0.72	0.94	1.15	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	5.5	10.1	12.7	15.4	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	17569	18319	22716	25293	26055	27508	2.7
Hydro	16331	16525	16732	16494	15996	16329	-0.1
<i>Hydro <1MW</i>	-	178	143	189	171	182	0.1
<i>Hydro 1-10MW</i>	-	741	798	803	762	779	0.3
<i>Hydro 10+MW</i>	-	15587	15683	15403	14964	15269	-0.1
<i>Mixed plants</i>	427	19	108	99	99	99	11.6
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	3	11	43	60	104	26.7
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	8	209	2019	4194	5097	5840	24.9
Industrial waste	-	-	100	209	190	81	-
Municipal waste	30	74	654	680	459	876	17.9
Solid biofuels	1200	1490	3178	3120	3729	3700	6.3
Biogases	-	18	22	5	2	2	-13.6
Liquid biofuels	-	-	-	548	522	576	-
Solar collectors surface (1000 m ²)	90	207	510	475	475	478	5.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	63	145	357	333	333	335	5.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	48.76	51.98	41.91	37.92	38.11	43.06	x
Hydro	51.05	54.31	45.37	42.56	45.58	52.74	48.34
<i>of which: <1MW</i>	-	48.29	43.48	33.98	45.51	49.05	43.49
<i>of which: 1-10MW</i>	-	52.79	46.54	34.93	46.25	48.43	45.32
<i>of which: 10+MW</i>	-	54.49	45.57	43.24	45.77	53.25	48.77
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	5.40	8.92	9.29	8.94	10.65	9.68
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	8.56	24.96	19.80	26.79	25.16	31.80	26.30
Industrial waste	-	-	6.99	3.17	2.46	5.21	5.07
Municipal waste	39.19	36.87	49.91	47.63	67.40	37.99	53.81
Solid biofuels	18.09 e	30.42	36.85	35.16	27.57	27.70	31.38
Biogases	-	20.29	18.89	45.66	79.91	62.79	65.64
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	2.48	1.07	0.55	1.05

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	75044	83419	83409	84016	86974	103772	88611	0.4
Hydro	73033	78619	66501	61496	63872	75439	61733	-1.5
<i>of which: pumped storage</i>	530	35	103	135	108	127	1	-19.9
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	1	9	35	47	97	143	36.4
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	6	457	3502	9842	11234	16268	15426	24.6
Industrial waste	-	101	61	58	41	37	44	-5.1
Municipal waste renew.	41	96	1716	1702	1626	1749	1263	17.5
Municipal waste non-renew.	62	143	1144	1135	1084	1166	842	11.7
Solid biofuels	1902	3970	10260	9609	9007	8977	9141	5.4
Biogases	-	32	36	20	14	11	9	-7.6
Liquid biofuels	-	-	180	119	49	28	10	-
of which:								
Electricity only plants	73039	79077	70012	71373	75153	91804	..	-
Hydro	73033	78619	66501	61496	63872	75439	..	-
<i>of which: pumped storage</i>	530	35	103	135	108	127	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	1	9	35	47	97	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	6	457	3502	9842	11234	16268	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	2005	4342	13397	12643	11821	11968	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	101	61	58	41	37	..	-
Municipal waste renew.	41	96	1716	1702	1626	1749	..	-
Municipal waste non-renew.	62	143	1144	1135	1084	1166	..	-
Solid biofuels	1902	3970	10260	9609	9007	8977	..	-
Biogases	-	32	36	20	14	11	..	-
Liquid biofuels	-	-	180	119	49	28	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	24534 e	90539	150349	141508	138671	143781	142794	2.9
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	508	527	698	570	510	-	-
Municipal waste renew.	4979	6663	19905	22551	24127	26499	27332	9.2
Municipal waste non-renew.	7569	9996	13286	15035	16086	17667	18222	3.8
Solid biofuels	11986 e	72330	109500	98535	95369	97063	96569	1.8
Biogases	-	1042	731	558	370	274	283	-7.8
Liquid biofuels	-	-	6400	4131	2149	1768	388	-
<i>of which:</i>								
CHP plants	8518 e	57787	103001	104017	103975	108648	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	489	527	698	570	510	..	-
Municipal waste renew.	1869	4388	15805	20623	22362	24080	..	-
Municipal waste non-renew.	2804	6583	10536	13749	14909	16054	..	-
Solid biofuels	3845 e	45738	74500	67330	65393	67591	..	-
Biogases	-	589	333	255	201	149	..	-
Liquid biofuels	-	-	1300	1362	540	264	..	-
Heat only plants	16016	32752	47348	37491	34696	35133	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	19	-	-	-	-	-	-
Municipal waste renew.	3110	2275	4100	1928	1765	2419	..	-
Municipal waste non-renew.	4765	3413	2750	1286	1177	1613	..	-
Solid biofuels	8141 e	26592	35000	31205	29976	29472	..	-
Biogases	-	453	398	303	169	125	..	-
Liquid biofuels	-	-	5100	2769	1609	1504	..	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	..	14967	11327	9297	9900	8543	5580	-6.0
Heat pumps ²	..	21283	15539	12687	14303	13975	7295	-6.5
(-) Input to heat pumps	-	6317	4212	3390	4403	5432	1715	-7.8
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	6477	1399	-	8	-	11	18	908
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	6477	1399	-	8	-	11	18	908
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-6476	-1399	-	-8	-	-	-	-
Autoproducer electricity plants	-1	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-18	-844
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-64
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	-	11	-	-
Industry	-	-	-	-	-	-	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	11	-	-
Residential	-	-	-	-	-	11	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	75312	16268	-	97	-	-	37	1749
Electricity plants	75312	16268	-	97	-	-	-	-
CHP plants	-	-	-	-	-	-	37	1749
Heat generated - TJ	-	-	-	-	-	-	510	26499
CHP plants	-	-	-	-	-	-	510	24080
Heat plants	-	-	-	-	-	-	-	2419

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
605	9127	-	167	94	130	52	18996	55.9%
-	-	-	-	145	763	-	908	2.8%
-	-	-	-	-78	-4	-	-82	0.5%
-	-	-	-	-	-9	-	-9	x
605	9127	-	167	162	881	52	19815	43.6%
-	-	-	-	1	8	-	9	x
-	-	-	-	-	-	-	-7883	x
-	-	-	-	-	-	-	-1	x
-562	-1805	-	-5	-	-	-9	-3243	x
-	-1167	-	-	-	-	-3	-1170	x
-43	-785	-	-3	-	-	-40	-935	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-17	-	-	-	-17	x
-	-	-	-	-	-	-	-	-
-	5370	-	142	162	889	-	6574	20.4%
-	4280	-	-	-	-	-	4280	38.8%
-	-	-	-	-	-	-	-	-
-	12	-	-	-	-	-	12	1.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	18	-	-	-	-	-	18	5.0%
-	3873	-	-	-	-	-	3873	66.6%
-	359	-	-	-	-	-	359	64.8%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	18	-	-	-	-	-	18	2.4%
-	-	-	97	162	889	-	1148	14.5%
-	-	-	97	162 e	889	-	1148	15.4%
-	-	-	-	-	-	-	-	-
-	1090	-	45	-	-	-	1146	9.9%
-	913	-	45	-	-	-	969	13.5%
-	40	-	-	-	-	-	40	1.0%
-	136	-	-	-	-	-	136	38.9%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
1166	8977	-	11	-	-	28	103645	64.0%
-	-	-	-	-	-	-	91677	61.9%
1166	8977	-	11	-	-	28	11968	86.2%
17667	97063	-	274	-	-	1768	143781	78.4%
16054	67591	-	149	-	-	264	108648	82.3%
1613	29472	-	125	-	-	1504	35133	68.4%

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solar thermal (TJ)								
Production	133	223	432	468	468	472	468	5.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	133	223	432	468	468	472	468	5.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	133	223	432	468	468	472	..	5.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	133	223	432	468	468	472	..	5.1
Industrial waste (TJ)								
Production	209	1061	868	1087	863	749	673	-2.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	209	1061	868	1087	863	749	673	-2.3
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	1061	868	1087	863	749	..	-2.3
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	209	-	-	-	-	-	..	-
<i>Industry</i>	209	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	5856 e	8347 e	31100	34339	35911	38032	37411	10.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	5856 e	8347 e	31100	34339	35911	38032	37411	10.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	5856	8347	31100	34339	35911	38032	..	10.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	8784 e	12522 e	20700	22894	23942	25355	24940	4.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	8784 e	12522 e	20700	22894	23942	25355	24940	4.8
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	8784	12522	20700	22894	23942	25355	..	4.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	215730	322717	397731	385664	373593	382196	373288	1.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	215730	322717	397731	385664	373593	382196	373288	1.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	21839	101281	179550	164926	156470	157338	..	3.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	193891	221436	218181	220738	217123	224858	..	0.1
<i>Industry</i>	153614	181457	177143	174713	171865	179234	..	-0.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	40277	39979	41038	46025	45258	45624	..	0.9
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	1342	4654	6070	6422	7009	7009	11.7
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	1342	4654	6070	6422	7009	7009	11.7
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	1342	1012	750	500	358	..	-8.4
Energy industry own use	-	-	-	677	696	713	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	3642	4643	5226	5938	..	-
<i>Industry</i>	-	-	-	38	22	-	..	-
<i>Transport</i>	-	-	885	3138	3498	4062	..	-
<i>Other</i>	-	-	2757	1467	1706	1876	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	316	168	134	147	171	-
Net imports ¹	-	-	-	113	125	105	61	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	316	281	259	252	232	-
Statistical differences	-	-	-	-	-1	1 e	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	316	281	258	253 e	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	316	281	258	253 e	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	198	244	177	145	109	-
Net imports ¹	-	-	-	269	590	848	1031	-
Stock changes	-	-	-	-	-	-10	-	-
Gross consumption	-	-	198	513	767	983	1140	-
Statistical differences	-	-	-	-	-	9	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	198	513	767 e	992	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	198	513	767 e	992	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	240	141	72	57	9	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	240	141	72	57	9	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	240	141	72	57	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

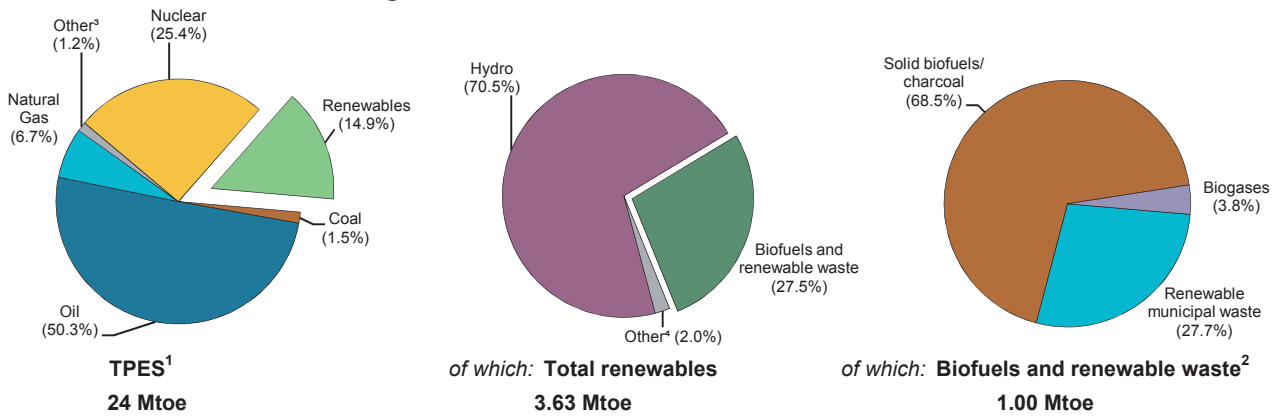


Figure 2. Contribution of renewables in 2016 provisional

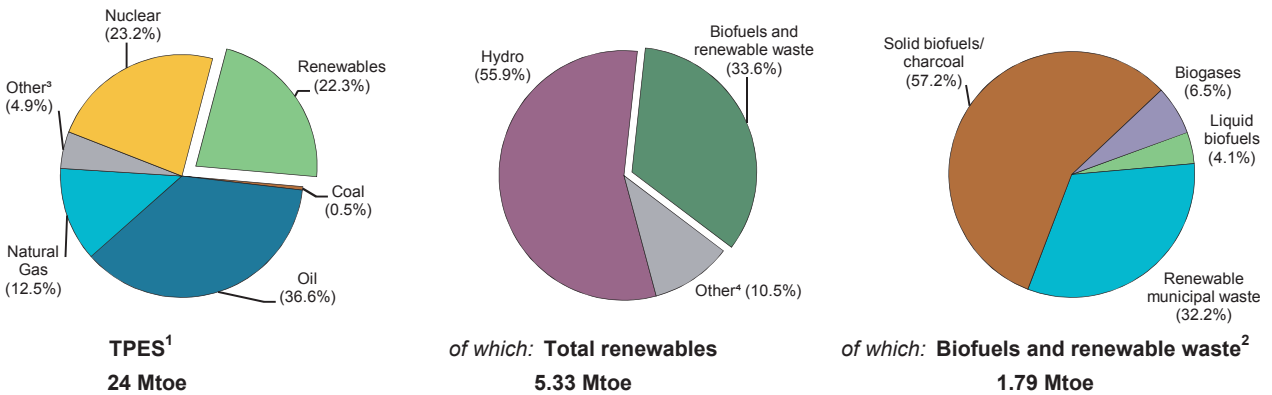
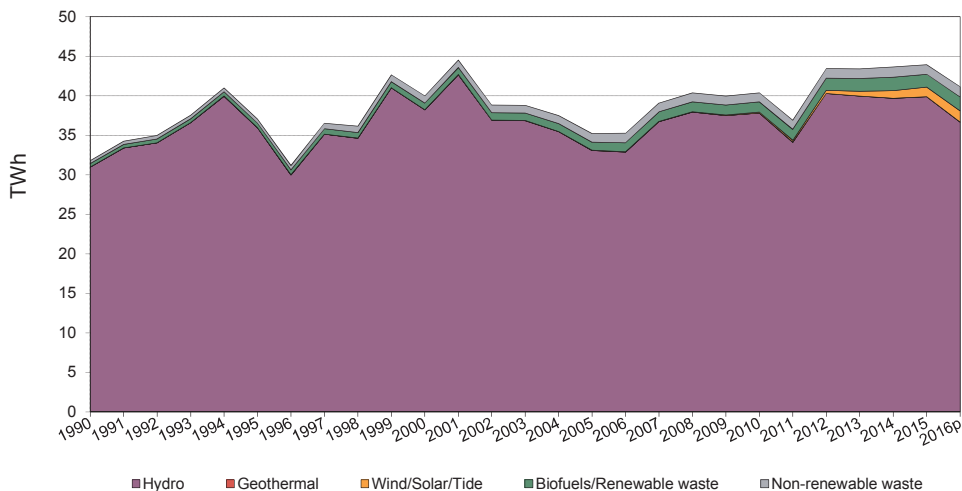


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	24.36	25.01	26.20	26.73	25.06	24.53	23.90	-0.3
of which: Renewables (Mtoe) ¹	3.63	4.43	4.98	5.42	5.29	5.46	5.33	1.2
Renewables/TPES(%)	14.9	17.7	19.0	20.3	21.1	22.3	22.3	1.4
GDP (billion 2010 US dollars)	429.00	483.40	581.21	608.54	620.70	625.92	633.98	1.7
TPES/GDP ²	0.06	0.05	0.05	0.04	0.04	0.04	0.04	-2.0
TPES/GDP (year 2010 = 100)	126	115	100	97	90	87	84	-2.0
Population (millions)	6.80	7.25	7.86	8.09	8.19	8.28	8.35	0.9
TPES/population (toe per capita)	3.58	3.45	3.33	3.30	3.06	2.96	2.86	-1.2
Electricity generation (TWh) ³	55.0	66.1	66.1	68.7	70.1	66.1	61.0	-0.5
of which: Renewables (TWh) ^{1,3}	30.24	37.69	37.47	40.68	40.67	41.11	37.80	0.0
Renew./Total Elec.(%) ^{1,4}	55.0	57.0	56.7	59.2	58.0	62.2	62.0	0.5
Road energy consumption (Mtoe)	4.8	5.5	5.7	5.6	5.6	5.4	..	..
of which: Liquid biofuels (Mtoe)	-	-	0.01	0.01	0.02	0.05	..	..
Liq. biofuels/road tr.(%) ⁵	-	-	0.2	0.2	0.3	0.8	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	11818	13565	14280	15064	15290	15720	1.0
Hydro	11665	13239	13723	13817	13743	13815	0.3
Hydro <1MW	115	125	143	156	173	180	2.5
Hydro 1-10MW	559	583	664	675	692	698	1.2
Hydro 10+MW	9224	10775	11077	11147	11039	11085	0.2
Mixed plants	1455	1440	1383	1383	1383	1383	-0.3
Pure pumped storage	312	316	456	456	456	469	2.7
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	2	16	125	756	1061	1394	34.7
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	3	42	60	60	60	22.1
Industrial waste	..	..	..	..	..	..	..
Municipal waste	148	274	358	398	394	422	2.9
Solid biofuels	..	..	..	..	..	..	..
Biogases	3	33	32	33	32	29	-0.9
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	97	445	1008	1385	1485	1566	8.7
Cap. of solar collectors (MW _{th}) ⁶	68	312	706	970	1040	1096	8.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	30.70	33.65	32.28	32.91	32.59	31.90	x
Hydro	30.32	32.96	31.46	33.02	32.98	32.95	32.12
<i>of which: <1MW</i>	-	-	-	-	-	-	-
<i>of which: 1-10MW</i>	-	-	-	-	-	-	-
<i>of which: 10+MW</i>	36.87	39.02	37.16	39.39	39.33	39.40	38.18
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	5.71	7.85	8.58	7.55	9.06	9.16	8.44
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	11.42	10.06	17.12	19.22	20.93	19.03
Industrial waste	..	..	..	..	..	..	-
Municipal waste	49.36	52.91	58.61	59.77	63.86	59.84	60.72
Solid biofuels	..	..	..	..	..	..	-
Biogases	x	51.63	74.56	97.20	103.81	119.67	98.46
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	31787	39990	40381	43422	43647	43924	41158	0.2
Hydro	30982	38230	37825	39968	39701	39881	36689	-0.3
<i>of which: pumped storage</i>	1187	1396	1764	1507	1665	1623	2066	2.5
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	1	11	94	500	842	1119	1300	34.8
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	3	37	90	101	110	108	25.1
Industrial waste	44	268	227	195	210	84	91	-6.5
Municipal waste renew.	320	635	919	1042	1102	1106	1203	4.1
Municipal waste non-renew.	320	635	919	1042	1102	1106	1203	4.1
Solid biofuels	40	59	151	304	298	214	233	9.0
Biogases	80	149	209	281	291	304	331	5.1
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
Electricity only plants	31209	38606	38076	40561	40646	41112	..	-
Hydro	30982	38230	37825	39968	39701	39881	..	-
<i>of which: pumped storage</i>	1187	1396	1764	1507	1665	1623	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	1	11	94	500	842	1119	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	3	37	90	101	110	..	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	103	159	58	-	-	-	-	-
Municipal waste non-renew.	103	159	58	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	20	44	4	3	2	2	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	578	1384	2305	2861	3001	2812	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	44	268	227	195	210	84	..	-
Municipal waste renew.	217	476	861	1042	1102	1106	..	-
Municipal waste non-renew.	217	476	861	1042	1102	1106	..	-
Solid biofuels	40	59	151	304	298	214	..	-
Biogases	60	105	205	278	289	302	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	5559	8658	13396	13975	13705	14976	15613	3.8
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	106	1225	1006	1014	1048	490	511	-5.3
Municipal waste renew.	2723	3659	5543	5602	5486	6106	6366	3.5
Municipal waste non-renew.	2723	3659	5543	5602	5486	6106	6366	3.5
Solid biofuels	7	65	1302	1757	1685	2274	2370	25.2
Biogases	-	50	2	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	5377	8308	13394	13975	13705	14976	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	106	1225	1006	1014	1048	490	..	-
Municipal waste renew.	2632	3509	5543	5602	5486	6106	..	-
Municipal waste non-renew.	2632	3509	5543	5602	5486	6106	..	-
Solid biofuels	7	65	1302	1757	1685	2274	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	182	350	2	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	91	150	-	-	-	-	-	-
Municipal waste non-renew.	91	150	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	50	2	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	51	94	59	36	62	68	1.7
Heat pumps ²	-	73	141	95	68	91	100	2.0
(-) Input to heat pumps	-	22	47	36	32	29	32	2.6
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	3290	9	-	96	344	56	244	554
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	3290	9	-	96	344	56	244	554
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-3043	-9	-	-	-	-	-	-
Autoproducer electricity plants	-248	-	-	-96	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-6	-
Autoproducer CHP plants	-	-	-	-	-	-	-15	-511
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	344	56	223	43
Industry	-	-	-	-	25	2	223	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	93	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallurgical minerals	-	-	-	-	-	-	109	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	3	-
Paper, pulp and print	-	-	-	-	-	-	15	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	25	2	3	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	319	55	-	43
Residential	-	-	-	-	277	46	-	-
Commercial and public services	-	-	-	-	41	9	-	43
Agriculture/forestry	-	-	-	-	1	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	38258	110	-	1119	-	-	84	1106
<i>Electricity plants</i>	38258	110	-	1119	-	-	-	-
<i>CHP plants</i>	-	-	-	-	-	-	84	1106
Heat generated - TJ	-	-	-	-	-	-	490	6106
<i>CHP plants</i>	-	-	-	-	-	-	490	6106
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/ wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
554	909	-	109	-	5	-	6170	50.5%
-	50	-	-	15	25	-	90	0.5%
-	-3	-	-	-	-	-	-3	0.1%
-	-	-	-	1	-	-	1	x
554	956	-	109	15	30	-	6257	25.5%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-3052	x
-	-	-	-	-	-	-	-344	x
-	-87	-	-	-	-	-	-93	x
-511	-31	-	-47	-	-	-	-1115	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-20	-	-	-	-20	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
43	838	-	42	15	30	-	1634	8.6%
-	222	-	11	-	-	-	483	13.5%
-	3	-	-	-	-	-	3	1.4%
-	-	-	-	-	-	-	93	13.3%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	109	24.3%
-	-	-	-	-	-	-	-	-
-	4	-	-	-	-	-	4	0.7%
-	-	-	-	-	-	-	-	-
-	1	-	-	-	-	-	4	0.8%
-	31	-	-	-	-	-	46	13.4%
-	-	-	-	-	-	-	-	-
-	67	-	-	-	-	-	67	35.4%
-	2	-	-	-	-	-	2	4.0%
-	115	-	11	-	-	-	156	30.2%
-	-	-	-	15	30	-	45	0.8%
-	-	-	-	15	30	-	45	0.8%
-	-	-	-	-	-	-	-	-
43	617	-	31	-	-	-	1108	12.1%
-	444	-	-	-	-	-	767	13.8%
43	159	-	27	-	-	-	322	9.7%
-	14	-	4	-	-	-	19	16.7%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
1106	214	-	304	-	-	-	42301	64.0%
-	-	-	2	-	-	-	39489	63.1%
1106	214	-	302	-	-	-	2812	80.2%
6106	2274	-	-	-	-	-	14976	73.5%
6106	2274	-	-	-	-	-	14976	88.6%
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	2871	4312	10848	13630	12616	14398	15910	8.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2871	4312	10848	13630	12616	14398	15910	8.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	2871	4312	10848	13630	12616	14398	..	8.4
<i>Industry</i>	206	309	784	985	912	1041	..	8.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	2665	4003	10064	12645	11704	13357	..	8.4
Solar thermal (TJ)								
Production	106	555	1451	2042	2212	2359	2500	10.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	106	555	1451	2042	2212	2359	2500	10.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	106	555	1451	2042	2212	2359	..	10.1
<i>Industry</i>	3	14	42	62	67	72	..	11.5
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	103	541	1409	1980	2145	2287	..	10.1
Industrial waste (TJ)								
Production	8680	10440	10050	10532	11864	10234	10810	-0.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	8680	10440	10050	10532	11864	10234	10810	-0.1
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	345	2465	2017	1920	2002	881	..	-6.6
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	8335	7975	8033	8612	9862	9353	..	1.1
<i>Industry</i>	8335	7975	8033	8612	9862	9353	..	1.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	11589	17560	22305	22110	22525	23215	24140	1.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	11589	17560	22305	22110	22525	23215	24140	1.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	11589	15788	19175	20272	20646	21416	..	2.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	1772	3130	1838	1879	1799	..	0.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	1772	3130	1838	1879	1799	..	0.1

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	11589	17560	22305	22110	22525	23215	24140	1.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	11589	17560	22305	22110	22525	23215	24140	1.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	11589	15788	19175	20272	20646	21416	..	2.1
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	1772	3130	1838	1879	1799	..	0.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	1772	3130	1838	1879	1799	..	0.1
Solid Biofuel excluding charcoal (TJ)								
Production	28370	28030	39410	42460	37020	38060	41230	2.1
Net imports ¹	270	-	590	1910	1480	1990	1620	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	28640	28030	40000	44370	38500	40050	42850	2.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	186	347	3576	6161	6041	4944	..	19.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	28454	27683	36424	38209	32459	35106	..	1.6
<i>Industry</i>	-	9428	9405	10104	8584	9284	..	-0.1
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	28454	18255	27019	28105	23875	25822	..	2.3
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	1603	2460	3143	4014	4354	4585	4842	4.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1603	2460	3143	4014	4354	4585	4842	4.2
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	486	1055	1524	2263	2588	2840	..	6.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	1117	1405	1619	1751	1766	1745	..	1.5
<i>Industry</i>	40	148	320	435	458	452	..	7.7
<i>Transport</i>	-	7	4	-	-	-	..	-
<i>Other</i>	1077	1250	1295	1316	1308	1293	..	0.2

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	3	1	6	23	31	-
Stock changes	-	-	-2	1	-	1	-1	-
Gross consumption	-	-	1	2	6	24	30	-
Statistical differences	-	-	1	1	1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	2	3	7	24	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	2	3	7	24	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	7	5	5	6	8	-
Net imports ¹	-	-	3	5	13	33	66	-
Stock changes	-	-	-	-	1	-	-2	-
Gross consumption	-	-	10	10	19	39	72	-
Statistical differences	-	-	-	1	-1	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	10	11	18	39	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	10	11	18	39	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

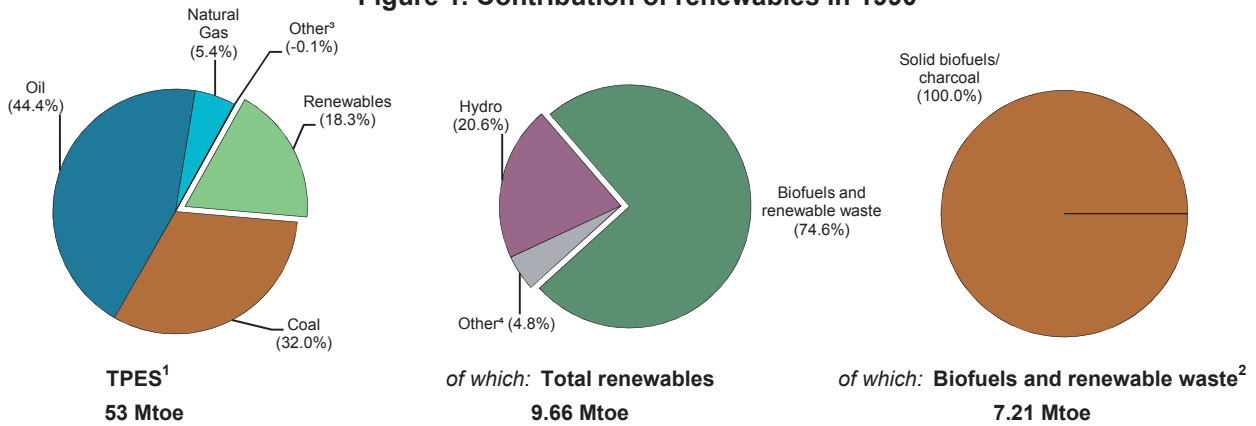


Figure 2. Contribution of renewables in 2016 provisional

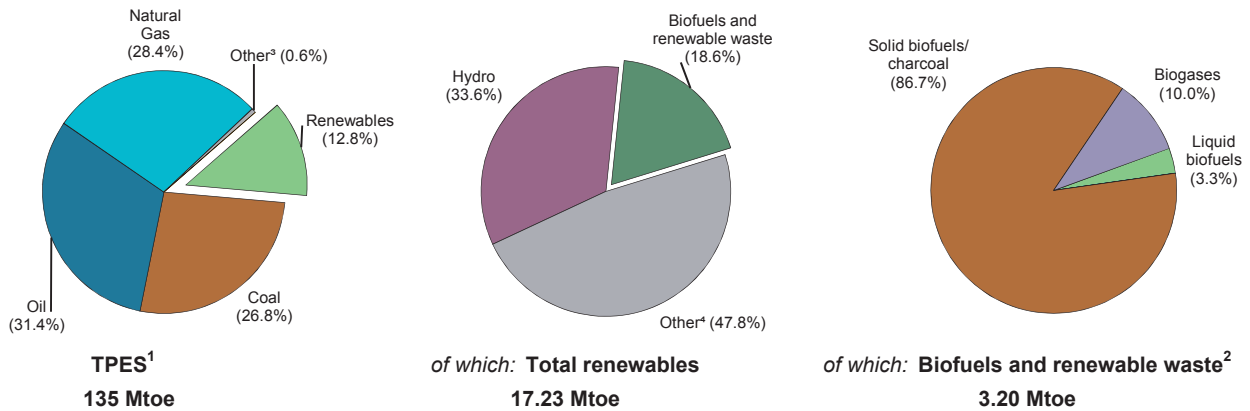
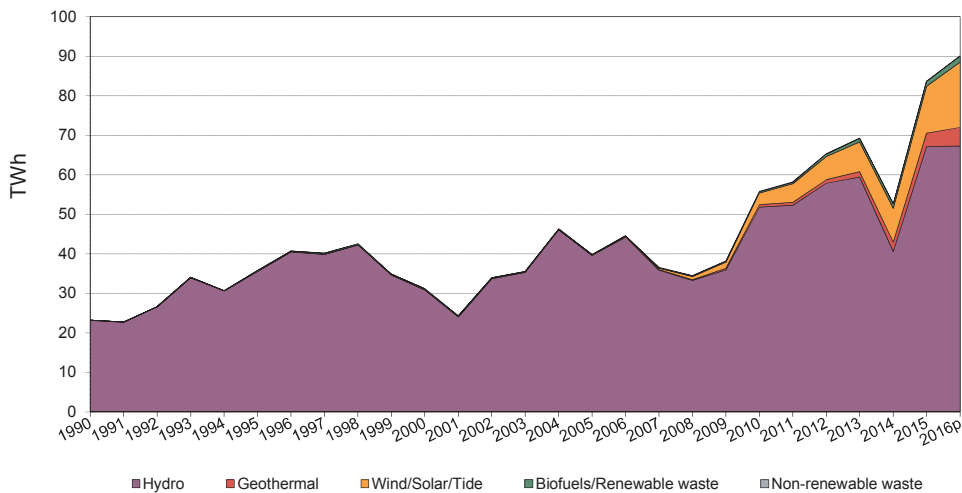


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	52.70	75.92	106.65	116.85	121.50	128.81	134.57	3.6
<i>of which: Renewables (Mtoe)</i> ¹	9.66	10.10	11.63	13.09	12.08	15.67	17.23	3.4
<i>Renewables/TPES(%)</i>	18.3	13.3	10.9	11.2	9.9	12.2	12.8	-0.2
GDP (billion 2010 US dollars)	363.95	520.93	771.88	975.06	1025.43	1087.55	1118.83	4.9
TPES/GDP ²	0.14	0.15	0.14	0.12	0.12	0.12	0.12	-1.2
TPES/GDP (year 2010 = 100)	105	105	100	87	86	86	87	-1.2
Population (millions)	55.12	64.25	73.00	75.77	76.62	77.45	78.25	1.2
TPES/population (toe per capita)	0.96	1.18	1.46	1.54	1.59	1.66	1.72	2.4
Electricity generation (TWh) ³	57.5	124.9	211.2	240.2	252.0	261.8	273.4	5.0
<i>of which: Renewables (TWh)</i> ^{1,3}	23.23	31.15	55.71	69.22	52.63	83.66	90.04	6.9
<i>Renew./Total Elec.(%)</i> ^{1,4}	40.4	24.9	26.4	28.8	20.9	32.0	32.9	1.8
Road energy consumption (Mtoe)	8.4	10.5	13.3	17.7	18.5	22.3	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	0.01	0.40	0.14	0.11	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	0.0	2.3	0.8	0.5	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	6782	11307	17390	25559	27966	31543	7.1
Hydro	6764	11175	15831	22289	23643	25868	5.8
<i>Hydro <1MW</i>	12	16	17	19	19	20	1.5
<i>Hydro 1-10MW</i>	72	136	436	967	1098	1180	15.5
<i>Hydro 10+MW</i>	6680	11023	15378	21303	22526	24668	5.5
<i>Mixed plants</i>	-	-	-	-	-	-	-
<i>Pure pumped storage</i>	-	-	-	-	-	-	-
Geothermal	18	18	94	311	405	624	26.7
Solar photovoltaic	-	-	-	-	40	249	-
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	-	19	1320	2760	3630	4503	44.0
Industrial waste	-	19	27	27	27	27	2.4
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	72	47	10	10	13	-10.8
Biogases	-	4	71	162	204	252	31.8
Liquid biofuels	-	-	-	-	7	7	-
Solar collectors surface (1000 m ²)	..	7700	12350	19300	19490	19690	6.5
<i>Cap. of solar collectors (MW_{th})</i> ⁶	..	5390	8645	13510	13643	13783	6.5

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	39.10	31.51	36.65	30.96	21.53	30.32	x
Hydro	39.07	31.54	37.35	30.43	19.62	29.63	29.65
<i>of which: <1MW</i>	-	22.12	38.18	38.24	27.28	37.27	34.45
<i>of which: 1-10MW</i>	1.59	26.27	31.52	33.41	21.84	33.83	30.27
<i>of which: 10+MW</i>	39.54	31.62	37.51	30.29	19.31	29.42	29.56
<i>of which: pure pumped storage²</i>	-	-	-	-	-	-	-
Geothermal	50.74	48.20	81.15	50.05	66.63	62.66	62.45
Solar photovoltaic	-	-	-	-	4.96	8.90	6.93
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	-	19.83	25.22	31.26	26.79	29.54	29.67
Industrial waste	-	32.44	52.65	42.93	44.12	46.19	48.20
Municipal waste	-	-	-	-	-	-	-
Solid biofuels	-	22.99	8.87	39.67	39.04	27.50	32.51
Biogases	-	59.93	47.66	59.46	58.53	54.74	52.59
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	3.91	2.30	3.11

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	23228	31208	55837	69323	52733	83767	90067	6.8
Hydro	23148	30879	51796	59420	40645	67146	67268	5.0
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	80	76	668	1364	2364	3425	4767	29.5
Solar photovoltaic	-	-	-	-	17	194	972	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	33	2916	7557	8520	11652	15492	46.9
Industrial waste	-	54	125	102	104	109	24	-4.9
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	145	36	35	34	31	74	-4.1
Biogases	-	21	296	845	1047	1209	1469	30.4
Liquid biofuels	-	-	-	-	2	1	1	-
of which:								
Electricity only plants	23228	31116	55798	69065	52347	83266	..	-
Hydro	23148	30879	51796	59420	40645	67146	..	-
<i>of which: pumped storage</i>	-	-	-	-	-	-	-	-
Geothermal	80	76	668	1364	2364	3425	..	-
Solar photovoltaic	-	-	-	-	17	194	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	-	33	2916	7557	8520	11652	..	-
Industrial waste	-	54	125	102	102	105	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	53	14	12	12	13	..	-
Biogases	-	21	279	610	685	730	..	-
Liquid biofuels	-	-	-	-	2	1	..	-
CHP plants	-	92	39	258	386	501	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	2	4	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	92	22	23	22	18	..	-
Biogases	-	-	17	235	362	479	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

TURKEY

Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	213	1499	2478	3597	3859	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	98	862	1549	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	865	920	27	-
Biogases	-	-	213	1499	1515	1815	2283	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	213	1499	2478	3597	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	98	862	..	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	865	920	..	-
Biogases	-	-	213	1499	1515	1815	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	3993	3252	4847	10974	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	3993	3252	4847	10974	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

TURKEY

Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	5775	1002	-	17	4834	827	59	-
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	5775	1002	-	17	4834	827	59	-
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-5775	-1002	-	-17	-2944	-	-32	-
Autoproducer electricity plants	-	-	-	-	-	-	-	-
Main activity CHP plants	-	-	-	-	-	-	-28	-
Autoproducer CHP plants	-	-	-	-	-	-	-	-
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	1890	827	-	-
Industry	-	-	-	-	-	283	-	-
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	283	-	-
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	1890	544	-	-
Residential	-	-	-	-	1310	544	-	-
Commercial and public services	-	-	-	-	-	-	-	-
Agriculture/forestry	-	-	-	-	580	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	67146	11652	-	194	3425	-	109	-
<i>Electricity plants</i>	67146	11652	-	194	3425	-	105	-
<i>CHP plants</i>	-	-	-	-	-	-	4	-
Heat generated - TJ	-	-	-	-	-	-	862	-
<i>CHP plants</i>	-	-	-	-	-	-	862	-
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

TURKEY

Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	18137	28623	82317	110363	147528	202416	251239	13.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	18137	28623	82317	110363	147528	202416	251239	13.9
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	2880	2736	24060	49111	85103	123286	..	28.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	15257	25887	58257	61252	62425	79130	..	7.7
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	15257	25887	58257	61252	62425	79130	..	7.7
Solar thermal (TJ)								
Production	1172	10967	18087	33284	33620	34647	34622	8.0
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1172	10967	18087	33284	33620	34647	34622	8.0
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	1172	10967	18087	33284	33620	34647	..	8.0
<i>Industry</i>	335	4060	5426	11597	11723	11848	..	7.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	837	6907	12661	21687	21897	22799	..	8.3
Industrial waste (TJ)								
Production	-	648 e	1496	1215	1403	2489	2079	9.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	648 e	1496	1215	1403	2489	2079	9.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	648 e	1496	1215	1403	2489	..	9.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Solid Biofuel excluding charcoal (TJ)								
Production	301722	271875 e	186289	137976	131978	118943	116241	-5.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	301722	271875 e	186289	137976	131978	118943	116241	-5.4
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	1585	603	588	1559	1545	..	-0.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	301722	270290	185686	137388	130419	117398	..	-5.4
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	301722	270290	185686	137388	130419	117398	..	-5.4
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	-	209	2846	8511	9741	11329	13400	30.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	209	2846	8511	9741	11329	13400	30.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	209	2846	8511	9741	11329	..	30.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

TURKEY

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	-	36	55	67	72	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	36	55	67	72	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	36	55	67	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	36	55	67	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	7	22	36	69	64	-
Net imports ¹	-	-	-	375	80	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	7	397	116	69	64	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	7	397	116	69	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	7	397	116	69	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

UNITED KINGDOM

Figure 1. Contribution of renewables in 1990

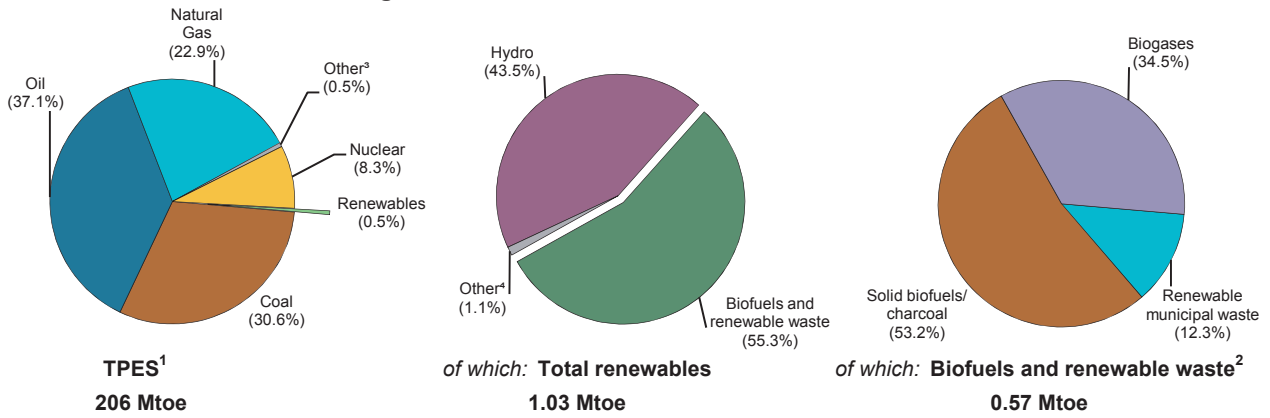


Figure 2. Contribution of renewables in 2016 provisional

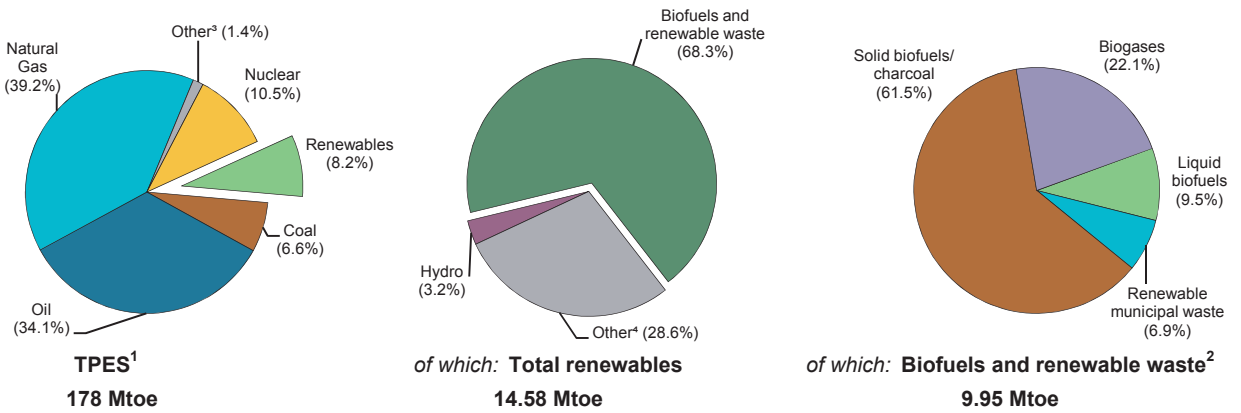
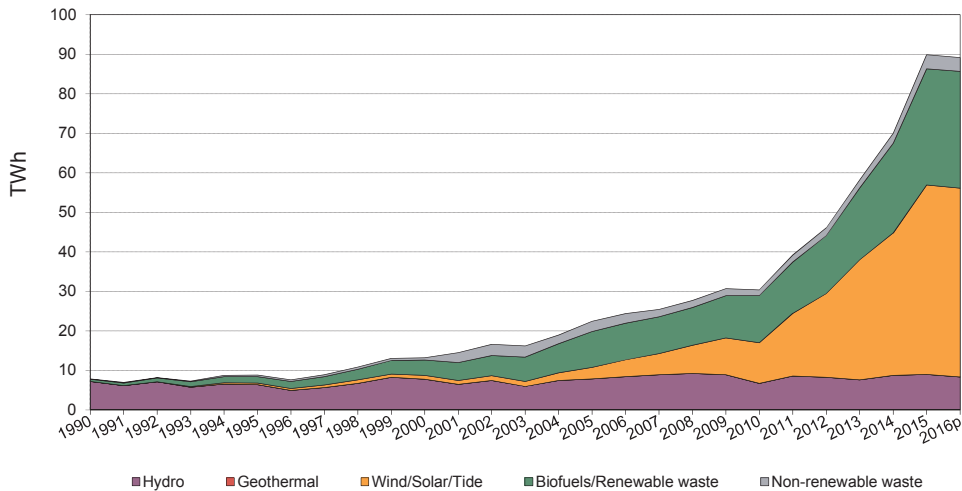


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.
Source: IEA/OECD Renewables Statistics, World Energy Balances.

UNITED KINGDOM

Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	205.92	222.95	203.78	190.99	179.89	180.75	177.68	-1.4
<i>of which: Renewables (Mtoe)</i> ¹	1.03	2.26	7.28	10.63	12.36	14.74	14.58	12.3
<i>Renewables/TPES(%)</i>	0.5	1.0	3.6	5.6	6.9	8.2	8.2	14.0
GDP (billion 2010 US dollars)	1638.92	2076.02	2429.68	2546.48	2624.67	2682.26	2730.71	1.7
TPES/GDP ²	0.13	0.11	0.08	0.08	0.07	0.07	0.07	-3.1
TPES/GDP (year 2010 = 100)	150	128	100	89	82	80	78	-3.1
Population (millions)	57.24	58.89	62.76	64.11	64.60	65.11	65.57	0.7
TPES/population (toe per capita)	3.60	3.79	3.25	2.98	2.78	2.78	2.71	-2.1
Electricity generation (TWh) ³	317.8	374.4	378.5	355.5	335.3	336.4	335.6	-0.7
<i>of which: Renewables (TWh)</i> ^{1,3}	5.81	9.97	25.79	53.28	64.59	83.55	82.76	14.1
<i>Renew./Total Elec.(%)</i> ^{1,4}	1.8	2.7	6.8	15.0	19.3	24.8	24.7	14.9
Road energy consumption (Mtoe)	36.4	38.9	37.7	36.7	37.3	37.8	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	-	1.15	1.02	1.17	0.93	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	-	3.1	2.8	3.1	2.5	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	4028	5473	12145	22504	27407	33133	12.8
Hydro	3897	4273	4386	4453	4472	4503	0.4
<i>Hydro <1MW</i>	-	26	74	120	139	170	13.3
<i>Hydro 1-10MW</i>	26	40	177	180	180	180	10.5
<i>Hydro 10+MW</i>	1084	1419	1391	1409	1409	1409	-0.0
<i>Mixed plants</i>	300	300	300	300	300	300	-
<i>Pure pumped storage</i>	2487	2488	2444	2444	2444	2444	-0.1
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	2	96	2873	5424	9187	75.4
Solar thermal	-	-	-	-	-	-	-
Tide, wave, ocean	-	1	1	3	3	4	9.7
Wind	10	412	5401	11212	13037	14291	26.7
Industrial waste	-	-	-	-	-	-	-
Municipal waste	31	184	424	545	681	925	11.4
Solid biofuels	-	133	676	2085	2355	2735	22.3
Biogases	90	468	1161	1333	1435	1488	8.0
Liquid biofuels	-	-	-	-	-	-	-
Solar collectors surface (1000 m ²)	205	396	1038	1307	1352	1383	8.7
<i>Cap. of solar collectors (MW_{th})</i> ⁶	144	277	727	915	946	968	8.7

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

UNITED KINGDOM

Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	22.32	27.50	28.58	29.50	29.16	30.96	x
Hydro	21.06	20.78	17.48	19.50	22.40	22.89	21.63
<i>of which: <1MW</i>	-	9.22	28.70	32.79	37.26	37.68	33.87
<i>of which: 1-10MW</i>	-	55.08	28.17	36.21	42.77	46.15	42.93
<i>of which: 10+MW</i>	54.83	39.19	24.14	30.69	38.60	40.51	36.58
<i>of which: pure pumped storage²</i>	x	x	x	x	x	x	x
Geothermal	-	-	-	-	-	-	-
Solar photovoltaic	-	5.71	4.88	7.98	8.50	9.39	7.49
Solar thermal	-	-	-	-	-	-	-
Tide, wave and ocean	-	-	20.99	22.40	8.45	5.70	12.17
Wind	10.27	26.24	21.67	28.91	27.99	32.20	28.43
Industrial waste	-	-	-	-	-	-	-
Municipal waste	82.12	84.31	67.75	65.57	64.47	68.69	65.59
Solid biofuels	-	46.43	76.88	54.02	67.14	81.05	58.26
Biogases	57.71	62.32	57.42	56.94	54.98	55.16	55.93
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	-	-	-	-	-

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	7876	13183	30412	58161	70004	89873	89154	12.7
Hydro	7189	7780	6715	7608	8776	9028	8327	0.4
<i>of which: pumped storage</i>	1982	2694	3150	2904	2883	2739	2959	0.6
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	1	41	2008	4040	7561	10292	78.1
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	2	6	2	2	-	-
Wind	9	947	10255	28396	31966	40310	37507	25.9
Industrial waste	-	-	490	496	611	799	879	-
Municipal waste renew.	140	840	1530	1650	1923	2782	2558	7.2
Municipal waste non-renew.	83	519	987	1481	1923	2784	2560	10.5
Solid biofuels	-	541	4553	9867	13852	19418	19587	25.1
Biogases	455	2555	5839	6649	6911	7189	7444	6.9
Liquid biofuels	-	-	-	-	-	-	-	-
of which:								
Electricity only plants	7560	12761	28828	56220	67677	87711	..	-
Hydro	7189	7780	6715	7608	8776	9028	..	-
<i>of which: pumped storage</i>	1982	2694	3150	2904	2883	2739	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar photovoltaic	-	1	41	2008	4040	7561	..	-
Solar thermal	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	2	6	2	2	..	-
Wind	9	947	10255	28396	31966	40310	..	-
Industrial waste	-	-	176	335	384	613	..	-
Municipal waste renew.	140	804	1107	1035	1209	2174	..	-
Municipal waste non-renew.	83	500	714	929	1209	2176	..	-
Solid biofuels	-	541	4553	9867	13852	19418	..	-
Biogases	139	2188	5265	6036	6239	6429	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
CHP plants	316	422	1584	1941	2327	2162	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	314	161	227	186	..	-
Municipal waste renew.	-	36	423	615	714	608	..	-
Municipal waste non-renew.	-	19	273	552	714	608	..	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	316	367	574	613	672	760	..	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	972	565	1167	1446	1446	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	188	495	629	629	-
Municipal waste non-renew.	-	-	933	199	529	660	660	-
Solid biofuels	-	-	39	178	143	157	157	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	972	565	1167	1446	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	188	495	629	..	-
Municipal waste non-renew.	-	-	933	199	529	660	..	-
Solid biofuels	-	-	39	178	143	157	..	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	541	3467	-	650	1	51	179	749
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	541	3467	-	650	1	51	179	749
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-422	-2860	-	-121	-	-	-	-166
Autoproducer electricity plants	-119	-607	-	-529	-	-	-149	-387
Main activity CHP plants	-	-	-	-	-	-	-	-
Autoproducer CHP plants	-	-	-	-	-	-	-29	-140
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-24
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	1	51	-	32
Industry	-	-	-	-	-	-	-	18
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	-	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	-	-
Paper, pulp and print	-	-	-	-	-	-	-	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	18
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	1	51	-	14
Residential	-	-	-	-	-	-	-	6
Commercial and public services	-	-	-	-	1	-	-	7
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	51	-	-
Electricity generated - GWh	6289	40310	2	7561	-	-	799	2782
<i>Electricity plants</i>	6289	40310	2	7561	-	-	613	2174
<i>CHP plants</i>	-	-	-	-	-	-	186	608
Heat generated - TJ	-	-	-	-	-	-	-	629
<i>CHP plants</i>	-	-	-	-	-	-	-	-
<i>Heat plants</i>	-	-	-	-	-	-	-	629

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	33	33	33	33	33	33	33	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	33	33	33	33	33	33	33	-
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	33	33	33	33	33	33	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	33	33	33	33	33	33	..	-
Solar thermal (TJ)								
Production	428	469	1640	2005	2075	2122	2122	10.6
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	428	469	1640	2005	2075	2122	2122	10.6
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	428	469	1640	2005	2075	2122	..	10.6
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	428	469	1640	2005	2075	2122	..	10.6
Industrial waste (TJ)								
Production	676	1472	2439	4379	8556	7485	8234	11.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	676	1472	2439	4379	8556	7485	8234	11.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	-	-	2439	4379	8556	7485	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	676 e	1472	-	-	-	-	..	-
<i>Industry</i>	398	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	278	1472	-	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	2933	11055	18660	17871	21845	31354	28829	7.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2933	11055	18660	17871	21845	31354	28829	7.2
Statistical differences	-	-	-1	-	1	-	..	-
Transformation processes	2033	10266	17839	16983	21157	30004	..	7.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	900	789	820	888	689	1350	..	3.6
<i>Industry</i>	-	92	68	55	38	772	..	15.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	900	697	752	833	651	578	..	-1.2

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	1747	6441	17061	21381	27506	36094	33190	12.2
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	1747	6441	17061	21381	27506	36094	33190	12.2
Statistical differences	-	-	-1	-7	-24	-30	..	..
Transformation processes	1211	6028	13300	15543	21462	30303	..	11.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	536	413	3760	5831	6020	5761	..	19.2
<i>Industry</i>	-	54	1986	3501	3787	3708	..	32.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	536	359	1774	2330	2233	2053	..	12.3
Solid Biofuel excluding charcoal (TJ)								
Production	12685	27588	82035	120735	132513	160086	160086	12.4
Net imports ¹	-	-	29316	50098	72009	95181	96085	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	12685	27588	111351	170833	204522	255267	256171	16.0
Statistical differences	-	-	-	-	-1	-	..	..
Transformation processes	-	6742	47128	81666	112691	146795	..	22.8
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	12685	20846	64223	89167	91830	108472	..	11.6
<i>Industry</i>	2386	11137	13473	18690	23367	33806	..	7.7
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	10299	9709	50750	70477	68463	74666	..	14.6
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	..
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	8222	33912	74933	85309	89145	94303	92139	7.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	8222	33912	74933	85309	89145	94303	92139	7.1
Statistical differences	-	-	1	-	1	1	..	..
Transformation processes	5622	31575	72063	81556	84555	87663	..	7.0
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	..
Final energy consumption	2600	2337	2871	3753	4591	6641	..	7.2
<i>Industry</i>	1281	528	528	528	528	528	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	1319	1809	2343	3225	4063	6113	..	8.5

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	-	223	416	410	264	264	-
Net imports ¹	-	-	278	252	249	376	344	-
Stock changes	-	-	-	-17	-13	-9	-5	
Gross consumption	-	-	501	651	646	631	603	-
Statistical differences	-	-	-	1	-	-	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	501	652	646	631	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	501	652	646	631	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biodiesel (kt)								
Production	-	-	155	267	143	149	149	-
Net imports ¹	-	-	779	458	746	427	446	-
Stock changes	-	-	-	-43	-39	20	36	
Gross consumption	-	-	934	682	850	596	631	-
Statistical differences	-	-	-	-	-1	-1	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	934	682	849	595	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	934	682	849	595	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Other liquid biofuels (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	..	
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Figure 1. Contribution of renewables in 1990

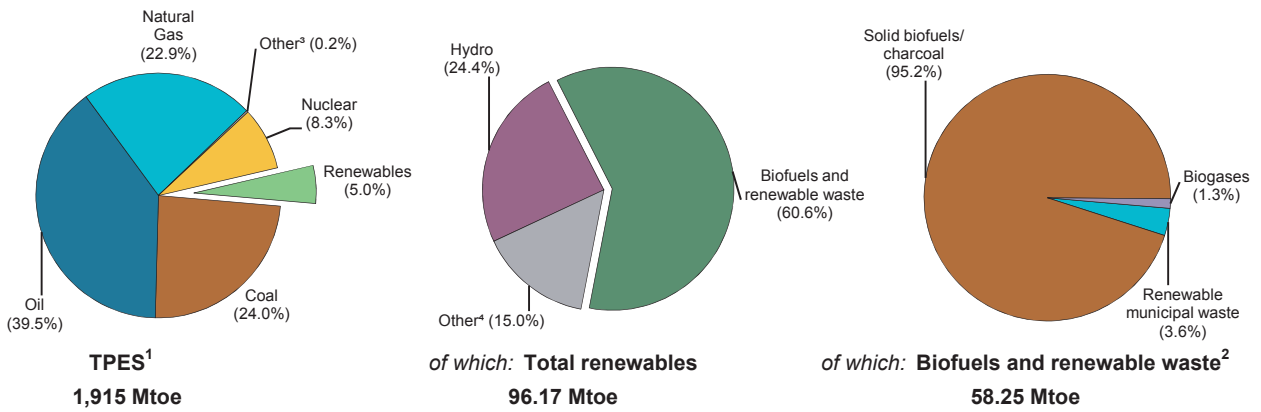


Figure 2. Contribution of renewables in 2016 provisional

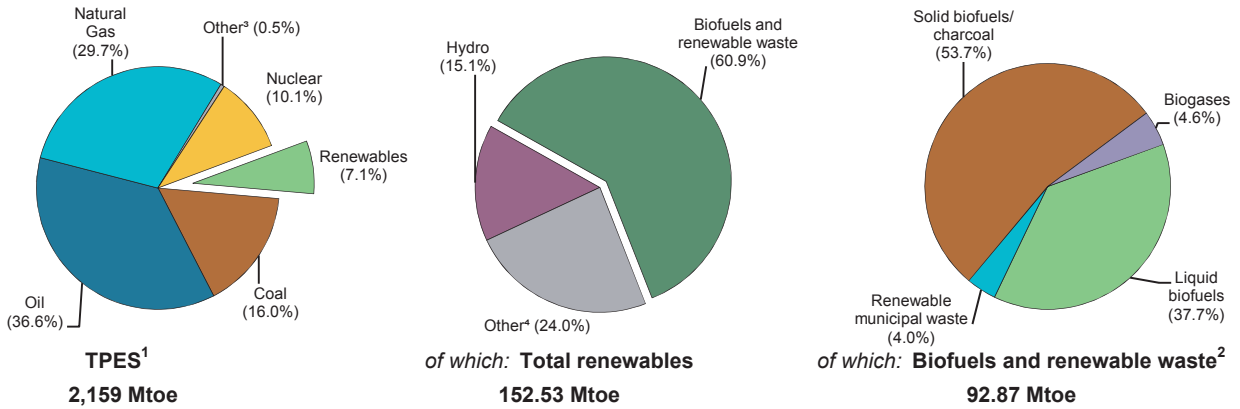
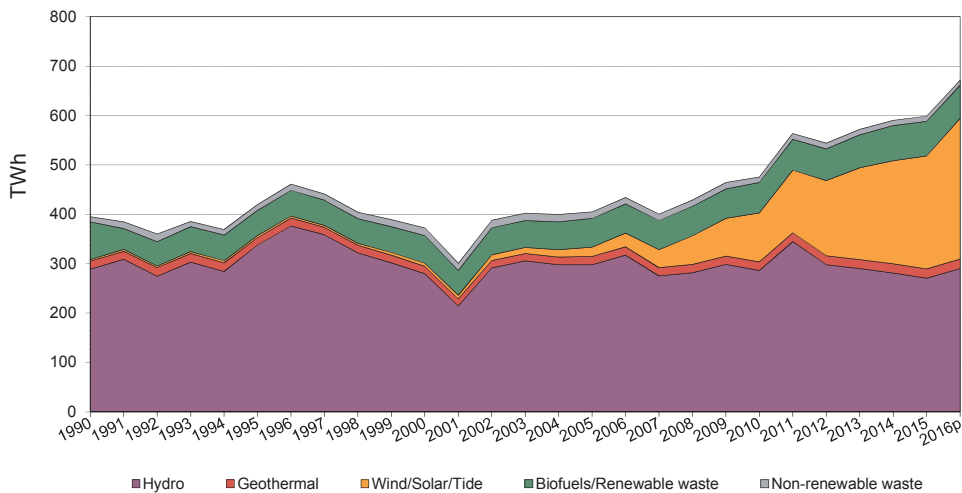


Figure 3. Electricity production by renewables and waste energy source



1. Total primary energy supply includes electricity trade.
2. Biofuels and renewable waste include solid biofuels, liquid biofuels, biogases, and renewable municipal waste.
3. Includes non-renewable municipal waste, industrial waste, peat, shale oil, electricity trade, and other sources of primary energy. (In the case of negative values, the net exports of electricity are greater than the other products in this category).
4. Includes geothermal, solar, wind and tide.

Note: Totals may not sum due to rounding.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 1. Energy supply, GDP and population

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
TPES (Mtoe)	1915.05	2273.34	2215.22	2179.31	2216.81	2188.28	2158.99	-0.3
<i>of which: Renewables (Mtoe)</i> ¹	96.17	101.96	125.26	144.88	149.52	147.05	152.53	2.5
<i>Renewables/TPES(%)</i>	5.0	4.5	5.7	6.6	6.7	6.7	7.1	2.9
GDP (billion 2010 US dollars)	9064.41	12713.06	14964.37	15802.86	16177.46	16597.45	16865.60	1.8
TPES/GDP ²	0.21	0.18	0.15	0.14	0.14	0.13	0.13	-2.1
TPES/GDP (year 2010 = 100)	143	121	100	93	93	89	86	-2.1
Population (millions)	250.18	282.40	309.81	316.80	319.23	321.70	324.24	0.9
TPES/population (toe per capita)	7.65	8.05	7.15	6.88	6.94	6.80	6.66	-1.2
Electricity generation (TWh) ³	3202.8	4025.9	4354.4	4287.1	4319.2	4297.0	4297.3	0.4
<i>of which: Renewables (TWh)</i> ^{1,3}	369.24	330.36	440.68	541.80	559.50	568.44	639.13	4.2
<i>Renew./Total Elec.(%)</i> ^{1,4}	11.5	8.2	10.1	12.6	13.0	13.2	14.9	3.8
Road energy consumption (Mtoe)	391.4	490.7	516.9	516.6	528.9	538.7	..	..
<i>of which: Liquid biofuels (Mtoe)</i>	-	3.19	24.19	30.53	30.98	32.88	..	..
<i>Liq. biofuels/road tr.(%)</i> ⁵	-	0.6	4.7	5.9	5.9	6.1	-	-

1. Renewables do not include industrial waste, non-renewable municipal waste and pumped storage production.

2. In units of toe per thousand 2010 US dollars.

3. Electricity generation = gross production - amount of electricity produced in pumped storage plants.

4. Electricity share generated from renewables over the total electricity production.

5. Energy from liquid biofuels consumed in road transport over the total energy consumed in road transport.

Source: IEA/OECD Renewables Statistics, World Energy Balances and OECD Main Economic Indicators.

Table 2. Net generating capacity of renewable and waste sources (MWe)

	1990	2000	2010	2013	2014	2015	Average annual percent change 00-15
Total capacity	108105 e	114920	157859	191190	199572	215082	4.3
Hydro	92360	98881	101024	101589	102162	102239	0.2
<i>Hydro <1MW</i>	-	630	38	39	32	33	-17.8
<i>Hydro 1-10MW</i>	-	5602	2790	2859	2920	2907	-4.3
<i>Hydro 10+MW</i>	-	73127	67376	67674	68095	68095	-0.5
<i>Mixed plants</i>	-	-	12308	12331	12339	12339	-
<i>Pure pumped storage</i>	-	19522	18511	18686	18776	18866	-0.2
Geothermal	2669	2793	2405	2607	2514	2542	-0.6
Solar photovoltaic	..	176 e	2909 e	11759 e	14878 e	21684 e	37.8
Solar thermal	339	419	473	1286	1667	1758	10.0
Tide, wave, ocean	-	-	-	-	-	-	-
Wind	1911	2377	39135	59973	64232	72573	25.6
Industrial waste	538 e	638	513	578	585	193	-7.7
Municipal waste	2001 e	2627	2220	2228	2230	2248	-1.0
Solid biofuels	7958 e	6129	7361	8744	8755	9320	2.8
Biogases	329 e	880	1636	2271	2394	2370	6.8
Liquid biofuels	-	-	183	155	155	155	-
Solar collectors surface (1000 m ²)	18530	19395	25566 e	28785 e	29840 e	30827 e	3.1
<i>Cap. of solar collectors (MW_{th})</i> ⁶	12971	13577	17896 e	20150 e	20888 e	21579 e	3.1

6. Converted at 0.7 kW_{th}/m² of solar collector area, as estimated by the IEA Solar Heating & Cooling Programme.

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Table 3. Capacity factors (%)

	1990	2000	2010	2013	2014	2015	Average ³
Total plants¹	41.72 e	37.02 e	34.39 e	34.17 e	33.78 e	31.79 e	x
Hydro	35.71	32.32	32.36	32.60	31.46	30.27	33.40
<i>of which: <1MW</i>	-	43.38	91.85	98.68	81.28	72.12	90.74
<i>of which: 1-10MW</i>	-	24.52	49.80	45.21	43.25	40.76	45.82
<i>of which: 10+MW</i>	-	37.27	42.32	43.72	41.94	40.31	44.72
<i>of which: pure pumped storage²</i>	-	15.66	x	x	x	x	x
Geothermal	68.48	59.76	83.43	80.67	84.96	84.10	82.83
Solar photovoltaic	..	11.84 e	12.02 e	14.42 e	16.81 e	16.89 e	14.55
Solar thermal	22.33	14.33	21.20	9.00	18.41	23.01	19.00
Tide, wave and ocean	-	-	-	-	-	-	-
Wind	18.32	27.13	27.75	32.30	32.68	30.36	30.59
Industrial waste	99.94 e	128.29	78.92	62.03	55.03	136.25	96.65
Municipal waste	60.55 e	72.69	85.47	84.60	84.93	83.91	85.50
Solid biofuels	98.33 e	79.32	65.97	59.45	63.32	58.48	62.26
Biogases	86.54 e	67.84	68.42	64.29	64.78	65.86	65.13
Biodiesels	-	-	-	-	-	-	-
Other liquid biofuels	-	-	5.89	14.19	15.29	16.45	13.57

1. The capacity factor is defined as: the annual gross electricity generation divided by the reported net capacity times 365 (days/year) times 24 (hours/day).

2. In case country has at least one mixed hydro plants, it is impossible to calculate capacity factor thus it is shown as 'not applicable'.

3. Average means 5 year average where data are available. Otherwise, most recent available data within 5 years are used to calculate the value.

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Table 4. Gross electricity production from renewable and waste sources (GWh)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total electricity¹	395066	372679	475605	572291	590501	598949	671354	3.7
Hydro	288960	279986	286333	290113	281527	271129	290248	0.2
<i>of which: pumped storage</i>	<i>15808</i>	<i>26782</i>	<i>24067</i>	<i>19257</i>	<i>20054</i>	<i>20111</i>	<i>22443</i>	<i>-1.1</i>
Geothermal	16012	14621	17577	18422	18710	18727	19244	1.7
Solar photovoltaic	3	183	3063	14858	21915	32091	50103	42.0
Solar thermal	663	526	879	1014	2688	3544	5533	15.8
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	3066	5650	95148	169713	183892	192992	229299	26.0
Industrial waste	4710	7170	3547	3141	2821	2303	1665	-8.7
Municipal waste renew.	5306	8364	9308	8420	8461	8427	8393	0.0
Municipal waste non-renew.	5307	8363	7315	8091	8130	8096	8118	-0.2
Solid biofuels	68545	42586	42536	45535	48563	47743	45273	0.4
Biogases	2494	5230	9805	12791	13586	13674	13260	6.0
Liquid biofuels	-	-	94	193	208	223	218	-
of which:								
Electricity only plants	333179	330831	438453	534336	551840	560902	..	-
Hydro	288960	279986	286333	290113	281527	271129	..	-
<i>of which: pumped storage</i>	<i>15808</i>	<i>26782</i>	<i>24067</i>	<i>19257</i>	<i>20054</i>	<i>20111</i>	..	-
Geothermal	16012	14621	17577	18422	18710	18727	..	-
Solar photovoltaic	3	183	3063	14858	21915	32091	..	-
Solar thermal	663	526	879	1014	2688	3544	..	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind	3066	5650	95148	169713	183892	192992	..	-
Industrial waste	749	923	822	851	788	736	..	-
Municipal waste renew.	4846	7263	8343	7646	7576	7528	..	-
Municipal waste non-renew.	4847	7262	6556	7346	7279	7233	..	-
Solid biofuels	11539	10512	11173	12908	15285	14652	..	-
Biogases	2494	3905	8550	11425	12130	12206	..	-
Liquid biofuels	-	-	9	40	50	64	..	-
CHP plants	61887	41848	37152	37955	38661	38047	..	-
Geothermal	-	-	-	-	-	-	-	-
Industrial waste	3961	6247	2725	2290	2033	1567	..	-
Municipal waste renew.	460	1101	965	774	885	899	..	-
Municipal waste non-renew.	460	1101	759	745	851	863	..	-
Solid biofuels	57006	32074	31363	32627	33278	33091	..	-
Biogases	-	1325	1255	1366	1456	1468	..	-
Liquid biofuels	-	-	85	153	158	159	..	-

1. **Total electricity** includes the electricity produced from industrial waste, non-renewable municipal waste and pumped storage. Electricity from renewable sources does *not* include the electricity produced from industrial waste, non-renewable municipal waste and pumped storage production.

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Table 5A. Heat production¹ from renewable and waste sources in the transformation sector (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	27118	44006	41842	46552	43835	44936	3.2
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	187	3807	4904	4938	4300	5319	23.3
Municipal waste renew.	-	7626	6363	4373	5423	5481	5612	-1.9
Municipal waste non-renew.	-	7625	4999	4201	5210	5266	5426	-2.1
Solid biofuels	-	9489	26954	27494	29987	27400	26165	6.5
Biogases	-	2191	1883	870	994	1388	2414	0.6
Liquid biofuels	-	-	-	-	-	-	-	-
<i>of which:</i>								
CHP plants	-	27118	44006	41842	46552	43835	..	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	187	3807	4904	4938	4300	..	-
Municipal waste renew.	-	7626	6363	4373	5423	5481	..	-
Municipal waste non-renew.	-	7625	4999	4201	5210	5266	..	-
Solid biofuels	-	9489	26954	27494	29987	27400	..	-
Biogases	-	2191	1883	870	994	1388	..	-
Liquid biofuels	-	-	-	-	-	-	-	-
Heat only plants	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar thermal	-	-	-	-	-	-	-	-
Industrial waste	-	-	-	-	-	-	-	-
Municipal waste renew.	-	-	-	-	-	-	-	-
Municipal waste non-renew.	-	-	-	-	-	-	-	-
Solid biofuels	-	-	-	-	-	-	-	-
Biogases	-	-	-	-	-	-	-	-
Liquid biofuels	-	-	-	-	-	-	-	-

1. Waste heat and heat production from heat pumps are not included and are reported separately in Table 5B.

Source: IEA/OECD Renewables Statistics

Table 5B. Heat production from heat pumps and waste heat (TJ)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-16
Total heat	-	-	-	-	-	-	-	-
Heat pumps ²	-	-	-	-	-	-	-	-
(-) Input to heat pumps	-	-	-	-	-	-	-	-
Other sources ³	-	-	-	-	-	-	-	-

2. Installations producing heat for own use are not included.

3. Refers to production from hydrogen, purchased steam from industry, and waste heat.

Source: IEA/OECD Electricity Statistics

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Table 6. Renewable and waste balance for 2015

thousand tonnes of oil equivalent	Hydro ¹	Wind	Tide wave ocean	Solar PV	Geo-thermal	Solar thermal	Industrial waste	Mun. waste renew.
Production	21588	16597	-	2760 e	8991	3008	1210	3584
Imports	-	-	-	-	-	-	-	-
Exports	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
TPES	21588	16597	-	2760 e	8991	3008	1210	3584
Statistical differences	-	-	-	-	-	-	-	-
Main activity electricity plants	-21463	-16582	-	-1850	-8721 e	-720	-182	-2573
Autoproducer electricity plants	-125	-16	-	-910 e	-	-	-208	-385
Main activity CHP plants	-	-	-	-	-	-	-236	-279
Autoproducer CHP plants	-	-	-	-	-	-	-174	-73
Main heat plants	-	-	-	-	-	-	-	-
Autoproducer heat plants	-	-	-	-	-	-	-	-
Charcoal production plants	-	-	-	-	-	-	-	-
Other transformation	-	-	-	-	-	-	-	-
Energy Industry own use	-	-	-	-	-	-	-	-
Losses	-	-	-	-	-	-	-	-
TFC	-	-	-	-	269	2289	411	274
Industry	-	-	-	-	-	-	411	40
Iron and steel	-	-	-	-	-	-	-	-
Chemical and petrochemical	-	-	-	-	-	-	140	-
Non-ferrous metals	-	-	-	-	-	-	-	-
Non-metallc minerals	-	-	-	-	-	-	-	-
Transport equipment	-	-	-	-	-	-	-	-
Machinery	-	-	-	-	-	-	-	-
Mining and quarrying	-	-	-	-	-	-	-	-
Food and tobacco	-	-	-	-	-	-	6	-
Paper, pulp and print	-	-	-	-	-	-	265	-
Wood and wood products	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Textile and leather	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	40
Transport	-	-	-	-	-	-	-	-
Road	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-
Other	-	-	-	-	269	2289	-	233
Residential	-	-	-	-	269	222	-	-
Commercial and public services	-	-	-	-	-	2067	-	233
Agriculture/forestry	-	-	-	-	-	-	-	-
Fishing	-	-	-	-	-	-	-	-
Non-specified	-	-	-	-	-	-	-	-
Electricity generated - GWh	251018	192992	-	32091 e	18727	3544	2303	8427
<i>Electricity plants</i>	251018	192992	-	32091 e	18727	3544	736	7528
<i>CHP plants</i>	-	-	-	-	-	-	1567	899
Heat generated - TJ	-	-	-	-	-	-	4300	5481
<i>CHP plants</i>	-	-	-	-	-	-	4300	5481
<i>Heat plants</i>	-	-	-	-	-	-	-	-

1. Hydro does not include pumped hydro.

Source: World Energy Balances.

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Table 6. Renewable and waste balance for 2015 (continued)

Mun. waste non-ren.	Wood/wood waste	Charcoal	Bio-gases	Bio-gasoline	Bio-diesel	Other liquid biofuels	Total renew. & waste sources ²	Share in total energy sources ³
3443	52362	-	4247	32607	1611	290	152298	7.6%
-	-	-	-	225	2063	-	2288	0.4%
-	-	-	-	-1884	-314	-	-2198	0.7%
-	-	-	-	-272	-248	-	-520	x
3443	52362	-	4247	30676	2945	290	151701	6.9%
-	-	-	-	2	-27	1	-24	x
-2473	-5052	-	-3170	-	-24	-11	-62821	x
-370	-42	-	-287	-	-	-1	-2344	x
-268	-1296	-	-165	-	-1	-	-2245	x
-70	-4636	-	-189	-	-1	-52	-5195	x
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-2	-	-	-	-95	-	-97	x
-	-	-	-	-	-	-	-	-
263	41333	-	435	30677	2798	227	78976	5.2%
39	28356	-	392	-	203	227	29668	11.3%
-	-	-	-	-	2	-	2	0.0%
-	53	-	1	-	26	2	222	0.4%
-	-	-	-	-	-	-	-	-
-	432	-	-	-	6	2	440	2.4%
-	-	-	2	-	1	-	3	0.0%
-	-	-	-	-	6	-	6	0.0%
-	-	-	-	-	38	-	38	0.4%
-	594	-	2	-	5	-	607	2.2%
-	25842	-	386	-	3	223	26719	58.5%
-	1313	-	-	-	8	-	1321	27.7%
-	-	-	-	-	101	-	101	0.7%
-	-	-	-	-	-	-	-	-
39	123	-	2	-	6	-	210	0.8%
-	-	-	-	30677	2434	-	33111	5.3%
-	-	-	-	30677	2206	-	32883	6.1%
-	-	-	-	-	228	-	228	0.3%
224	12977	-	43	-	161	-	16196	3.2%
-	10554	-	-	-	-	-	11045	4.2%
224	1473	-	43	-	-	-	4040	1.9%
-	949	-	-	-	161	-	1110	5.0%
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
8096	47743	-	13674	-	-	223	578838	13.5%
7233	14652	-	12206	-	-	64	540791	13.6%
863	33091	-	1468	-	-	159	38047	11.9%
5266	27400	-	1388	-	-	-	43835	10.5%
5266	27400	-	1388	-	-	-	43835	10.5%
-	-	-	-	-	-	-	-	-

2. Total includes non-renewable waste.

3. Share of renewables on TFC excludes electricity and heat generated from renewable sources.

Source: World Energy Balances.

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Table 7. Aggregated renewables and waste statistics

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Geothermal (TJ)								
Production	590501	548091	353529	369623	375852	376496	396708	-2.5
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	590501	548091	353529	369623	375852	376496	396708	-2.5
Statistical differences	-	-	-	-	-	-	..	-
Transformation processes	576432	526356	342777	359268	364883	365216	..	-2.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	14069	21735	10752	10355	10969	11280	..	-4.3
<i>Industry</i>	-	4642	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	14069	17093	10752	10355	10969	11280	..	-2.7
Solar thermal (TJ)								
Production	2387	65871 e	87203	98238	116043	125981	131062 e	4.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2387	65871 e	87203	98238	116043	125981	131062 e	4.4
Statistical differences	4846	-	1	-	-	-	..	-
Transformation processes	7233	5569	7719	8746	23271	30141	..	11.9
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	60302	79485	89492	92772	95840	..	3.1
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	60302	79485	89492	92772	95840	..	3.1
Industrial waste (TJ)								
Production	80721 e	172192	80589	59796	58520	50686	30424	-7.8
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	80721 e	172192	80589	59796	58520	50686	30424	-7.8
Statistical differences	-	-	-1	-	-	-	..	-
Transformation processes	80721 e	69406	41741	37864	38567	33475	..	-4.7
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	102786	38847	21932	19953	17211	..	-11.2
<i>Industry</i>	-	102131	38709	21932	19953	17211	..	-11.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	655	138	-	-	-	..	-
Municipal waste - renewables (TJ)								
Production	86915 e	171490	162810	151280	150537	150084	153751	-0.9
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	86915 e	171490	162810	151280	150537	150084	153751	-0.9
Statistical differences	-	-	-1	-1	-	1	..	-
Transformation processes	86915 e	128715	151312	140231	139870	138631	..	0.5
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	42775	11497	11048	10667	11454	..	-8.4
<i>Industry</i>	-	23850	1140	1496	1601	1679	..	-16.2
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	18925	10357	9552	9066	9775	..	-4.3

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

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Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Municipal waste - non-renewables (TJ)								
Production	86914	171489	127922	145347	144633	144198	148880	-1.1
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	86914	171489	127922	145347	144633	144198	148880	-1.1
Statistical differences	-	-	1	-	-	-	..	..
Transformation processes	86914	128714	118889	134731	134384	133193	..	0.2
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	42775	9034	10616	10249	11005	..	-8.7
<i>Industry</i>	-	23850	896	1438	1538	1614	..	-16.4
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	18925	8138	9178	8711	9391	..	-4.6
Solid Biofuel excluding charcoal (TJ)								
Production	2321772 e	2303809	2202485	2286469	2369657	2192710	2089782	-0.3
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	2321772 e	2303809	2202485	2286469	2369657	2192710	2089782	-0.3
Statistical differences	-	-	-2	-1	1	1	..	..
Transformation processes	1375699 e	502381	397912	439100	484876	461763	..	-0.6
Energy industry own use	-	-	-	130	90	90	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	946073	1801428	1804571	1847238	1884692	1730858	..	-0.3
<i>Industry</i>	379180	1294091	1153758	1182850	1192040	1187436	..	-0.6
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	566893	507337	650813	664388	692652	543422	..	0.5
Charcoal (kt)								
Production	-	-	-	-	-	-	-	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	-	-	-	-	-	-
Statistical differences	-	-	-	-	-	-	-	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	-	-	-	-	..	-
<i>Industry</i>	-	-	-	-	-	-	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-
Biogases (TJ)								
Production	30674 e	123966	116208	159411	183110	177841	179538	2.4
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	30674 e	123966	116208	159411	183110	177841	179538	2.4
Statistical differences	-	-	-1	1	1	-	..	..
Transformation processes	30674 e	63322	114408	146036	162387	159616	..	6.4
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	60644	1799	13376	20724	18225	..	-7.7
<i>Industry</i>	-	57399	301	12168	19162	16435	..	-8.0
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	3245	1498	1208	1562	1790	..	-3.9

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

UNITED STATES

Table 7. Aggregated renewables and waste statistics (continued)

	1990	2000	2010	2013	2014	2015	2016p	Average annual percent change 00-15
Biogasoline (kt)								
Production	-	4498	38044	38489	41582	42634	44021	16.2
Net imports ¹	-	15	-1148	-680	-2221	-2169	-3055	-
Stock changes	-	79	-317	484	-379	-356	247	-
Gross consumption	-	4592	36579	38293	38982	40109	41213	15.5
Statistical differences	-	365	-162	-	-	2	..	-
Transformation processes	-	-	-	-	-	-	..	-
Energy industry own use	-	-	-	142	153	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	4957	36417	38151	38829	40111	..	15.0
<i>Industry</i>	-	-	-	35	37	-	..	-
<i>Transport</i>	-	4957	36417	37606	38290	40111	..	15.0
<i>Other</i>	-	-	-	510	502	-	..	-
Biodiesel (kt)								
Production	-	21	1292	1879	1893	1499	811	32.9
Net imports ¹	-	-	-274	1234	778	1627	2810	-
Stock changes	-	-	9	-338	138	-231	-621	-
Gross consumption	-	21	1027	2740	2732	2740	3000	38.4
Statistical differences	-	-	1	-	-	-25	..	-
Transformation processes	-	-	-	12	17	24	..	-
Energy industry own use	-	-	-	109	123	88	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	21	1028	2619 e	2592 e	2603	..	37.9
<i>Industry</i>	-	-	-	226	252	189	..	-
<i>Transport</i>	-	21	1028	2223 e	2162 e	2264	..	36.6
<i>Other</i>	-	-	-	170	178	150	..	-
Other liquid biofuels (kt)								
Production	-	-	194	536	525	563	510	-
Net imports ¹	-	-	-	-	-	-	-	-
Stock changes	-	-	-	-	-	-	-	-
Gross consumption	-	-	194	536	525	563	510	-
Statistical differences	-	-	-	-	1	1	..	-
Transformation processes	-	-	29	111	116	124	..	-
Energy industry own use	-	-	-	-	-	-	..	-
Losses	-	-	-	-	-	-	..	-
Final energy consumption	-	-	165	425	410	440	..	-
<i>Industry</i>	-	-	165	425	410	440	..	-
<i>Transport</i>	-	-	-	-	-	-	..	-
<i>Other</i>	-	-	-	-	-	-	..	-

1. Net imports = total imports - total exports.

Source: IEA/OECD Renewables Statistics, World Energy Balances.

COUNTRY NOTES

General notes

This report is focused on the data from 1990 onwards, due to the limited availability of data prior to 1990.

Where no breakdown of municipal waste between renewable and non-renewable components is reported, the IEA Secretariat estimates equal shares of renewable and non-renewable components.

Australia

Source

Department of Industry, Canberra.

General notes

- All data refer to the fiscal year (e.g. July 2014 to June 2015 for 2015).
- The data for **biogasoline** and **biodiesel** are not available before 2003 and 2004 respectively.
- There are breaks in the time series for many data between 2002 and 2003 due to the adoption of the National Greenhouse and Energy Reporting (NGER) data as the main energy consumption data source for the Australian Energy Statistics.
- In 2002, the Australian administration started to use a new survey methodology and reclassified the types of plants between main activity producers and autoproducers.
- From 1996, a different industry consumption breakdown for **biofuels and waste** is available and leads to breaks in time series.

Supply

- Indigenous production of **biodiesel** decreased substantially in 2016 because one of major **biodiesel** producers ceased production in January 2016.

- **Biogas** production data at sewage treatment works are not available.
- The production data of electricity from **wind** are available from 1994.

Transformation

- Electricity production from **solar PV** starts in 1992 and from **solar thermal** in 2003.
- Prior to 1995, electricity production from **biogases** is included in natural gas.

Consumption

- In the 2017 edition of this publication, there has been a revision to the time series of **solid biofuels** consumption in “Paper, pulp and printing” sector. This time series has been revised back to 2010 resulting in break in time series between 2009 and 2010.
- In the 2016 edition of this publication, the Australian administration revised **primary solid biofuels** back to 2010 which impact mostly final consumption in Food and Tobacco. This created breaks in time series.
- The consumption data of **biogases** in industry is not available before 2003.

Austria

Source

Bundesanstalt Statistik Österreich, Vienna.

General notes

- In the 2016 and 2017 edition, widespread data revisions were received due to enhanced reporting for 2005 onwards as a consequence of the Austrian Energy Efficiency Act (Bundes-Energieeffizienzgesetz). For some time series, these revisions were

extrapolated back to 1990. As a consequence, there may be breaks between 2004 and 2005, and 1989 and 1990.

- Data for **solar photovoltaic** and **wind** are available from 1993.

Transformation

- A large autoproducer electricity plant was reclassified as an autoproducer CHP plant and therefore creates a break in time series for **municipal waste** in 2011.
- Due to a change in the survey methodology, the heat produced in small plants (capacity inferior to 1 MW) is not reported starting in 2002.
- Electricity plants data may include some CHP plants operating in electricity only mode.
- Prior to 2002, data for **biogases** only include plants of 1 MW or larger.
- Electricity generation from **geothermal** started in 2002.

Consumption

- In the 2016 edition, improvement in the iron and steel industry data have allowed more precision in the consumption, among other for **industrial wastes** in blast furnaces.
- In the 2016 edition, the consumption of **solid biofuels** in the residential sector was revised down from 2005 data.

Belgium

Source

Observatoire de l'Energie, Brussels.

General notes

- Renewable **municipal wastes** include a share of renewable **industrial wastes**.
- No information on **wood pellets** and **animal waste** is available prior to 2012.
- Data for **biodiesels** and **biogasoline** are available starting in 2009.

Supply

- Data on pure **biogasoline** and **biodiesels** trade are not available for 2009 and 2010.

Transformation

- No information is available on heat production in main activity CHP plants for **industrial waste** in 2007.

- In 2003, combustion of **municipal waste** for electricity and heat generation purposes increased significantly. However, because a large portion of the heat produced is not used (sold), plant efficiencies dropped significantly between 2002 and 2003.
- In 2000, most autoproducer electricity plants using **combustible fuels** were reclassified as autoproducer CHP plants; the heat production from these plants was used for internal industrial processes and not sold to third parties until 2005.
- For 1998 and 1999, electricity production at CHP plants with annual heat output below 0.5 TJ is reported with electricity only plants.

Consumption

- **Industrial waste** consumption in the chemical sector started in 2013.
- **Other liquid biofuels** consumed in power plants reported before 2011 can include **biodiesel**.
- New data on consumption cause breaks in time series for **primary solid biofuels** between 2011 and 2012.

Canada

Source

Natural Resources Canada, Ottawa.

General notes

- The split of **municipal waste** reported assumes 65% renewable and 35% non-renewable.
- Starting in 2009, a new data source has been used by Canadian administration for electricity production from **solar**, **wind**, and **tide**. This new source covers production from **solar** and **wind** only from plants with capacity higher than 500 kW.
- The IEA Secretariat has estimated the data for **biogases**, **industrial and municipal waste** from 1990 to 2004, **biogasoline (ethanol)** from 1998 to 2004 based on information supplied by Natural Resources Canada.

Supply

- Canadian **biodiesel** production increased significantly in 2014 because a large producer came online at the end of 2013. In 2016 again, there was big increase in production of **biodiesel** due to a large plant coming online in Alberta. This is also

the reason for the increase in export, as Canada exports most of its **biodiesel** to the US.

- There were no exports of **biogasoline** since 2013.

Transformation

- In the 2017 edition of this publication, electrical capacity of **other liquid biofuels** have been reported without any relevant inputs or outputs due to the lack of data.
- In the 2016 edition of this publication, there was a reclassification from autoproducer to main activity producer for plants fuelled by **biogases** and **municipal waste**.
- In the 2016 edition of this publication, the electrical capacity of **solid biofuels** revised back to 2005, which makes break in time series between 2004 and 2005.
- Only gross maximum electrical capacity is available.
- Production capacity figures for **biodiesel** and **biogasoline** are not available.

Consumption

- The **solid biofuels** consumption for the residential sector in 2015 is equal to 2014 data because firewood data lag one year behind.

Chile

Source

Ministerio de Energia, Santiago.

General notes

- The Chilean administration applied a new revised methodology for *final consumption* of **primary solid biofuels**. This may lead to breaks in time series between 2013 and 2014.
- **Charcoal** production and consumption have been estimated by the IEA Secretariat until 2013. From 2014 data, only **solid biofuels** input to **charcoal** production plant is estimated.
- The split of electricity generation by main activity and autoproducer by fuel was estimated by the Chilean administration for the period 1990 to 2003.
- From 1990, consumption in paper and pulp includes forestry and consumption in agriculture is included in non-specified industry.

Supply

- Production of **landfill gas** ceased in 2001 as landfill sites stopped producing adequate gas to continue collection.
- **Solar thermal heat** production has been estimated by the IEA Secretariat using data published by Chilean ministry of energy.

Transformation

- **Biofuels** are co-fired with other fuels for electricity production. For plants where multiple fuels are used for electricity production, capacities are reported under the dominant fuel.
- Regarding electricity generation from **solar PV** and **wind**, Chilean administration applied a new methodology for 2014 and this resulted in breaks in time series between 2013 and 2014. The revision for the previous years is pending.
- A new survey on primary **solid biofuels** causes breaks in production and input to autoproducer CHP between 2011 and 2012.
- Data for heat production in CHP and heat plants are not available.
- The split of **hydro** generation by plant size is available from 1996 for main activity and from 2000 for autoproducers.

Consumption

- **Solar thermal** consumption data are not available so all consumption data are allocated to the non-specified (other) sector.

Czech Republic

Source

Ministry of Industry and Trade, Prague.

General notes

- The restructuring of the Czech electricity market leads to breaks in the time series in all sectors between 1998 and 1999.
- Data for **municipal waste** and **solid biofuels** are not available prior to 1990 and **liquid biofuels** data are not available prior to 1992.

Transformation

- In 2012, a main activity producer electricity plant using **solid biofuels** started to produce heat and was reclassified as main activity CHP plant.

- Data on **biogases** used in main activity producer CHP and autoproducer heat plants start in 1997.
- **Industrial waste** use in main activity producer electricity plants is **included** with **solid biofuels** from 1996.

Consumption

- In the 2017 edition, due to a new survey in households made by the Czech Statistical Office in 2015 (ENERGO 2015), **solid biofuels** consumption in residential sector has been considerably revised upwards since 1990.
- Hospital waste previously reported as **municipal waste** is reported under **industrial waste** since 2008.
- New survey systems cause breaks in final consumption in 1999 and in 2002. Breaks in both supply and consumption of biofuels and waste occur again in 2003.
- Data for direct use of **solar** energy are available from 2003.

Denmark

Source

Danish Energy Agency, Copenhagen.

General note

- In the 2014 edition, total heat production was revised back to 1994, due to the availability of new data for heat production from **liquid biofuels**.

Supply

- In the 2015 edition, the Danish administration revised the **geothermal heat** production from 1990 to 2009.

Transformation

- From 2012, **biogasoline** trade designated to be blended with motor gasoline is included under **biodiesels**, for confidentiality reasons.
- From 2012, **biodiesel** production was confidential and gathered with imports.
- **Biodiesels** and **biogasoline** consumption for electricity and heat production are reported under **other liquid biofuels**, for confidentiality reasons.
- Data for **other liquid biofuels** main activity heat plants are available from 1994.

- Due to the high number of heating companies burning **wood chips** that are equipped with boilers with flue-gas condensation, the **solid biofuels** heat plants show a high efficiency.
- **Fish oil** used in main activity producer heat plants is included with **solid biofuels**.
- For some years heat plants for **biogases** show efficiencies larger than 100%, on a net calorific value basis, due to the use of condensing boilers that recover the latent heat of vaporisation.
- Based on the reported production from **solar thermal** collectors and installed surface of these, a decline in specific production [kWh/m²] is observed. The main reason of this is that the sources of the production data and installed surface are different each other. The production data origins from the “energy-producer-survey” that most certainly misses some of the newly established installations. Danish administration expects that this divergence will probably become smaller again in the next cycle.

Consumption

- In the 2017 edition of this publication, Danish administration used the 2014 figures of **municipal waste** consumption in industrial sector for the 2015 figures. These figures will be revised in the 2018 edition.
- In the 2016 edition, the Danish statistics revised energy consumption in industry sectors causing some breaks in **solid biofuels** consumption between 2010 and 2011.

Estonia

Source

Statistics Estonia, Tallinn.

General notes

- Data for Estonia are available starting in 1990. Prior to that, they are included in the Former Soviet Union in World Energy Statistics.
- Data for **biogases** include **landfill gas** starting in 2005.

Transformation

- For plants where multiple fuels are used for electricity production, capacities are reported under the dominant fuel.

Finland

Source

Statistics Finland, Helsinki.

General notes

- A new survey system and a reclassification of the data lead to breaks in the time series between 1999 and 2000 for most products and sectors. The new survey system is more detailed and has better product coverage, especially in electricity, CHP and heat production, as well as in industry.
- Prior to 2004, **industrial waste** also included other energy forms such as **hydrogen**, **heat from chemical processes**, **natural gas** and **blast furnace gas**.
- Data for **biogases** and **industrial waste** are available from 1996.

Supply

- Due to confidentiality reasons, the **biodiesel** production includes trade figures and stock changes for 2015. Regarding **biogasoline**, import covers production, exports and stock changes.

Transformation

- The capacities of co-firing plants are reported under the dominant fuel.
- In the 2016 edition, the allocation of **solar photovoltaic** between main activity and autoproducer plants was revised.
- In 2014, the new consumption of **other liquid biofuels** in main activity electricity plant corresponds to biopyrolysis oil made from wood chips.
- The increase in heat production from **municipal waste** in 2014 is due to the opening of a new plant.
- Heat output from autoproducer CHP plants is available starting in 1996 and from autoproducer heat plants starting in 2000.
- Before 1999, all electricity production from autoproducers running on **fuelwood** is allocated to CHP plants.
- Prior to 1992, outputs from the use of combustible renewables and waste to generate electricity and/or heat were included in peat. Therefore, the IEA Secretariat estimated the breakdown of outputs from **municipal waste** and **solid biofuels** based on reported inputs.

France

Source

Ministère de la Transition Écologique et Solidaire, Paris.

General notes

- In 2014, a new survey on **Solid biofuels** and **Biogases** causes breaks in time series between 2013 and 2014. **Biogas** was previously reported under **Solid biofuels**.
- From 2012, the energy consumption is more detailed due to a new national survey.
- Prior to 2005, all the **geothermal** heat consumption was reported as direct use. From 2005 data, some quantities are reported as output of heat plants, resulting in breaks in time series for production, transformation and consumption.

Transformation

- Electricity plants data may include some CHP plants operating in electricity only mode. And heat plants data may include some CHP plants operating in heat only mode.
- Data for heat produced from combustible fuels in heat only plants are available starting from 2012.
- Electricity production from **geothermal** started in 2011 and stopped in 2012 due to the maintenance of the only plant.
- From 2011, all **photovoltaic** plants with capacity above 100kWp are considered as main activity producers, while all plants with capacity below that value are considered autoproducers.
- Plants using **municipal waste** were reclassified as autoproducer CHP plants from 1995, which leads to a break in time series. Breaks in time series in 2005 for **municipal waste** and **solid biofuels** are caused by sectoral reclassifications.
- Data on electricity production from **wind** is available from 1990.

Consumption

- Production and consumption of **industrial waste** are reported from 2013. Prior to that, they were included in **municipal waste**.
- A revision of the **solid biofuels** and **biogases** time series created breaks in the direct use time series between 2004 and 2005.

- The breakdown of the final energy consumption of **biogases** was estimated by the French administration from 1970 to 2003.

Germany

Source

Federal Ministry for Economic Affairs and Energy, Berlin.

General notes

- Changes in the reporting system lead to breaks in time series between 1996 and 1997, 2002 and 2003, 2006 and 2007 and between 2010 and 2011.
- In 2011, numerous changes to methodology and classifications have caused many breaks in time series.
- Starting in 2008, **municipal waste** and **industrial waste** data were collected separately. This leads to breaks in the time series between 2007 and 2008.
- Data on **geothermal** heat production and direct consumption were revised by the German administration and are only available starting in 2003.
- GDP figures prior to 1991 are based on conversions made by the German Institute for Economic Research (Deutsches Institut für Wirtschaftsforschung) and the former Statistical Office of the GDR (Statistisches Amt der DDR).

Supply

- Trade data for **biogasoline** are available from 2004 and for **biodiesels** from 2003.

Transformation

- **Industrial wastes** are co-fired with other fuels for electricity production. For plants where multiple fuels are used for electricity production, capacities are reported under the dominant fuel.
- Due to a reclassification of **wind** energy and **solar photovoltaic** in the official data of the German Federal Statistical Office since 2011, the production is now only reported under main activity producer plants.
- Prior to 2003 electricity production in electricity plants includes production from CHP plants and heat production in CHP plants includes production from heat plants.

- In some instances, electricity generation from **hydro-electricity**, **solar** and **wind** in autoproducer electricity plants are confidential or non-available and therefore are included in main activity producer electricity plants.

Consumption

- For **solid biofuels** consumption in the commercial and public services sector, new data were derived in cooperation with the Federal Research Institute for Rural Areas, Forestry and Fisheries by applying a different calculation approach based on the total demand for material and energy use of the resource wood in Germany. This had resulted in breaks in time series between 2013 and 2014.

Greece

Source

Ministry for Environment and Energy, Athens.

General notes

- New information on **solid biofuels** is available from 1996 and leads to breaks between 1995 and 1996.
- Data for **biofuels and waste** input and output to transformation are available from 1992.
- Data for **biogases** are available from 1990 and data for **industrial waste** from 1992.

Supply

- No heat production of **solar heat** is reported although it exists.

Transformation

- The big increase in delivery of **industrial wastes** to autoproducer CHP plant in 2010 is mainly due to the opening of a new plant.
- Inputs of **solid biofuels** to **charcoal** production are estimated for 2007 to 2010 by the IEA Secretariat assuming an efficiency of 40%.
- **Industrial waste** used in autoproducer CHP plants decreased substantially in 2006 because a plant closed.

Consumption

- **Solid biofuels** consumption in commercial/public services is included in residential until 2011.

- The consumption of **solid biofuels** in the paper, pulp and printing industry is not available from 2003 to 2012.
- Direct use of **geothermal heat** in residential is available starting in 2004.

Hungary

Source

Hungarian Energy and Public Utility Regulatory Authority, Budapest.

General notes

- Data for **biogases** are available from 2000; for **industrial waste** from 2003; for **biodiesel** production from 2007.
- Data for **wind** and **solar thermal** are available from 2001.
- The Hungarian administration reclassified some of their plants between 1996 and 2000, which caused some breaks in the time series.

Supply

- A 2012 change in **biogasoline** reporting methodology results in break in time series between 2011 and 2012.

Transformation

- In 2014, some CHP plants running on **Industrial waste** and **solid biofuels** produced only heat and were reclassified to heat plants.
- From 2014 data, more data suppliers were involved in the process, causing new autoproducer time series to appear for **geothermal** and **industrial waste** plants.
- Data on electricity and heat production from **solid biofuels** in autoproducer CHP plants are available from 1995.
- **Geothermal heat** production from main activity producer heat plants is also available from 1995.

Consumption

- In the 2017 edition, the Hungarian administration has revised **solid biofuels** consumption in other sectors back to 2010 based on the new survey from Hungarian Central Statistical Office (HCSO). This resulted in break in time series between 2009 and 2010.

- A new reporting methodology for the direct use of **geothermal** energy was applied from 2014 resulting in break in time series between 2013 and 2014.
- Data for direct use of **geothermal heat** are available from 1990.

Iceland

Source

National Energy Authority, Reykjavik.

General notes

- Energy industry own use of electricity refers mainly to the use of electricity by the **geothermal** industry to pump **geothermal** water from underground sources.
- In the 2015 edition, the Icelandic administration revised **geothermal heat** production and heat consumption back to 1990. This affects mainly the **geothermal** direct use, the **geothermal heat** production and the final consumption of heat. Prior to 1990, all heat for space heating was reported in residential.

Supply

- The increase in **hydroelectric** and **geothermal** electricity production and capacity between 2007 and 2008 is due to the expansion of the aluminium industry.

Transformation

- For 2016, access to improved data revealed considerably better **geothermal** heat plant efficiencies than previously inferred, with increases in **geothermal** heat production seen during this period. The Icelandic administration plans to revise previous years' figures in succeeding editions.
- From 2013 data, the Hellisheidi **geothermal** power plant, previously reported under main activity electricity plant, was categorised as main activity CHP plant.
- The use of **municipal waste** to produce heat is available from 1993 and stops in 2010.
- In 1998, 60 MW of generating capacity was installed in the **geothermal** CHP plant at Nesjavellir. Since the plant was inoperable for four months, production of **geothermal heat** is almost same with 1997. The extra electricity capacity caused electricity production from **geothermal** to almost double over the same period.

- Electricity production from **geothermal** sources in main activity producer CHP plants is available from 1992.

Consumption

- **Biodiesel** consumption data for 2014 are estimated by Icelandic administration based on 2013.
- Revisions in the direct use of **geothermal heat** from 2013 create breaks in time series between 2012 and 2013.
- **Biogases** used for transport purposes were reported for the first time in 2007.
- The **geothermal** consumption on industrial sector is reported under non-specified industry, as the Icelandic administration decided not to estimate the allocation amongst the sub-sectors of industry.

Ireland

Sources

- Department of Communications, Energy and Natural Resources, Dublin.
- Sustainable Energy Authority of Ireland, Cork.

General notes

- Data for **municipal waste** are available from 2009.
- Data for **solid biofuels** and **biogases** are available from 1990.
- The **solid biofuels** capacity only refers to CHP. The electricity generated by **solid biofuels** from main activity producer electricity plants, refers to an 118MW co-firing plant using milled peat and biomass. As the primary fuel is peat, this capacity is reported under peat.

Supply

- Prior to 2011, production and trade of **biogasoline** and **biodiesels** cannot be distinguished due to confidentiality issues.

Transformation

- In 2012 and 2013, the renewable fraction of tyre-derived fuel (12%) used by a cement plant was reported by the administration under **renewable municipal waste**; the non-renewable fraction (88%) was reported under **industrial waste**.
- In 2012, a new main activity electricity plant burning **municipal waste** (the Meath plant) started operation

- There is no **Pumped Hydro** capacity reported in 2010 and 2011 due to the fact that Ireland's pumped storage station, Turlough Hill, was taken offline for an overhaul late in 2010 and did not come back online until February 2012.

- Electricity production from **wind** begins in 1992 and from **biogases** in 1996.

Consumption

- The consumption of pure **biodiesel** in the industry sector and in the road transport refers to one site, which is no longer in operation since 2014.
- Data for direct use of **solar thermal** heat are available from 1990.

Israel

Source

Israel Central Bureau of Statistics, Jerusalem.

General notes

- The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli administration. The use of such data by the OECD and/or the IEA is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.
- In the 2017 edition, **Solar thermal** production and direct consumption were revised and are now estimated by the IEA Secretariat from 2012 onwards, using data published in the IEA-Solar Heating and Cooling Programme Annual Report. These estimations may create breaks in time series between 2011 and 2012.
- Data on the breakdown of **hydroelectric** plants by size became available in 2009.

Transformation

- In 2014, the breakdown of **hydro** electricity production by size is revised due to more accurate data.
- **Biogas** input to transformation sector was estimated by the IEA Secretariat from 2013 data point.
- **Hydroelectricity** production data for 2012 were estimated based on the previous years.
- Electricity production from **wind** begins in 2001.

Consumption

- Data on imports and consumption of **charcoal** were estimated since 2012 based on figures for 2011.

Italy

Sources

- Ministry of Economic Development, Rome.
- Terna, Rome.

General notes

- The methodology of data collection for the **geothermal** sector changed in 2010, causing a break in time series between 2009 and 2010.
- A change in methodology led to breaks in time series for industry and transformation between 2003 and 2004.

Supply

- **Biogasoline** includes **bio-ETBE**.
- From 2014, a distinction between trade and production became available for **other liquids biofuels**.

Transformation

- The methodology of data collection for **photovoltaic** electricity production changed in 2009 and the distinction between main activity and auto-producer plants could not be determined, causing a break in the time series.
- In 2008, data for **biofuels and waste** were reclassified, which results in several breaks in the time series for transformation.
- Heat production is reported starting in 2004 and includes self-generation in industry.
- Up to 2003, **solid biofuels** capacity includes industrial waste capacity.
- From 2000 onwards, the Italian administration defines electricity and heat production from auto-producers as generation from producers that consume more than 70% of their own electricity production. However, for the 2000 to 2002 period, all electricity production from autoproducers is reported with main activity producers.

Consumption

- The final consumption of **biogas** has been constant from 2013 to 2015 as these figures are the result of a survey which is not carried out annually. Figures are expected to be revised after the next survey.

- In the 2016 edition, the methodology used to calculate **solid biofuels** consumption in the residential sector for 2002 to 2014 was updated and this created a break in time series between 2001 and 2002. This also affects the indigenous production of **solid biofuels**. The revisions were limited backwards to 2002 because of reliability issues.

Japan

Source

The Institute of Energy Economics Japan, Tokyo.

General notes

- Starting in 1990, data are reported on a fiscal year basis (e.g. April 2015 to March 2016 for 2015).
- Due to time constraints, amounts reported under solid biofuels data for 2016 may not reflect full-scale national coverage, causing a break in time series. Revisions are expected in the 2018 edition.
- Consumption data for commercial/public services may include consumption in small and medium-size industries. The Japanese administration expects that this shortcoming be corrected in the near future.
- There was a large revision in **municipal waste** data in the 2016 edition of this publication. This revision has removed data for **municipal waste** for the entire time series up to 2010, which create breaks in time series between 2009 and 2010.
- For **municipal waste** data, the breakdown between renewable and non-renewable **municipal waste** is estimated by the IEA Secretariat.
- The net calorific value for **charcoal** since 2010 was estimated as equal to 2009 by the IEA Secretariat.

Transformation

- The capacities of co-firing plants are reported under the dominant fuel.
- In the 2017 edition, the Japanese administration revised electrical capacity for combustible fuels back to 2003 creating breaks in time series between 2002 and 2003. Due to the data unavailability, **municipal waste** plant generation capacity now includes plants operating on **black liquor** since 2012, following the revision. Prior to 2012, **black liquor** capacity was included under **solid biofuels** capacity.
- The IEA Secretariat estimated the **photovoltaic (PV)** electricity generation from autoproducers

starting in 1992 based on an average capacity factor of 12% and capacity data for autoproducers. Autoproducer PV capacity is derived from data from the Japanese administration as well as the IEA Photovoltaic Power Systems Programme (IEA-PVPS) report, “Trends in Photovoltaic Applications” published in 2016.

- Input data of **solid biofuels** to **charcoal** production are estimated by the IEA Secretariat assuming an efficiency of 40%.
- Data on heat produced for sale by autoproducer heat plants are not available.
- Electricity and heat produced in CHP plants are not included in the CHP data time series, but instead are reported as separate electricity or heat components.
- Heat production from **geothermal** and **solar thermal** sources in Japan is not reported by the Japanese administration.
- Production of electricity from **solar photovoltaic** and **wind** in autoproducer electricity plants is understated as it only covers generation from plants with capacity of 1000kW or more.
- The **industrial waste** consumption in the transformation sector (non-specified) surged in 2013, because of the increase in use of waste plastics for coke production.
- From 2005 to 2007, the electricity produced in main activity electricity plants from **solar photovoltaic** decreased because plants were out of operation due to maintenance.
- Prior to 1998, the electricity produced using TRT technology (Top pressure Recovery Turbines) was included with electricity generated from **wood**, **wood waste** and other **solid waste**.
- Data on electricity production from **wind** began in 1993.

Korea

Source

Korea Energy Economics Institute, Ulsan.

General notes

- Due to the change of reporting methodology, breaks in time series may occur between 2013-2014 and 2014-2015.
- Prior to 2009, autoproducer heat production includes amounts of unsold heat.

- Electricity statistics from 1971 to 1993 have been estimated by the IEA Secretariat based on the Korean National Statistics. Data from 1994 have been submitted by the Korean administration. This leads to breaks in time series between 1993 and 1994. Before 1994, electricity production from main activity producer CHP plants is included with main activity producer electricity only plants. Heat data are available starting in 1993.

Transformation

- Inputs to autoproducer heat plants have been estimated by the IEA Secretariat because of efficiency issues for **municipal waste** prior to 2011 and in 2012 and for **biogas** in 2008, 2011 and 2012.
- New plants were included in the Korean survey creating breaks in time series in 2011.
- In 2007, some main activity heat plants and autoproducers in the commercial/public services sector were reclassified as main activity CHP plants, resulting in a break in the time series between 2006 and 2007 for **biogases**.
- Prior to 2007, the consumption of **landfill gas** in main activity CHP plants may have been included in main activity heat plants. Difficulties in ownership classification are also the reason **landfill gas** data only appears one time in the commercial and public services sector in 2006.
- Between 1993 and 1999, the breakdown of heat output by type of fuel was estimated by the IEA Secretariat. In 2000, the Korean administration started to report heat statistics for some heat plants which were not reported before.

Consumption

- Data for direct use of **geothermal heat** are available from 2002. **Geothermal** direct use data are overstated as it refers to heat production by **geothermal** heat pumps, which include inputs of electricity and/or gas in the transformation process.

Latvia

Source

Central Statistical Bureau, Riga.

Transformation

- From 2012 to 2015, electrical capacity of **solar photovoltaic** was not reported, because capacity

was under 0.5 MW. For the same reason, electrical capacity of **biodiesel** for 2010 to 2015 was not reported.

- From 2012 onwards, the increase in electricity production from **solid biofuels** is due to the deployment of six new main activity producer CHP plants running on **wood chips**.
- Due to a reclassification in 2004, there was break in time series of electricity production from auto-producer electricity plant fuelled by **biogas** between 2003 and 2004.

Luxembourg

Source

STATEC, Institut national de la statistique et des études économiques du Grand-Duché du Luxembourg, Luxembourg.

General notes

- Most of the **hydro** production shown for Luxembourg is from the Vianden **pumped storage** plant and is exported directly to Germany.
- The Luxembourgian administration started including trade figure of **wood chips** in trade figure of **Solid biofuels** from 2015 data. This creates breaks in time series between 2014 and 2015.
- Data for **solar thermal** are available starting in 2001 and for **solar PV** starting in 2000.
- Data on **solid biofuels** are available from 1992.

Transformation

- The production of electricity from **solid biofuels** from 2013 corresponds to the opening of a new plant burning **wood wastes**.
- In 2011, the blending of **biogases** with **natural gas** started.
- Data on electricity production from **biogases** are available from 1998 and heat production from 2010.

Mexico

Source

Secretaría de Energía, Mexico City.

General note

- The Mexican administration is currently undertaking major work on revisions of the time series back to 1990. These revisions could not be implemented in the 2017 edition. As a consequence, breaks in time series appear between 2007 and 2008. Revisions to historical data are pending.

Supply

- Data for **bagasse** production is available from 2008.
- Data on the production of **sewage sludge gas** are available from 1997.

Transformation

- Electricity production from **solid biofuels** and **biogases** data are available respectively from 1991 and 1997.
- Data on electricity production from **wind** and **solar photovoltaic** are available from 1990.

Consumption

- Data for **solid biofuels** used in autoproducer electricity plants from 1991 to 2005 have been estimated by the Mexican administration.
- Data on **biogases** consumption are available from 1997.
- Direct use of **solar thermal heat** is available from 1990.

Netherlands

Source

The Netherlands Central Bureau of Statistics, The Hague.

Supply

- From 2009 to 2012, and again from 2014 the production and trade of pure **biogasoline** were confidential; net imports were estimated by the Dutch administration based on consumption.
- Trade data for **municipal waste** are available from 2011.

Transformation

- All **municipal solid waste** autoproducer electricity and heat only plants have been reclassified by Statistics Netherlands as autoproducers CHP from 2012, causing breaks in the time series.

- Prior to 2008, a few small autoproducer electricity plants using **solid biofuels** were included with main activity plants for reasons of confidentiality.
- In 2006, for **municipal waste** some plants changed ownership and were reclassified from electricity only to CHP plants as they started heat projects.
- For **biofuels and waste**, all electricity and heat produced prior to 1995 is included in CHP plants.
- Electricity production from **solar photovoltaic** is available from 1990.
- Heat produced from **biofuels and waste** is available from 1990.

Consumption

- From 2014, a better allocation of heat own use was available for **biogas** digester prewarming, and in **municipal waste** burning plants for flue gas cleaning.
- The final consumption of **solid biomass** in the residential and agriculture sector increased in 2014 due to the results of new surveys and parameters.
- Direct use of **geothermal heat** in agriculture/forestry starting in 2008 is due to a new project extracting deep **geothermal heat**.

New Zealand

Source

Ministry of Business, Innovation and Employment, Wellington.

General note

- Prior to 1994, data refer to fiscal year (April 1993 to March 1994 for 1993). From 1994 data refer to calendar year.

Transformation

- Electricity production from autoproducer **geothermal** plant data are available from 1990.
- The New Zealand administration has updated efficiencies for electricity production from **geothermal heat** from 10% to 15% from 1990 onwards; this causes a break in the time series between 1989 and 1990.

Consumption

Data on direct use of **geothermal heat** are available from 1990 and direct use of **solar thermal heat** from 2002.

Norway

Source

Statistics Norway, Oslo.

General notes

- Prior to 2007, equal shares of renewable and non-renewable **municipal waste** were estimated because the actual split was not known.
- Data for **industrial waste** and **biogases** are available from 1991.

Supply

- In 2014, the **biodiesel** production facility closed.
- **Liquid biofuels** imports data are available starting in 2006.

Transformation

- No data on electricity production from **solar energy** are submitted separately to the IEA by the Norwegian administration.
- In the 2016 edition, Norway corrected the **industrial waste** consumption in heat plants, and reclassified some the corresponding heat output under other sources.
- For 2003 to 2009, estimates of **solar thermal collector** capacity were made by the IEA Secretariat using data published in the IEA-Solar Heating and Cooling Programme Annual Report.
- Heat production from **biogases** data are available from 1995.
- Electricity production from **wind** data are available from 1993.

Consumption

- Distribution losses for **biogases** are included in commercial/public services prior to 2003.

Poland

Source

Central Statistical Office, Warsaw.

General notes

- Several breaks in the **industrial wastes** time series are caused by difficulties in the classification of wastes.

- Data on **biodiesels** are available from 2005, **bio-gasoline** from 2003, and **other liquid biofuels** from 2009.
- In 2008, a new questionnaire was launched which increased the coverage of renewable and waste data.
- In 1993 and 1995, new estimation methodologies were used for **solid biofuels** data and this creates a break in time series between 1992 / 1993 and 1994 / 1995.

Supply

- Under current Polish law, only producers and importers of **biodiesel** are obliged to fulfil the National Indicative Target of share of biofuels in the total usage of transportation fuels. Since the regulation is currently not applied to retail distributors they, for economic reason, rather export the **biodiesel** than sell it domestically. This results in low domestic consumption and increase of exports in 2016.
- Production of **other liquid biofuels** increased in 2015 because new companies started to report their biofuel production to the Polish administration.

Transformation

- For plants where multiple fuels are used for electricity production, capacities are reported under the dominant fuel.
- State support for biomass co-firing was reduced in 2016, resulting in electricity production from **solid biofuels** falling during this period.
- In 2008, a number of CHP plants were reclassified from autoproducer to main activity producer due to an industry re-organisation.
- Before 2000, **industrial wastes** were used interchangeably with **light fuel oil** in some plants, which might result in breaks in the time series.
- Prior to 2010, heat supply and consumption can include autoproducers unsold heat. Previous attempts to address such issue may have caused breaks for heat production and fuel in autoproducer heat plants (1993) and in autoproducer CHP plants, and for heat consumption in industry sub-sectors.

Consumption

- Data for **biogases** refer only to the gas from fermentation of biomass.
- Data for direct use of **geothermal heat** are available from 2000 and direct use of **solar thermal** heat

in commercial/public services from 2002 and in residential from 2009.

- Until 1998, data for **industrial waste** include **other recovered gases** which have to be reported in Coal questionnaire, causing a break between 1997 and 1998.
- Between 1992 and 1993, due to data availability, there is a large increase in **solid biofuels** for residential, commercial/public services and agriculture/forestry.

Portugal

Source

Direcção Geral de Energia e Geologia, Lisbon.

General notes

- The production capacity of **other liquid biofuels** for the years 2006 to 2012 are estimated by the Portuguese administration.
- Data are available from 1994 for **biogases**, from 1999 for **municipal waste** and from 2003 for **industrial waste**.
- Data for **solid biofuels** were revised by the National administration from 1990 to 2001, which may result in breaks in time series between 1989 and 1990.

Transformation

- The power station that burns **industrial waste** started to work as a CHP plant in 2007, whereas previously it was only producing electricity.
- In 2007, some power plants that were previously reported as main activity CHP have been reclassified as autoproducer CHP.
- New plants fuelled by **solid biofuels** and by **municipal waste** started in 1999.
- Data for production of electricity from **solar photovoltaic** and **wind** are available from 1989.

Consumption

- Data on **solid biofuels** were further revised based on a new survey on industry, resulting in breaks in sub-sectoral consumption for 2012.
- Between 2009 and 2010 a new survey on energy consumption in households creates a break in time series in the **solid biofuels** consumption in residential time series.

- Data for direct use of **solar thermal heat** are available from 1989 and direct use of **geothermal heat** from 1994.

Slovak Republic

Source

Statistical Office of the Slovak Republic, Bratislava.

General notes

- The Slovak Republic became a separate state in 1993 and harmonised its statistics to EU standards in 2000. These two facts lead to several breaks in time series between 1992 and 1993, and between 2000 and 2001.
- Data for **solar photovoltaic** are available from 2010.
- Prior to 2001, the data reported as **industrial waste** include **biogases** and **municipal waste**.
- **Hydroelectricity** capacity breakdown by plant size is available from 2001.

Transformation

- Prior to 2001, electricity generation from primary **solid biofuels**, **municipal waste** and **biogases** are included with **industrial waste**.

Consumption

- Data for direct use of **geothermal heat** are available from 2001 and direct use of **solar thermal heat** from 2005.

Slovenia

Source

Statistical Office of the Republic of Slovenia, Ljubljana.

General notes

- Data for Slovenia are available starting in 1990. Prior to that, they are included in Former Yugoslavia in World Energy Statistics.
- A new energy data collection system was implemented in January 2001, causing some breaks in time series between 1999 and 2000.

Consumption

- The break in time series between 2008 and 2009 for **solid biofuels** is due to revisions based on a new household survey which is to be carried out on an annual basis.
- Direct use of **solar thermal** and **geothermal heat** is available from 2009.
- Breaks in total final consumption for **industrial waste** prior to 2008 are a result of a sectoral reclassification.

Spain

Source

Ministerio de Energía, Turismo y Agenda Digital, Madrid.

General notes

- Spain is working on the improvement of data collection and as such, breaks in time series exist; historical revisions are expected in the 2018 edition.
- New reporting systems were implemented in 2000 and again in 2006 which resulted in a reclassification of many plants from main activity to auto-producer and vice versa. This leads to breaks in the time series for the transformation sector and final consumption sectors between 1999 and 2000 and again between 2005 and 2006.
- The Spanish administration verifies that production and consumption of **industrial waste** do exist but data are not available after 2001.

Transformation

- Since January 2013, the tax exemption for biofuels has expired, and the mandatory **biodiesel** blending target has been reduced from 7% to 4.1%, causing a significant decrease in the amount of pure **biodiesel** sent to blending.
- From 2013 data, a revision of the industry sector of some companies causes breaks in time series for **solid biofuels**, **municipal wastes** and **biogases**.
- A reclassification of plants from main activity to autoproducer in 2008 has led to breaks in electricity production between 2008 and 2009.
- The National Energy Commission reclassified plants that consume **biogases**, leading to breaks in time series between 2007 and 2008.

- Data for electricity from **solar thermal** plants are available from 2007.
- Prior to 2006, inputs of **biogases** used to generate process heat by autoproducers were included as inputs to transformation when they should have been reported in the appropriate industry in final consumption.
- From 2005, residential rooftop **solar photovoltaic** electricity production data are included in main activity electricity plants according to the Spanish administration classification, previously they were reported under autoproducer.
- The breakdown of **hydro** production by plant size is reported from 1999.
- Electricity production from **wind** and **solar** are reported from 1989 when data became available.
- Prior to 1989 inputs and outputs from the use of biofuels and waste to generate electricity and/or heat (i.e. comprising solid and liquid biofuels, industrial waste, municipal waste and biogases) are reported under non-specified biofuels and waste.

Consumption

- Prior to 2006, inputs of **biogases** used to generate process heat were erroneously included as inputs to transformation when they should have been reported in the appropriate industry in final consumption.
- The breakdown of **solid biofuels** direct use in the industry sector prior to 1999 is not available.
- Data for direct use of **geothermal heat** are available from 1990 and from 1994 for **solar thermal heat**.

Sweden

Sources

- Statistics Sweden, Örebro.
- Swedish Energy Agency, Eskilstuna.

General notes

- There are some breaks in time series between 2015 and 2016 in **pumped hydro**, **industrial waste** and **other liquid biofuels** figures due to the lack of data. The figures are expected to be modified in the 2018 edition.
- From 1990 to 2006, **municipal waste** was reported as 60% non-renewable and 40% renewable. In

2007, reanalysis of the waste revealed the content was 40% non-renewable and 60% renewable. This results in breaks in the time series between 2006 and 2007 for both renewable and non-renewable **municipal waste**.

Supply

- 2015 data for **primary solid biofuels** were revised downwards because estimated figures in the last edition came from quarterly surveys whereas in this 2017 edition, final statistics for 2015 are published.

Transformation

- Heat production from **solid biofuels** in autoproducer CHP includes waste heat and chemical heat.
- For 2012 and 2013, small quantities of **bio-methanol** used to produce electricity are included in **other liquid biofuels**, under production, as well as input and output of autoproducer CHP.
- Prior to 1992, data on electricity production from **biogases** are included with **solid biofuels**.

Consumption

- Due to confidentiality issues, **solid biofuels** consumption in food, beverages and tobacco is reported with paper, pulp and printing for 2014 data.
- Consumption data by sector for **biogases** are available from 2011.
- In 2011, there was a change in the reporting methodology for consumption of **solid biofuels and waste** in the residential sector, which is responsible for breaks in concerned time series between 2010 and 2011.
- Data on direct use of **solar thermal** are available from 1989.

Switzerland

Sources

- Swiss Federal Office of Energy (SFOE), Ittigen.
- Carburas, Swiss Organisation for Stockholding of Liquid Fuels, Zurich.

General note

From 1999, data on consumption result from a new survey and are not comparable with data of previous years.

Supply

- Due to a new program launched in September 2014 in which CO₂ emissions due to traffic can be compensated by substituting fossil gasoline and diesel by biofuels, the imports and road consumption of **bioDiesels** and **biogasoline** increased sharply in 2015.

Transformation

- The capacity reported for **biogases** only refers to the sum of capacities of **landfill** and **sewage sludge gas**.
- All **hydro electricity** production is reported under large scale hydro (> 10 MW) due to the fact that production data are not being collected by different size capacity categories.
- In 2015, the big decrease seen in electricity and heat production from **industrial wastes** is due to one large main activity CHP plant significantly reduced their activity.
- From 2012, the **municipal waste** autoproducer plant previously reported as electricity plant met the CHP requirements and was reclassified as such.
- **Biogas** is no longer being used for heat production as of 2011.
- The autoproducer heat plant that produced heat for sale using **municipal waste** was closed in 2006.
- Electricity production from **wind** data are available from 1996 and from 1990 for **solar photovoltaic**.

Consumption

- **Geothermal** direct use is over-stated as it refers to heat production by **geothermal heat pumps**, which include inputs from electricity and/or gas in the transformation process.
- Consumption data for **biogases** in the transport sector are available from 1996 to 2012 as a **biogas** fuel station had stopped selling **biogas** in 2013.
- Data for direct use of **geothermal heat** and **solar thermal heat** are available from 1990.

Turkey

Source

Ministry of Energy and Natural Resources (Enerji ve Tabii Kaynaklar Bakanlığı), Ankara.

General notes

- The Turkish administration only intermittently surveys **renewables and waste** used for power and heat. Due to this fact, some breaks may appear in the **biofuels and waste** time series.
- In the 2006 edition, the Turkish Statistical Office started providing electricity and heat output on the basis of a new survey that revised time series back to 2000. This causes breaks in the time series between 1999 and 2000. Not all of the input time series have been revised.
- In 1995, the Turkish administration reclassified auto-producer plants by type and source to be consistent with IEA definitions. This caused breaks between 1994 and 1995 for electricity production.

Transformation

- In the middle of 2014, most autoproducer electricity, heat and CHP plants in Turkey were reclassified as main activity producer due to a change in the legislation. This has resulted in electricity and heat amounts for autoproducer plants to record sharp generation changes from 2014 onwards.
- Data on electricity generated from **biofuels** are available from 1991.
- Electricity production from **wind** is available starting in 1998.

Consumption

- Prior to 1998, consumption in the **wood and wood products** sector includes that of the paper, pulp and printing industry.

United Kingdom

Source

Department for Business, Energy and Industrial Strategy (BEIS), London.

General notes

- In the 2017 edition, the UK government revised the data time series for **municipal waste** and **solid biofuels** back to 2001. As a result, breaks in time series may occur between 2000 and 2001.
- The launch of a feed-in-tariff scheme in April 2010 resulted in a rapid increase of capacity and corresponding electricity production growth from **solar PV** in the following years

Supply

- In 2009, the **biogasoline** production was above the reported production capacity. This is because of the fact that the capacity had reduced at the end of the year, due to closure.

Transformation

- From 2015, the UK administration started collecting data from the main activity **solar PV** companies. Prior to this, all data were included under autoproducers.
- The consumption of **solid biofuels** has increased in 2015, as the largest power station in the UK half-way through the year converted a further unit from **coal** to **biomass**, plus the previously converted unit had a full year of operation in 2015 rather than just the last few months of 2014.
- Prior to 2013, due to data confidentiality reasons, one or two main-activity **municipal waste** plants had to be included within the autoproducer plant category. Since 2013, as there have been at least three main-activity companies, these plants have been reclassified from autoproducer plant to main activity electricity plant, with some CHP plants included under main electricity due to confidentiality reasons.
- New data for electricity production from main activity electricity **wind** plant became available in 2007.
- Heat production started to be reported from 2008 onward.
- Electricity production data for **solar PV** are available from 1999.

Consumption

- The UK administration undertook a survey of domestic wood consumption in 2015 and revised figures back to 2008. This resulted in breaks in time series for solid biofuels consumption in residential sector between 2007 and 2008.

United States

Source

U.S. Energy Information administration, Washington DC.

General notes

- Capacity is net summer capacity.

- Due to the change in reporting methodology for **liquid biofuels**, breaks in time series occur between 2012 and 2013. This is especially noticeable in **biodiesel** time series. Potential revisions to historical data could occur in the 2018 edition.
- **Solar PV** electricity production reported for main activity producers refers only for grid-connected central power stations. The IEA Secretariat estimated US **photovoltaic (PV)** electricity generation from autoproducers starting in 1999 by multiplying the dispersed and distributed **PV** capacity estimated by the US administration by an average capacity factor of 12%. The capacity factor was based on a report published in 2007 by the IEA Photovoltaic Power Systems Programme, Cost and Performance Trends in Grid-Connected Photovoltaic Systems and Case Studies.
- **Geothermal** supply and transformation data are estimated by the IEA Secretariat starting in 2009 because of efficiency discrepancies.
- Data on **liquid biofuels** became available in 1993.
- Data on **industrial waste** and gas from **biomass** for 1990 and 1991 were estimated by IEA Secretariat.

Transformation

- The EIA collects generation and consumption data from all plants 1 MW or more in capacity.
- In 2015, many plants did not report **industrial waste** capacity as a primary energy source. This results in break in time series between 2014 and 2015.
- From 2007 to 2009, **industrial waste** includes recovered heat from industrial processes. From 2010, the electricity produced from recovered heat is reported under other sources.
- The **solar collector surface** figures are estimated by IEA Secretariat since 2010.
- In the 2009 edition, the US administration changed their methodology for calculating heat production in CHP plants, and revised data back to 2006. This leads to breaks in time series between 2005 and 2006.
- For the United States, prior to 2000, autoproducers include small and independent power producers, which under IEA definitions are considered main activity producers.
- Prior to 1999, **solar thermal electricity** production includes generation from natural gas because some

natural gas units are attached to **solar thermal** plants and their production could not be separated.

- In the 2003 edition, the US administration reclassified some plants to autoproducers. This reclassification causes more breaks between 1998 and 1999.
- Heat production data for **solid biofuels** became available in 1991.

Consumption

- Due to an improved estimation methodology, there are some breaks in time series of industrial sector and other sector between 2009 and 2010 for many fuels types: For the industrial sector, this can be found in **geothermal**, **biogases** and **industrial waste** (paper, pulp and printing). For other sectors,

breaks can be shown in **geothermal** and **solar thermal**.

- Prior to 2008, heat produced by heat pumps was reported as **geothermal** use in residential and commercial/public services.
- Direct use of **solar thermal heat** in residential is available from 1999.
- Due to problems in reporting, there are numerous breaks in time series for the US data, particularly in 1992, 1999, 2001 and 2002. Care should be taken when evaluating consumption by sector since inputs of fuel to autoproducers are included in final consumption for some years. No data are available for most energy products in the construction and mining and quarrying industries.

Energy Data Officer/Statistician

Possible Staff Vacancies

International Energy Agency, Paris, France

The IEA

The International Energy Agency, based in Paris, acts as energy policy advisor to 29 member countries in their effort to ensure reliable, affordable and clean energy for their citizens. Founded during the oil crisis of 1973-74, the initial role of the IEA was to co-ordinate measures in times of oil supply emergencies. As energy markets have changed, so has the IEA. Its mandate has broadened to incorporate the “Three E’s” of balanced energy policy making: energy security, economic development and environmental protection. Current work focuses on climate change policies, market reform, energy technology collaboration and outreach to the rest of the world, especially major consumers and producers of energy like China, India, Russia and the OPEC countries.

The Energy Data Centre, with a staff of around 30 people, provides a dynamic environment for young people just finishing their studies or with one to two years of work experience.

Job description

The data officers/statisticians compile, verify and disseminate information on all aspects of energy including production, transformation and consumption of all fuels, energy efficiency indicators, CO₂ emissions, and energy prices and taxes. The data officers are responsible for the production of data sets through receiving, reviewing and inputting data submissions from member countries and other sources. They check for completeness, correct calculations, internal consistency, accuracy and consistency with definitions. Often this entails proactively investigating and helping to resolve anomalies in collaboration with national administrations. The data officers/statisticians also design and implement computer macros used in the preparation of their energy statistics publication(s) alongside analysis of the data.

Principal qualifications

- University degree in a topic relevant to energy, or statistics. We currently have staff with degrees in mathematics, statistics, information technology, economics, engineering, physics, environmental studies, etc.
- Experience in the basic use of databases and computer software. Experience in Visual Basic is an advantage.
- Ability to work accurately, pay attention to detail and work to deadlines; ability to deal simultaneously with a wide variety of tasks and to organise work efficiently.
- Good communication skills; ability to work well in a team and in a multicultural environment, particularly in liaising with contacts in national administrations and industry; ability to understand, and communicate data.
- An excellent written and oral command of English; knowledge of other languages would be an asset.
- Some knowledge of energy industry operations and terminology would also be an advantage, but is not required.

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Office of Management and Administration
International Energy Agency
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Nine Annual Publications

■ World Energy Statistics 2017

World Energy Statistics presents comprehensive world energy statistics on all energy sources – coal, gas, oil, electricity, renewables and waste. It covers energy supply and consumption for 150 countries and regions, including all OECD countries, over 100 other key energy producing and consuming countries, as well as world totals. The book includes detailed tables by country in original units for the year 2015, and summary time series on production, trade, and final consumption by sector. It also presents provisional 2016 supply data for OECD countries, and initial 2016 estimates for non-OECD countries' production and trade of natural gas, primary coal and oil.

Published August 2017 - Price: Print €120; PDF €96

■ World Energy Balances 2017

World Energy Balances presents comprehensive energy balances for all the world's largest energy producing and consuming countries. It contains detailed data on the supply and consumption of energy for 150 countries and regions, including all OECD countries, over 100 other key energy producing and consuming countries, as well as world totals. The book includes graphs and detailed data by country for all energy sources – coal, gas, oil, electricity, renewables and waste - expressed in balance format, for the year 2015. Alongside this, there are summary time series on production, trade, final consumption by sector, as well as key energy and economic indicators. The volume also presents provisional 2016 supply data for OECD countries, and initial 2016 estimates for non-OECD countries' production and trade of natural gas, primary coal and oil.

Published August 2017 - Price: Print €120; PDF €96

■ Coal Information 2017

Coal Information provides a comprehensive review of historical and current market trends in the world coal sector, including 2016 provisional data. It provides a review of the world coal market in 2015, alongside a statistical overview of developments, which covers world coal production and coal reserves, coal demand by type, coal trade and coal prices. A detailed and comprehensive statistical picture of historical and current coal developments in the 35 OECD member countries, by region and individually is presented in tables and charts. Complete coal balances and coal trade data for selected years are presented on 22 major non-OECD coal-producing and -consuming countries, with summary statistics on coal supply and end-use statistics for about 40 countries and regions worldwide.

Published August 2017 - Price: Print €165; PDF €132

■ Electricity Information 2017

Electricity Information provides a comprehensive review of historical and current market trends in the OECD electricity sector, including 2016 provisional data. It provides an overview of the world electricity developments in 2015 covering world electricity and heat production, input fuel mix, supply and consumption, and electricity imports and exports. More detail is provided for the 35 OECD countries with information covering production, installed capacity, input energy mix to electricity and heat production, consumption, electricity trades, input fuel prices and end-user electricity prices. It provides comprehensive statistical details on overall energy consumption, economic indicators, electricity and heat production by energy form and plant type, electricity imports and exports, sectoral energy and electricity consumption, as well as prices for electricity and electricity input fuels for each country and regional aggregate.

Published August 2017 - Price: Print €150; PDF €120

■ Natural Gas Information 2017

Natural Gas Information is a detailed reference work on gas supply and demand covering not only the OECD countries but also the rest of the world; this publication contains essential information on LNG and pipeline trade, gas reserves, storage capacity and prices. The main part of the book concentrates on OECD countries, showing a detailed supply and demand balance for each country and for the three OECD regions: Americas, Asia-Oceania and Europe, as well as a breakdown of gas consumption by end user. Import and export data are reported by source and destination.

Published August 2017 - Price: Print €165; PDF €132

■ Oil Information 2017

Oil Information is a comprehensive reference book on current developments in oil supply and demand. This publication contains key data on world production, trade, prices and consumption of major oil product groups, with time series back to the early 1970s. Its core consists of a detailed and comprehensive picture of oil supply, demand, trade, production and consumption by end-user for each OECD country individually and for the OECD regions. Trade data are reported extensively by origin and destination.

Published August 2017 - Price: Print €165; PDF €132

■ Renewables Information 2017

Renewables Information provides a comprehensive review of historical and current market trends in OECD countries, including 2015 provisional data. It provides an overview of the development of renewables and waste in the world over the 1990 to 2015 period. A greater focus is given to the OECD countries with a review of electricity generation and capacity from renewable and waste energy sources, including detailed tables. However, an overview of developments in the world and OECD renewable and waste market is also presented. The publication encompasses energy indicators, generating capacity, electricity and heat production from renewable and waste sources, as well as production and consumption of renewables and waste.

Published August 2017 - Price: Print €110; PDF €88

■ CO₂ Emissions from Fuel Combustion 2017

In recognition of the fundamental importance of understanding energy related environmental issues, the IEA's *CO₂ Emissions from Fuel Combustion* provides a full analysis of emissions stemming from energy use. This annual publication has become an essential tool for analysts and policy makers in many international fora such as the Conference of the Parties, which will be meeting in Bonn, Germany, from 7 to 16 November 2017. The data in this book are designed to assist in understanding the evolution of the emissions of CO₂ from 1971 to 2015 for 150 countries and regions by sector and by fuel. Emissions were calculated using IEA energy databases and the default methods and emission factors from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

Published November 2017 - Price: Print €165; PDF €132

■ Energy Efficiency Indicators Highlights 2017

Energy Efficiency Indicators Highlights is designed to help understand what drives final energy use in IEA member countries in order to improve and track national energy efficiency policies. It provides the first comprehensive selection of data that the IEA has been collecting each year after its member states recognised in 2009 the need to better monitor energy efficiency policies. The report includes country-specific analysis of end uses across the largest sectors – residential, services, industry and transport. It answers questions such as:

- What are the largest drivers for energy use trends in each country?
- Was energy saved because of efficiency progress over time?
- How much energy is used for space heating, appliances or cooking?
- What are the most energy-intensive industries?

Improving energy efficiency is a critical step for governments to take to move towards a sustainable energy system. This report highlights the key role of end-use energy data and indicators in monitoring progress in energy efficiency around the world.

Published December 2017 - Free pdf

Two Quarterlies

■ Oil, Gas, Coal and Electricity

Oil, Gas, Coal and Electricity provides detailed and up-to-date quarterly statistics on oil, natural gas, coal and electricity for the OECD countries. Oil statistics cover production, trade, refinery intake and output, stock changes and consumption for crude oil, NGL and nine selected product groups. Statistics for electricity, natural gas and coal show supply and trade. Oil and coal import and export data are reported by origin and destination. Gas imports and exports data are reported by entries and exits of physical flows. Moreover, oil and coal production are reported on a worldwide basis.

Published Quarterly - Price €120, annual subscription: Print €380; PDF €304

■ Energy Prices and Taxes

Energy Prices and Taxes responds to the needs of the energy industry and OECD governments for up-to-date information on prices and taxes in national and international energy markets. It contains crude oil import prices by crude stream, industry prices and consumer prices. The end-user prices for OECD member countries cover main oil products, gas, coal and electricity. Every issue includes full notes on sources and methods and a description of price components in each country. Time series availability varies with each data series.

Published Quarterly - Price €120, annual subscription: Print €380; PDF €304

Electronic Editions

■ CD-ROMs and Online Data Services

To complement its publications, the Energy Data Centre produces CD-ROMs containing the complete databases which are used for preparing the statistics publications. Built-in software allows you to access and manipulate all these data in a very user-friendly manner and includes graphic facilities. These databases are also available on the internet from our online data service.

Annual CD-ROMS / Online Databases

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|--|-----------------------------|
| ■ World Energy Statistics 2017 | Price: €800 (single user) |
| ■ World Energy Balances 2017 | Price: €800 (single user) |
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| ■ Electricity Information 2017 | Price: €550 (single user) |
| ■ Natural Gas Information 2017 | Price: €550 (single user) |
| ■ Oil Information 2017 | Price: €550 (single user) |
| ■ Renewables Information 2017 | Price: €400 (single user) |
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A description of these services is available on our website: <http://data.iea.org>

Other Online Services

■ The Monthly Oil Data Service

The IEA *Monthly Oil Data Service* provides the detailed databases of historical and projected information which is used in preparing the IEA's monthly *Oil Market Report* (OMR). The IEA Monthly Oil Data Service comprises three packages available separately or combined as a subscriber service on the Internet. The data are available at the same time as the official release of the Oil Market Report.

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- | | |
|---------------------------------------|------------------------------------|
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A description of this service is available on our website: www.iea.org/statistics/mods

■ The Monthly Gas Data Service

The service provides monthly natural gas data for OECD countries:

- Supply balances in terajoules and cubic metres;
- Production, trade, stock changes and levels where available, gross inland deliveries, own use and losses;
- Highly detailed trade data with about 50 import origins and export destinations;
- LNG trade detail available from January 2002,
- From 2011 onwards, transit volumes are included and trade data corresponds to entries/exits.

The databases cover the time period January 1984 to current month with a time lag of two months for the most recent data.

- Monthly Gas Data Service: Natural Gas Balances & Trade
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Price: €800 (single user)

For more information consult: www.iea.org/statistics/mgds

Moreover, the IEA statistics website contains a wealth of free statistics covering oil, natural gas, coal, electricity, renewables, energy-related CO₂ emissions and more for 150 countries and regions and historic data for the last 20 years. It also contains Sankey flows to enable users to explore visually how a country's energy balance shifts over up to 40 years, starting with production and continuing through transformation to see important changes in supply mix or share of consumption. The IEA Energy Atlas offers panoramas on every aspect of energy on a global basis and for 150 individual countries, with interactive maps and customisable charts that detail and compare a host of data based on the Agency's authoritative statistics. The website also includes free headline energy data in excel format for all OECD countries and global regions from 1971 onwards as well as for Association countries from 1990 onwards.

The IEA statistics website can be accessed at www.iea.org/statistics/

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Renewables Information is one of a series of annual IEA statistical publications on major energy sources; other reports are *Coal Information*, *Electricity Information*, *Natural Gas Information* and *Oil Information*.

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