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Overcoming climate change and unleashing a dynamic, zero-carbon economy

A low-carbon transition is feasible. And besides, we have no choice.

Angel Gurría
Secretary-General of the OECD

The UN Conference on Climate Change (COP21) in Paris 30 November-11 December is a once-in-a-generation opportunity to reach a new international agreement to combat climate change and accelerate our transition to a low-carbon economy. World leaders attending the summit are aware of the urgency we face. However, to judge by their national contributions pledged so far, more ambition will be needed to keep global temperatures from rising above the agreed limit of 2°C. The "carbon entanglement" of our economies is keeping us on a collision course with nature.

We must and can change course. Simply committing to reduction targets for greenhouse gas (GHGs) emissions by 2030 is not enough; leaders must take action, with zero net emissions by the end of the century as our common goal.

The OECD has been involved in the fight against climate change for several decades, with cross-cutting analysis and in-depth discussion among experts and stakeholders both at the organisation and beyond. We know a low-carbon transition will not be easy, but it is feasible. And besides, we have no choice.

For COP21, the OECD's message is clear: world leaders are three steps away from overcoming climate change and unleashing a dynamic, zero-carbon economy. They must: first, end harmful subsidies and wasteful support for fossil fuels; second, spur innovation, and promote the conditions needed for climate-friendly investment and development; and third, work together to monitor progress and help one another to move forward, through co-operation, investment, trade and sharing ideas.

Let's start with unhealthy fossil fuels. Coal, oil and gas can be replaced by cleaner energy sources, which open up new opportunities for wealth creation, work and well-being. Policy makers must do more to make that happen.

Removing fossil fuel subsidies would be a quick win. Our latest inventory of some 800 measures on government books to support fossil fuels found that in OECD and emerging economies, subsidies amounted to about US$160-200 billion a year between 2010 and 2014, mostly for refined fuel through the likes of tax credits and exemptions. Remarkably, two-thirds of these measures were introduced before 2000, and some during the oil crisis of the 1970s. A broader estimate from the International Energy Agency (IEA) puts global consumer price subsidies even higher, at about $500 billion. Both estimates greatly exceed the $100 billion per year that developed countries have pledged to help poor countries prepare for climate change. Fossil fuel subsidies benefit the wealthy, and skew resources away from priorities such as health, education and cleaner energy development. They no longer make sense.

Removing them may not be easy in the face of resistance from deep-seated interests in "carbon-entangled" sectors. Yet many countries are taking action, such as the Netherlands, Mexico, India and Indonesia, in some cases with surprisingly good results in terms of improved public finances, economic incentives and equity. More governments should follow suit.

Apart from subsidies, policy makers must put a robust and steadily rising price on carbon through green taxes and/or sound carbon trading schemes that operate globally. These will help curb emissions by tilting the policy balance away from, say, coal which is relatively lightly taxed, and in favour of cleaner alternatives.

This leads to our second step, which is that of unleashing a low-carbon future. This entails two initial challenges: devising and aligning policies to build the innovative, dynamic environment in which low-carbon technologies and systems can flourish; and funding the infrastructure and transition.

Public spending on clean energy R, D&D (research, development and demonstration) averages about 0.05% in OECD countries. The IEA warns that we need to triple public energy investment in RD&D and scale up collaboration between public and private entities.

Meanwhile, OECD research shows that although new firms are driving innovation in low-carbon technology and systems, conventional policy settings like tax credits and regulatory standards restrict them, putting polluting incumbents at an advantage instead. Policy makers must reverse this.

Our analysis suggests that they should do a better job of aligning other parameters too. The low-carbon transition cuts across society, and policies on the likes of value-added trade, investment rules, local-content requirements, building standards, electricity grids, transport procurement, skills and taxes should all be pointing in one single direction: low-carbon.

Finance is particularly critical. Over the next 20 years, some $53 trillion–roughly the GDP of the OECD area–in cumulative capital expenditure on energy supply and energy efficiency will be needed to stay within the 2°C limit. This sounds huge but it is really just 10% or so above the $48 trillion to be spent on energy investment under business-as-usual projections. It is a small premium that in any case would be more than compensated for by the massive fuel and health savings brought about by shifting to low-carbon

infrastructures compared with locking us further into harmful fossil fuels.

How can we pay for it? New sources of funding should be tapped, such as the surging green bond markets, as should institutional investors, like insurers and pension and investment funds. These hold over $90 trillion in assets in OECD countries, but invest just a tiny fraction of that in energy infrastructure. This can be improved with the right policies and partnerships.

The third step for COP21 is working together to monitor progress. Developed countries should honour the aforementioned $100 billion commitment to poorer countries for a start. This is crucial for the UN Sustainable Development Goals and for garnering trust. Robust monitoring of all climate measures will help ensure everyone makes progress together and no one is left behind.

Businesses and households from Chile to Japan and from Gabon to New Zealand are showing what is possible, in technology, carbon markets and green regulations, as policy makers and OECD experts writing in this edition show. Cities too are taking a lead as laboratories of change, including Paris; as Mayor Anne Hidalgo remarks in our spotlight, another world is within reach.

The carbon clock is ticking and will continue ticking after COP21. In three steps, leaders can seize the momentum and help make the world a cleaner, healthier and fairer place to live.

www.oecdobserver.org/angelgurria
www.oecd.org/about/secretary-general
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Paris attacks

OECD condemns terrorist attacks in Paris, expresses condolences and solidarity with France

On behalf of the OECD, Secretary-General Angel Gurría tonight condemned in the strongest terms the barbaric terrorist attacks perpetrated in Paris on the evening of 13 November. He expressed his most heartfelt condolences and solidarity with France and the French people, the City of Paris, and its citizens following these terrible attacks.

Mr Gurría has written to the French president and prime minister to express these sentiments on behalf of the organisation headquartered in Paris and whose staff and families live in the city and surrounding area. "Our heartfelt condolences, thoughts and prayers are with the citizens of our host country France and our host city Paris and most particularly the families of the victims of these atrocities. This is a moment when we must all stand more united than ever in defence of the freedoms our democracies hold dear."

Posted 13 November on www.oecd.org

Tribute

We cannot comfort those who lost loved ones. We can–and we do–condemn the senseless attacks on Friday night. We can–and we do–reject terrorism and violence. So then, how can we pay tribute to the innocent victims and their families? The answer is clear: we can do so by carrying on the work that each of you do here at the OECD.

We are not soldiers or police or intelligence officers. But make no mistake, our challenge is just as great as theirs in fighting the scourge of terrorism. Our weapons are policies, passion and patience. We demonstrate our defiance by redoubling our efforts to make the world a better place, a safer place and a more inclusive place. We strike back against nihilism by doing everything in our power to improve lives everywhere.

The work that all of you do to expand access to jobs and education, to promote transparency and good governance, to pursue better policies for better lives: that is how we honour the victims. That is how we keep their memories alive.

A hashtag that emerged on social media in the hours after this terrible tragedy has stuck with me. #Portouverte signalled open doors for those fleeing the attacks. It was a symbol of our city's unity against violence, just like the long lines of blood donors on Saturday and those who gathered at Place de la République on Sunday.

But there is another message in the phrase "open door." It reminds us that we must maintain open doors for those who are fleeing exactly the same mindless violence behind the attacks on our home. We must not give in to hatred. We must not succumb to those who would demonise the women, children and men desperate to find a safe haven. We must not condemn the whole for the acts of the few. We must not be confused about who our enemies are.

We at the OECD–we of all people–must remain committed to equality, inclusion and tolerance. As we mourn our own, we cannot forget those struggling to escape extremism. We need to keep our doors open. And we need to keep our hearts open.

Now, as we pause to remember the victims and their loved ones, I ask each of you to honour them by deepening your commitment to making the world a better place through our work here.

Douglas Frantz, OECD Deputy Secretary-General, delivered on 16 November 2015 to OECD staff before holding a minute's silence in honour of the victims of the Paris attacks, 13 November 2015.

News brief

Growth prospects cloudy

A sharp slowdown in emerging market economies and world trade has weakened global growth to around 2.9% this year, the OECD said in November. This is well below the long-run average. Deep recessions have affected Brazil and Russia, while the slowdown in China has increased financial market uncertainty in the near term. Global trade growth has slowed markedly, especially in the emerging market economies.

In its latest biannual *Economic Outlook*, 9 November, the OECD projects a gradual strengthening of global growth in 2016 and 2017 to an annual 3.3% and 3.6%. However, a clear pickup in activity requires a smooth rebalancing of activity in China and more robust investment in advanced economies. The slowdown in global trade and the continuing weakness in investment are deeply concerning, the OECD said.

Screenshot of OECD Chief Economist Catherine L Mann on Bloomberg TV, 9 November.

See www.oecd.org/oecdeconomicoutlook

OECD-G20 BEPS project endorsed

In a step forward to improve the resilience of tax systems, the final package of Base Erosion and Profit Shifting (BEPS) measures was endorsed by all G20 finance ministers in Lima on 9 October. They agreed to forward BEPS measures for discussion and action by G20 leaders during their annual summit in Antalya, Turkey, on 15-16 November (see page 62).

The G20 finance ministers expressed strong support for the OECD/G20 BEPS project, which provides governments with solutions for closing the gaps in international rules that allow corporate profits to disappear, or be artificially shifted to low-tax environments, where little or no economic activity takes place. Reforms to the international tax system include new minimum standards on country-by-country reporting, treaty shopping and mutual agreement procedures.

www.oecd.org/tax/beps

Soundbites

New leader

Many of you have worried that Canada has lost its compassionate and constructive voice in the world over the past 10 years. Well, I have a simple message for you: on behalf of 35 million Canadians, we're back.

Justin Trudeau, Prime Minister Delegate of Canada, Ottawa rally, 20 October

Climate and planet

The longer we wait, the costlier and more difficult it will be for us–and our children and grandchildren–to protect the planet.

Jim Yong Kim, President, World Bank Group, *Project Syndicate*, 21 October

The narrative that we are being given is that the world has changed, and that it is time to expand the pool of so-called donors of climate aid and to narrow the list of eligible developing countries to receive support.

Nozipho Mxakato-Diseko, South African ambassador and leader of the G77 and China group at Bonn Climate Change Conference, *Politico*, 26 October

Migration distinction

Greece can guard its borders perfectly and has been doing so for thousands of years, but against its enemies. The refugees are not our enemies.

Yiannis Mouzalas, Greece's migration minister, *Wall Street Journal*, 25 October

Drug spending slows

Pharmaceutical spending reached around US$800 billion across OECD countries in 2013, according to the latest *Health at a Glance* report. The growth of retail pharmaceutical spending has slowed recently in most OECD countries, thanks to policies boosting the generic market. Depression may be a driver of drug spending growth, with the consumption of antidepressants nearly doubling on average across OECD countries since 2000.

Economy

Real **GDP** in the OECD area grew by 0.5% in the second quarter of 2015, the same rate as the previous quarter. Private consumption was the main contributor, with 0.3 percentage points. Growth rebounded to 1% in the US, following 0.2% in the previous quarter, and remained relatively strong in the UK at 0.7%. Growth contracted by 0.3% in Japan and 0.1% in Canada, while remaining flat in France. In the EU growth remained stable at 0.5%.

OECD-area **inflation** slowed to 0.4% in the year to September 2015, down from 0.6% in the year to August, as energy prices continued to fall. Excluding food and energy, the OECD annual inflation rate picked up marginally to 1.8% in September compared with 1.7% in August.

Unit labour costs in the OECD area grew at a steady 0.1% in the second quarter of 2015. In the US, labour costs slowed from 0.5% to 0.1% quarter-on-quarter, while rising by 1.4% in the UK and 0.4% in Japan.

The **unemployment** rate in the OECD area was stable at 6.7% in September 2015, 1.4 percentage points below the January 2013 peak. Some 40.9 million people were out of work, 8.0 million less than in January 2013, but still 6.4 million more than in July

Country roundup

While **Korea** has seen strong economic growth over the past decades, its future depends on improving relevance of education and skills to labour market, a new OECD report finds. www.oecd.org/korea

Brazil has made remarkable social and economic progress in the past two decades, but must now overcome important challenges to put its economy on a stronger, fairer, greener growth trajectory, according to two new OECD reports. www.oecd.org/brazil

Promoting longer working lives would help **Denmark** meet the challenges of its rapidly ageing population, according to a new OECD report. www.oecd.org/denmark

Colombia needs to improve its capacity to investigate foreign bribery by establishing an effective corporate liability regime, improving co-ordination among its numerous agencies and more rigorously training law enforcement, a new OECD report says. www.oecd.org/countries/colombia

Improvements in health, access to basic services and housing have contributed to raising standards of living in **Mexico** over the past 15 years, though further advances are needed to get closer to the OECD average. www.oecd.org/mexico

Austria should do more to help people with frequent mental health problems find a job or stay in the workplace. www.oecd.org/austria

Viet Nam has made remarkable agricultural progress, the *OECD Review of Agricultural Policies in Viet Nam* says. www.oecd.org/countries/vietnam

Spain's future prosperity depends on raising people's skills and removing barriers to innovation and employment, according to a new OECD report. www.oecd.org/spain

The positive effects expected from the Macron Law show that **France** must pursue its structural reform initiatives, OECD says. www.oecd.org/france

The end of the mining boom has highlighted the urgent need for **Chile** to diversify its economy away from commodity-intensive sectors www.oecd.org/chile

Germany's former Chancellor Helmut Schmidt, who died aged 96 on 10 November, jokes with the late Margaret Thatcher, on a visit to the British prime minister in London, 1979. Chancellor Schmidt, who was a member of the Social Democratic Party (SPD), was an ardent European and supporter of international co-operation. As federal minister for finance Helmut Schmidt participated in the 12th OECD Ministerial Council Meeting, 6-8 June of 1973.

©AFP/DPA/DPA Picture Alliance

Other stories

Child poverty: Life satisfaction, reading and problem-solving skills, communication with parents and peers, and intention to vote in national elections in later life are lower among children from less well-off families, the latest edition of *How's Life* shows. They are also more likely to be bullied at school.

Cuts to R&D spending threaten to destabilise science and research systems in many advanced economies, a new report warns. The *OECD Science, Technology and Industry Scoreboard 2015* says countries should step up their investment in long-term R&D, to reshape industry and health care, and provide solutions to climate change.

Business and government leaders should treat **digital security** as an economic risk rather than a technical issue, according to a new OECD recommendation to member countries.

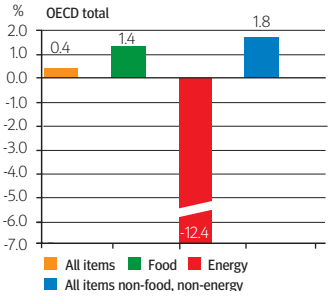
2008, before the crisis. The unemployment rate fell by 0.1 percentage points in the euro area, its lowest level since January 2012, and was stable in Japan and the US at 3.4% and 5.1% respectively.

Meanwhile, the OECD area **employment** rate (people of working age in employment) remained stable at 66.1% in the second quarter of 2015, 0.4 percentage points below the level recorded in the second quarter of 2008.

For latest updates on economic statistics, see www.oecd.org/std/statisticsnews releases.htm

Consumer prices

September 2015, % change on the same month of the previous year



Plus ça change...

So long as goods such as pure air, unpolluted water and amenities derived from nature or a pleasant environment were regarded as "free" goods belonging outside the economic sphere, it was quite legitimate not to account for them. Today an altogether different situation has arisen– to make these goods less scarce is to add to the world's assets and to increase human satisfaction.

"The need for intergovernmental co-operation and co-ordination regarding the environment" in Issue No 50, February 1971

OECD Observer

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Three things you need to know about climate change

Simon Upton, Director, OECD Environment Directorate

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Three key points will help world leaders and representatives of business, labour and civil society to strike an effective new deal on climate change at the crucial UN summit on climate change in Paris and accelerate climate action in 2015 and beyond.

Are we moving fast enough in fighting climate change?
In a word, no. Everyone acknowledges the problem, but around the world, hundreds of billions of dollars are still being spent subsidising the use of fossil fuels. Fossil fuels remain the dominant energy source. Now, there is incremental progress being made, but the trouble is it's just not fast enough. We are already seeing the physical signs of climate damage, and our work suggests we will start to see that impacting on economic growth before too long.

Remember, 2°C of warming is already locked in. It is going to be costly enough coping with that. Any warming beyond that is going to be harder and harder to cope with. So we need to move faster, because time is the one thing we haven't got. Delay is going to limit our choices and make things much more costly.

Is the solution to agree on concrete emission targets?
Well, it is not just a matter of setting targets; it is also a matter of meeting them. And that requires from governments a plan of action which will go right down into the engine room of the economy. This is a massive challenge, and no corner of the economy will be left untouched, because we will need to get to somewhere very different from where we are now. That is, a world in which there are net zero carbon emissions by the end of the century.

So, we need a price on carbon. That could be via a carbon tax or an emissions trading system, for instance. It is no use hoping people will stop polluting if it is free to do so. Already in 2015 carbon emissions into the atmosphere have reached new heights. We need to ensure that the regulations, which exist today to help a fossil economy prosper, are replaced with regulations which allow the penetration of clean technologies in all sectors. And then we need to be able to mobilise capital behind those clean technologies. And finally, but by no means least, we need to ensure that the costs of the transition, because there are costs, aren't disproportionally borne by people who are not in a position to bear them.

> "It is no use hoping people will stop polluting if it is free to do so

Do we have the funds to effectively fight climate change?
Well that is always going to be a question of priorities, but in the case of developed and rapidly emerging economies, there is a big question around mobilising private investment. Governments have to make sure that their policies do not stand in the way. Now, if you take institutional investors like pensions funds or insurance companies, these interests control over US$90 trillion dollars' worth of assets. Yet, less than 1% finds its way to investment in clean infrastructure. There are regulatory reasons for that, and those barriers need to be removed.

When it comes to developing countries, there is a case for more assistance from developed countries. The good news there is that that flow of funding is rising. Analysis by OECD and Climate Policy Initiative estimates that developed countries mobilised $62 billion to support climate action in developing countries in 2014, up from $52 billion in 2013. This is encouraging, but there is still some way to go to reach the target of $100 billion by 2020.

Adapted from video interview with Simon Upton, September 2014, see https://www.youtube.com/watch?v=jNJLxPNJ3Qc

Visit www.oecd.org/environment/cop21.htm

The energy sector holds the keys on climate

Fatih Birol, Executive Director, International Energy Agency (IEA)

When the International Energy Agency (IEA) was formed in 1974, concern over climate change was in its infancy. While the greenhouse effect was known it was not widely recognised, and the debate about the long-term effect of CO_2 emissions was confined more or less to academia.

However over the decades leading up to the first assessment report of the Intergovernmental Panel on Climate Change (IPCC) in 1990, the world slowly began to take notice. Climate change spilled out of the pages of scientific journals and into the realm of global politics.

Now, in 2015, climate change is globally accepted to be one of the defining challenges of the 21st century. There is no escaping it, and collective efforts to overcome this challenge must involve every region of the world, and every sector of the economy.

No sector is more important to these efforts than energy. If we are to have any hope of meeting our collective climate target of limiting global average temperature rise to 2° Celsius, future energy demand cannot be met using the methods we used in the past. The rising energy demand of the last half-century was met principally by fossil fuels, the burning of which accounts for two-thirds of global greenhouse gas (GHG) emissions. Future energy demand must be significantly less carbon-intensive. This is why it is so critical that when decision-makers gather in Paris for the UN summit on climate change, known as COP21, they build a climate agreement that has the energy transition at its core.

Thankfully, there are positive signs. As of October 2015, the more than 150 countries that have submitted their pledges on climate, known as Intended Nationally Determined Contributions (INDC), account for around 90% of global economic activity and almost 90% of global energy-related GHG emissions. These countries also account for around 90% of global fossil fuel demand, and almost 80% of fossil fuel production. If these pledges are fulfilled, then growth in energy sector GHG emissions will slow dramatically by 2030, marking a significant step towards decoupling emissions from economic growth.

So how can we ensure that these pledges are met? What can be done immediately, and in the short term, to put the energy sector on a path that ensures that COP21 does not join the list of climate summits

that produced agreements long on ambition but short on results? The IEA is coming to COP21 with four keys based on realistic and pragmatic actions that would open the door not only to a successful agreement, but more importantly, to successful implementation as well.

1. Achieve a peak in emissions. This first key focuses on the fact that before we can see a decline in global emissions, we must see a peak. Reaching this peak, while maintaining (and indeed supporting) economic growth, can be achieved through cost-effective measures and proven technologies. These efforts are outlined in the IEA's Bridge Scenario, which describes five actions that could be taken to see a peak in global emissions around 2020, while supporting the same level of GDP growth as in current climate pledges.

Globally, about half of the emissions savings in the Bridge Scenario are achieved through energy efficiency measures in the industry, buildings, and transport sectors. These measures are designed to improve the energy performance of new products and appliances, industrial processes, building energy services, and the fuel economy of vehicles.

About 9% of the emissions savings are achieved through a gradual reduction in the use of subcritical coal plants and a ban on new construction, and another 17% through the use of appropriate policy signals to increase investment in renewable energy to US$400 billion by 2030, up from $270 billion today. Some 15% of emissions savings are achieved through policies to reduce methane releases from upstream oil and gas production, as methane's effect on the atmosphere is considerably more potent than CO_2. Finally, a further 10% of the emissions savings are achieved through an almost complete phase-out of fossil fuel consumption subsidies by 2030. These subsidies encourage wasteful energy expenditure and contribute to air quality problems, and can be replaced with less costly policies to promote energy access for the poor.

2. Combine short-term actions with long-term goals. This second key to success at COP21 requires an agreement that signals a transformational shift to a low-carbon energy system. This is crucially important, as much of the energy infrastructure that is being built today will still be in service in 2050. How can we expect to meet targets for 2050 if we have not yet put in place the policies, technologies and infrastructure necessary to get us there? Tracking progress is essential for long-term, transformational change in the energy sector, and to enable this, the Paris framework must build in a credible process for periodic review and strengthening of countries' targets every five years. This would create an expectation of rising ambition and ensure that political commitments reflect changing circumstances in the energy sector, including the falling cost and improving performance of low-carbon technologies. A variety of metrics can help decision-makers ascertain whether short-term policy actions are producing outcomes in the energy sector that are in line with longer-term decarbonisation objectives.

> We need a tripling of public energy investment in RD&D and a scaling up of collaboration between public and private entities

3. Accelerate energy technology innovation. Reducing the cost and improving the performance of low-carbon technologies is an essential key to making the transformation of energy systems affordable and feasible. Unfortunately, the IEA's 2015 assessment *Tracking Clean Energy Progress* finds that no technology is currently on track. To get to where we need to be, we will need a tripling of public energy investment in RD&D (research, development and demonstration), and a scaling up of collaboration between public and private entities in both developed and developing countries. We will need policies and funding to bring low-carbon technologies from development and demonstration to market maturity.

4. Increase energy sector resilience. This last key is all too often overlooked. It is the importance of ensuring that any climate change that occurs does not threaten our energy infrastructure. Thermal and hydro power plants, for example, are particularly susceptible to water stresses that may be more frequent due to climate change, such as reduced river runoff. Businesses are key actors in this regard, in designing and implementing resilient and adaptive practices. Yet governments can also play a role in creating an enabling environment and appropriate policy frameworks to support and encourage resilience-building actions by businesses. Put simply, current and future energy systems must be climate-proof.

These four keys are not revolutionary. Indeed, these are issues and technologies that we have been aware of for many years. Yet this is where they draw their strength. Countries, businesses and households should not be waiting for tomorrow's technology or market development to reduce our collective emissions footprint and make progress on climate change. We already have the tools that we need, right here, today.

The test for governments in Paris will be whether or not they are willing to take these first steps. These steps are critical if we are to realise the deeper systemic changes needed once and for all to decouple growth and development from emissions, and set along a path to a dynamic, low-carbon future.

References

IEA (2015), *Energy Efficiency Market Report 2015*, OECD Publishing.

IEA (2015), *World Energy Outlook Special Briefing on COP21*, OECD Publishing.

IEA (2015), *World Energy Outlook Special Report 2015: Energy and Climate Change*, OECD Publishing.

IEA (2014), *World Energy Outlook 2014*, OECD Publishing.

Combating climate change: What policy makers are doing

World leaders attending the UN Conference on Climate Change (COP21) in Paris know they have a rare opportunity to forge a new international agreement to combat climate change and set forth a pathway towards a low-carbon world. More ambition will be needed by all sides if global temperatures are to be prevented from rising above 2°C, the agreed threshold for preventing catastrophic climate change. But even without that target, unleashing a low-carbon future makes sense for health, costs and sustainable development.

So what are policy makers actually doing? In our latest OECD Observer Roundtable, we asked a representative range of world leaders:

What concrete actions is your government taking to combat climate change and promote a low-carbon economy?

©Phil Noble/Reuters

Chile

Three actions for environmental democracy

Pablo Badenier Martínez, Minister of Environment

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As examples of our current efforts in addressing the challenges of climate change in Chile, I would like to highlight three actions. Firstly, as proposed in the Government Programme of President Michelle Bachelet we have strengthened our climate institutional framework by setting up an inter-ministerial decision body on climate change, called the Council of Ministers for Sustainability and Climate Change; this brings the climate agenda to the highest decision level. Our recently announced Intended Nationally Determined Contribution (INDC) and previously our National Adaptation Action Plan were both reviewed and approved by this committee.

Secondly, in close co-ordination with the finance and energy ministries, a carbon tax of USD$5 per tonne of CO_2 emitted to thermal generation sources above 50 megawatts is due to be applied in the country from 2017. Chile was the first country to set a tax of this kind in South America and in this regard, in October 2015 President Bachelet expressed Chile's support to the Carbon Pricing Leadership Coalition, to be launched at COP21 in Paris.

Thirdly, the Ministry of Environment is leading the building of the country´s next National Climate Change Action Plan (2016-21). This action plan will be built upon a participatory approach open to actors from all sectors and fields, following Chile's commitments on environmental democracy. The plan will have a strong emphasis on implementation, with a special focus on those measures needed to fulfil Chile´s INDC.

Of course, our work is not limited to these areas and measures. We are taking forward an ambitious agenda in other key areas, such as adaptation, greenhouse gas (GHG) inventories and regional best practice sharing. We are working for a global agreement in COP21, but Chile's work will not end in Paris: we are fully committed to a long-term climate agenda.

Visit: http://portal.mma.gob.cl/cambio-climatico/

Germany

Exceeding its pledge

Barbara Hendricks, Federal Environment Minister

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From 1990 to 2013 Germany achieved a significant cut of 24% in its GHG emissions, thus exceeding its pledge under the Kyoto Protocol to reduce emissions by an average of 21% between 2008 and 2012 compared to 1990. Moreover, in 2007 Germany had already set itself the goal of cutting emissions by at least 40% by 2020 compared to 1990 levels. This is substantially more ambitious than the target for the EU as a whole.

On 3 December 2014 the German government adopted the Climate Action Programme 2020, comprising more than 100 individual measures in all sectors, to ensure that the target is achieved by 2020.

One of the programme's key elements is the National Action Plan on Energy Efficiency (NAPE), which focuses on raising energy efficiency in buildings, energy saving as a business and earnings model, and individual responsibility for energy efficiency. NAPE instruments include a competitive tendering scheme, support for contracting, further development of existing energy efficiency programmes and co-operating with trade and industry associations to set up energy efficiency networks for companies.

The strategy on climate-friendly building and housing is primarily geared to the long-term target of climate-neutral buildings by 2050, but it also lays solid foundations for 2020, incorporating energy efficiency into other climate measures. In the transport sector we are promoting climate friendly modes for goods and passengers, such as rail, public transport and bicycles, the use of electric drives, and engine efficiency in motor vehicles.

To achieve the necessary reductions in the energy industry, besides the necessary reform of emissions trading, the Climate Action Programme 2020 focuses on the expansion of renewable energy, combined heat and power generation, and other measures in the electricity sector, in particular those aimed at lowering consumption.

In 2014, for instance, the share of renewable energies in gross electricity consumption rose to 27.4%, and helped avoid around 110 million tonnes of CO_2 equivalents, with wind energy, biomass and photovoltaics playing the most important roles.

Less than a year after the adoption of Germany's Climate Action Programme 2020, the first government report has shown that implementation planning for nearly all the adopted measures is either well-advanced or already complete.

A decisive factor for achieving the government's climate targets is the participation of all stakeholders and target groups. The Climate Action Alliance, comprising representatives of all civil groups, will support the German government in the implementation of adopted measures and help identify further areas for action, notably towards the Climate Action Plan 2050.

Visit www.bmub.bund.de/en/

Japan

Renewable energy and efficiency are pillars

Tamayo Marukawa, Minister of the Environment

COP21 marks a turning point in the challenge of climate change, symbolising the beginning of the world's commitment to the long-term efforts to create a low-carbon and climate-resilient society. Japan is devoted to the success of COP21 with the adoption of a new, fair and effective legal agreement applicable to all.

A Paris agreement should deliver a signal for the world to accelerate actions for transition to a low-carbon society and achieve the 2°C goal. From this viewpoint, it is important to establish a review system which effectively ensures implementation of each country's contribution and to progressively increase the ambition over time, taking into account the outcome of the 2015 G7 Summit supporting the upper end of 40-70% reductions by 2050 compared to 2010.

Japan's intended nationally determined contribution (INDC) strives for reduction of GHG emissions by 26% by the fiscal year (FY) 2030 compared to the FY 2013 (25.4% compared to the FY 2005). Japan will develop a plan to combat climate change as soon as possible to achieve this target.

Renewable energy is a pillar of mitigation. Renewables are to increase to 22-24% of total power generation by 2030. Solar energy will increase sevenfold. Wind and geothermal energy fourfold. INDC requires the proper implementation of a feed-in tariff (FIT) and the further development and demonstration of new renewables, including floating offshore wind turbines.

Energy efficiency represents another pillar. Japan aims to reduce its total energy consumption by approximately 50 million kL (crude oil equivalent) by 2030, through the promotion of next-generation motor cars, improved energy efficiency in buildings and housing using energy saving standards etc.

Japan is already implementing the Joint Crediting Mechanism (JCM) to reduce GHG emissions through the use of leading low-carbon technologies. Currently, there are 52 projects in the pipeline in 15 partner countries. We are pursuing further implementations of JCM projects.

In May 2016, I will host the G7 Environment Ministers' meeting in Toyama, a beautiful and environmentally friendly city. I look forward to hosting discussions on various environmental issues including climate change. As chair, I will seek to lend support to both individual and collective actions, paving the way to a sustainable society.

Visit www.env.go.jp/en/

New Zealand

Playing to its strengths

Tim Groser, Minister Responsible for International Climate Change Negotiations

We're blessed with an abundance of renewable electricity (already 80%, and we're aiming for 90%), but half our emissions arise from biological processes, where the options to reduce them are limited. Our answer is to play to our strengths: we've pledged to reduce emissions to 30% below 2005 levels by 2030. Coal-fired power generation in New

Tim Groser

Zealand will cease by 2018, with the planned closure of generators at our largest power station. Geothermal energy has more than doubled over the past decade and, for the first time in 40 years, contributed more electricity than natural gas in 2014. We're exporting our geothermal expertise around the globe, from Indonesia to Africa, and we're focusing NZ$100 million (US$65 million) in climate finance on helping Pacific Islands make the shift from diesel to clean energy.

Agriculture's our second key strength. Building on our proud history of innovation in agricultural science and policy, we initiated a Global Research Alliance of 46 developed and developing countries to collaborate on ways to grow more food without growing emissions. The results from initial trials are exciting, with a new compound seeing methane reductions of 30% to 90% in the sheep tested.

We phased out agricultural subsidies in the 1980s, and now, we're applying what we learned by leading a coalition of governments calling for the elimination of inefficient fossil fuel subsidies. With oil prices low, and the momentum of COP 21, the logic is undeniable: we can't on the one hand call for a price on carbon, and on the other pay subsidies that encourage wasteful consumption and tilt the playing field against renewables. Subsidy phase-out would deliver health benefits and cut global emissions by 10%. We'll deliver a well-supported communiqué promoting this on Leaders' Day in Paris.

Our fourth strength lies in carbon markets, where we've had an emissions trading system (ETS) in place since 2008. We're working hard with the many countries who've signalled that the international transfer of units will likely help them meet their national targets. Carbon pricing schemes are a reality, and will grow. The significance of China's plan to create a national ETS next year can't be under-estimated. We need to design systems to efficiently channel investment, maximise mitigation outcomes and capitalise on the co-benefits markets deliver, such as technology transfer. Setting standards to ensure environmental integrity and no double-counting is essential, and we're a driving force behind this.

Visit www.climatechange.govt.nz and www.mfe.govt.nz/climate-change

United States

Accelerating the clean energy economy

Gina McCarthy, Administrator, United States Environmental Protection Agency

The United States is cutting the pollutants that fuel climate change and seizing opportunities to drive our clean energy economy at the same time.

In 2013 President Barack Obama issued a Climate Action Plan to accomplish these goals by cutting carbon pollution, boosting the country's resilience to climate impacts and leading international efforts to address this as a global challenge. Over the past several years, the US administration has taken a host of steps to deliver on that plan.

We've set historic GHG and fuel efficiency standards that will send our cars twice as far on a gallon of gas by the middle of the next decade–saving US families at the pump and revitalising our auto industry at the same time.

The US is now generating three times as much wind power and 20 times as much solar power as we did when President Obama took office–and our solar industry is creating jobs 10 times faster than the rest of the economy.

We've also made unprecedented investments to cut energy waste in US homes, buildings and appliances–actions that will save consumers billions of dollars. And the US private sector is stepping up, including by making more than US$4 billion in commitments to scale up investments in clean energy innovation.

Over the past year, we've taken steps that will cut consumption of hydrofluorocarbons (HFCs), which have high global-warming potential, by the equivalent of more than 100 million metric tonnes of carbon dioxide through 2025. And US companies are hard at work developing the next generation of cost-effective alternatives that will be brought to market.

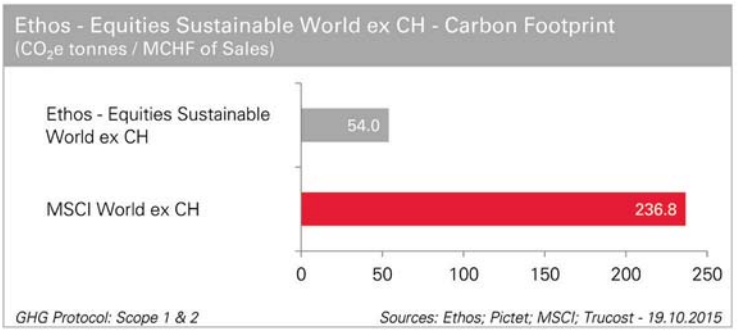
In August 2015 the US Environmental Protection Agency issued an historic Clean Power Plan that puts our country on track to slash carbon pollution from power plants 32% below 2005 levels by 2030. In addition to major health benefits and cost savings for US families, the plan will drive innovation by empowering states to use low-carbon electricity generation technologies to meet its requirements.

Addressing climate change brings tremendous opportunities to improve public health and drive a clean energy economy. With each step we're taking, the United States is seizing those opportunities.

www.epa.gov

Climate: the responsibilities of institutional investors

Several countries commit to reducing greenhouse gas emissions in the next decades. To meet these goals, a collective effort of all economic actors is required in this context, institutional investors play an important role as capital purveyors for companies. They are called to be actively involved by urging companies to take into account environmental risks in their activities, by investing in companies with low carbon intensity and by communicating the carbon footprint of their equity portfolios.



As investors we build the world of tomorrow

The Ethos Foundation was founded in 1997 in Geneva. It comprises approximately 220 Swiss pension funds and other tax-exempt institutions. Ethos aims at promoting socially responsible investment as well as a stable and prosperous socio-economic environment. Activities in the field of socially responsible investment (SRI) are conducted by the company Ethos Services SA which carries out asset management and advisory mandates. Ethos Services offers institutional investors a wide range of SRI-funds. The company also provides proxy voting reports including voting recommendations, a shareholder engagement programme, as well as sustainability and corporate governance ratings and analyses of listed companies.

Ethos Foundation follows a three step approach

Climate change constitutes not only a major environmental risk but also a significant financial risk for investors. In light of this, Ethos Foundation acts on three levels of its investment policy :

Engage in dialogue with companies on environmental matters
As capital purveyors, investors have a duty and responsibility to dialogue with company management. Via its dialogue programme with Swiss listed companies, Ethos acts on behalf of more than 120 Swiss institutional investors and supports the publication by companies of their CO2 emissions as well as emission reduction targets.

Reduce carbon footprint of equity portfolios
Financial risk reduction necessitates an active management of decarbonisation of holdings. In this spirit, Ethos recently launched the fund « Ethos - Equities Sustainable World ex Switzerland » the carbon footprint of which is four times less than that of the reference index (see above).

Communicate carbon intensity of equity portfolios
Responsible investors must be transparent by publishing the carbon intensity of their investments. Today, more than one hundred institutional investors (incl. Ethos Foundation) have signed the « Montréal Carbon Pledge ». This means they commit to publish, for all or a part of their portfolios, the greenhouse gas emissions for which they take responsibility.

www.ethosfund.ch

Electric vehicles are the answer to climate change

In bringing mobility to generations of women and men, motor cars opened the gates to the modern world–to freedom and independence. But this progress came at a cost: personal transport now generates 15% of greenhouse gas emissions. Renault and Nissan have developed a range of zero-emission electric vehicles, which now represent the most effective way of reducing carbon dioxide emissions and offer motorists an exciting new driving experience...

Zero-carbon mobility

Given that fossil fuels still meet 98% of energy needs in today's automotive sector, electric vehicles offer a genuine sustainable alternative, one pioneered by the Alliance when it brought out the Nissan LEAF in 2010. Power is provided by an electric motor, and since this requires no internal combustion of fossil fuels, the vehicle does not emit CO_2 on the road.[1] In fact, electric cars sold by Renault have prevented an annual average of 115 000 tonnes of CO_2 being emitted into the atmosphere, or 230 450 barrels of crude oil.[2]

The electric car's overall carbon footprint varies from country to country, since it depends on how the electricity is produced–hydropower, wind turbines, coal or nuclear power stations, etc. The Renault Zoe, for example, emits 15 grams of CO_2 per kilometre in France, 30 g/km in Canada and 58 on average in Europe.[3]

As global electricity production moves away from carbon, and shifts towards renewable energies, electric cars will become greener still. Worldwide, 56% of new electricity production facilities are renewable, and this figure is 72% in Europe.[4]

In the near future, electric vehicles will be able to store increasing quantities of electricity. When connected to an efficient, smart electric grid, they will be able to support the energy transition of cities, regions and countries.

The driving experience of the future

Going from 0 to 50 kmh in four seconds, steadily, smoothly and without jerking, charging the car as easily as you charge your phone, getting around in a silent vehicle... electric cars are inventing a new kind of mobility that is enjoyable and comfortable, while reducing the carbon footprint.

Time for mass production

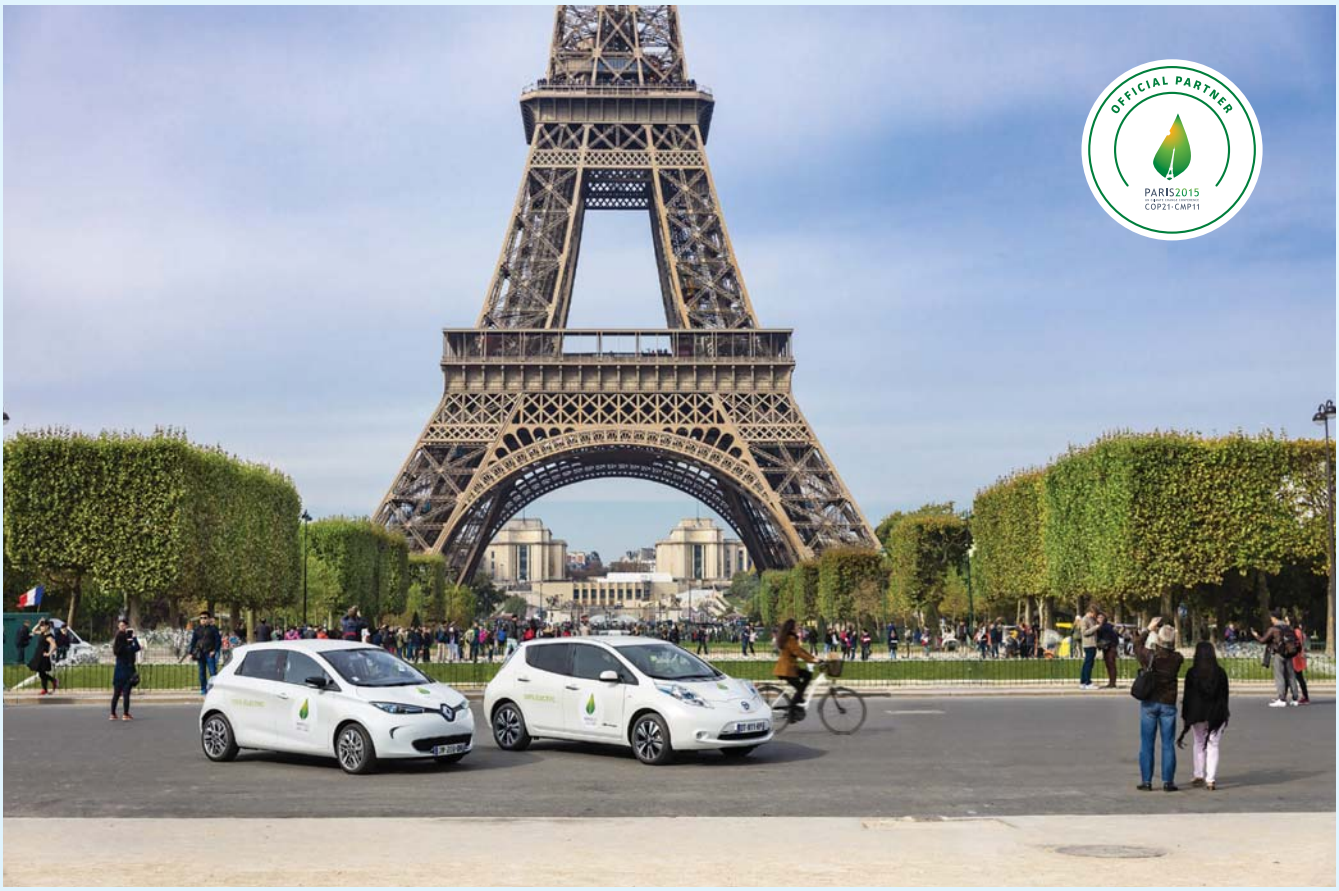
Renault and Nissan opted for mass-market solutions in making electric mobility affordable for the greater number, and these will also deliver benefits to the urban population, since all six electric vehicles in the range emit zero atmospheric pollutants on the road.

1 Neither carbon dioxide emissions nor regulated atmospheric pollutants emitted on the road.

2 Data calculated on the basis of figures provided by the oil industry body, *Comité Professionnel du Pétrole*, compared to a vehicle in an equivalent category.

3 "Well to wheel"

4 Renewables 2014 – Global Status Report



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The Renault-Nissan Alliance is partnering COP21

"Countries are joining forces to reduce the impact of climate change, and cities are trying to improve air quality for residents. Electric vehicles are the only practical, affordable solution to our planet's environmental challenges – and they are available today. To get the most out of it, there is one condition: we need to act on a much larger scale. Also, the policy makers at the state and regional level must continue to encourage the switch to zero-emission vehicles.

Carlos Ghosn
Chairman and CEO of the Renault-Nissan Alliance

The Alliance believes that it has an effective climate solution to offer and has taken its place in COP21, offering the event 200 Renault and Nissan electric vehicles–the biggest zero-emission* fleet ever assembled for an international event.

Proud, as employees, of this concrete solution and concerned, as citizens, by the climate issue, two hundred Alliance employees have volunteered to work for the operation as ambassador-drivers of this electric solution for the official delegates.

Sponsored by

RENAULT NISSAN

* The electricity provided by EDF through the French national grid during COP21 will offset the residual CO_2 emissions involved in producing it with carbon credits generated by UN-certified projects.

We have the ingenuity and the financial means to confront climate change

Takehiko Nakao, President, Asian Development Bank

©Reuters/ Beawiharta Beawiharta

Geothermal plant in Indonesia

Climate change is the pre-eminent challenge of our time. We need financing to mitigate and adapt to its impacts.

Climate change cuts across most of the new Sustainable Development Goals, which were agreed by global leaders in New York in September. Indeed, action on the global climate is essential to attain other development goals, such as poverty elimination, water and food security, and sustainable economic growth. We are also expecting that in December a new global climate agreement will be finalised at the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) in Paris.

The Asian Development Bank (ADB) announced in September that it will double its annual climate financing to US$6 billion by 2020–taking it to around 30% of our overall financing. This commitment reflects the importance of addressing climate change in Asia and the Pacific, where rising sea levels, melting glaciers, and weather extremes like floods, droughts and tropical storms are damaging livelihoods and taking too many lives.

This announcement by ADB comes against the backdrop of a pledge by developed countries to mobilise $100 billion a year from 2020 to combat climate change in developing countries. ADB's doubling of climate finance reflects its strategic priorities as well as the increase of overall financing capacity by up to 50% due to a more efficient use of its balance sheet.

But finance alone is not enough to meet huge challenges. It is imperative that we combine increased finance with smarter technology, stronger partnerships and deeper knowledge.

Technology: The Asia-Pacific region currently generates 37% of global greenhouse gas emissions. This will rise without aggressive interventions including a shift to cleaner technologies such as solar, wind and geothermal, and to sustainable transport and smarter, greener cities. Similarly, adaptation technology solutions, such as advanced drainage systems, heat-tolerant road surfacing and better irrigation, can help safeguard communities from climate impacts.

This is already happening in places like Indonesia, Southeast Asia's largest economy, where an ADB-supported geothermal power project will enhance energy security and offer a blueprint for the next generation of geothermal plants. In the Maldives, one of the countries most vulnerable to climate change, innovative hybrid solar systems being built in 160 of 192 inhabited islands will reduce greenhouse emissions, cut the cost of electricity and enhance energy security.

Such major initiatives require careful planning and deep knowledge of local conditions to ensure the best technologies are selected and applied. This is why ADB will adjust its procurement systems to integrate cleaner and more advanced technology into its projects.

Adequate regulatory and financial arrangements should also be in place to ensure the technologies are economically viable. Otherwise, countries with constrained budgets will almost certainly opt for cheaper, more polluting energy sources based on fossil fuels.

Partnerships: Strong partnerships are an essential component of a successful climate response because public budgets in developing countries are limited and government cannot do it alone.

The private sector can bring crucial financing, technology and expertise to global efforts against climate change. But business is sometimes reluctant to get involved as climate-relevant technologies can be regarded as risky.

Proper risk sharing can entice private-sector financing, but this often only happens if the government takes an enabling role in a venture by providing equity or guarantees. Public-private partnerships are one way of attracting private-sector involvement in climate-friendly projects.

We need more initiatives like ADB-sponsored Asia Climate Partners, a $400 million joint venture that will make private equity investments in environment- and climate-friendly companies and transactions. It aims to invest in areas including renewable energy, clean technology, natural resource efficiency, water, agriculture and forestry.

Knowledge: Finally, successful global action on climate change will depend on access to climate-relevant knowledge and information. This will require expanded partnerships between financing and knowledge institutions.

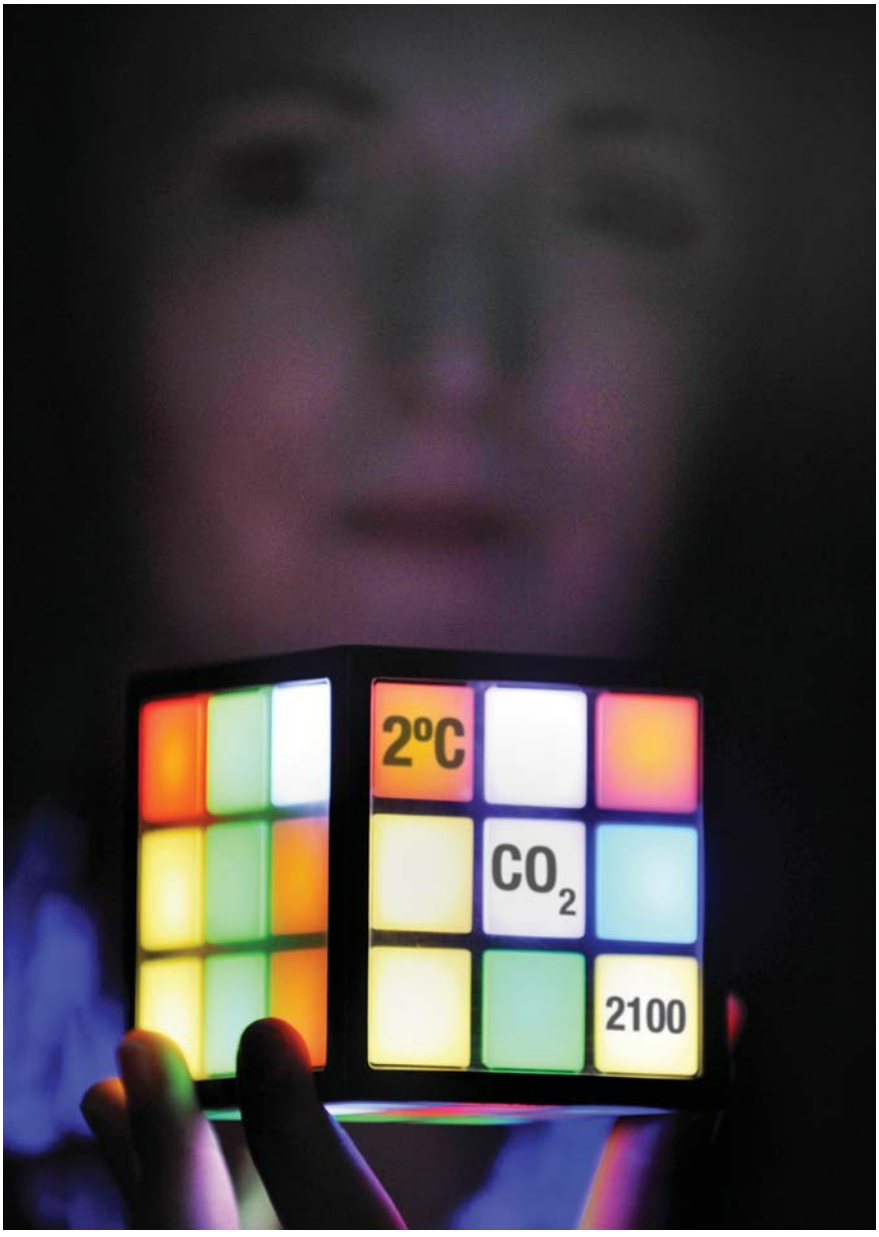
A model for future partnerships is the recently launched Climate Services for Resilient Development. It teams governments with multilateral development banks such as ADB, philanthropic institutions and private-sector companies to develop new tools, services and approaches to boost the climate resilience of developing countries. This diverse partnership delivers a broad range of expertise through the involvement of institutions such as NASA, Google and the Skoll Global Threats Fund.

We have the ingenuity and the financial means to confront climate change. With the right technologies, partnerships and knowledge, we can make real progress while there is still time.

Visit www.adb.org

Mitigation: Solving the Rubik's cube of climate change

Gregory Briner, OECD Environment Directorate



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Our countries are lagging behind in their mitigation targets and will have to catch up. Yet we know what we need to do to solve the climate change puzzle. So what are we waiting for?

On 29-30 November people from all over the world gather in an attempt to solve a complicated problem as quickly as possible. The occasion is the Johannesburg Open, organised by the World Cube Association, and their task is to solve a Rubik's Cube faster than the other competitors. (The current world record is 5.25 seconds, set in April 2015 by Collin Burns of the United States.)

There are parallels with the challenge facing world leaders at the UN Conference on Climate Change COP21 held around the same time in Paris, though the stakes are clearly far higher. While the consequences of failing to solve a Rubik's Cube are trivial, we cannot afford to fail on climate change.

The good news is that governments are familiar with the puzzle before them; though difficult, they know how to solve it and know they must do so in double quick time.

In the run-up to the COP21 conference, countries have been announcing targets and goals to cut their emissions of heat-trapping gases such as carbon dioxide.

What progress have they made in implementing policies to reduce emissions? And how can countries better come to grips with the Rubik's Cube of climate change? An OECD report, *Climate Change Mitigation: Policies and Progress*, takes a closer look at these questions in 34 OECD member countries, 10 partner economies and the European Union.

Off track

The goal agreed by all countries under the UN Framework Convention on Climate Change (UNFCCC) is clear: to avoid dangerous climate change by limiting the rise in global average temperature to below 2°C. To achieve this, global net emissions of carbon dioxide (CO_2) need to be reduced to zero by the end of the century. Moreover, the sooner global emissions peak and start to decline, the better our chances of avoiding catastrophic climate change and its costly impacts.

What really matters for climate change is the cumulative amount of greenhouse emissions pumped into the atmosphere, chiefly from burning fossil fuels. Although many countries have decreased their greenhouse-gas (GHG) emissions relative to their GDP, our overall global emissions of CO_2 and other GHGs have generally increased since the 1990s in absolute terms, despite occasional dips reflecting lower economic activity.

What does this mean for policy efforts? Countries have various types of targets

and goals to cut GHG emissions under the UNFCCC and its Kyoto Protocol.

But while their participation and enthusiasm are increasing, many countries are not on track to meet their mitigation targets and goals for 2020 and beyond. Even more ambitious objectives in the future (implying even swifter emission reduction rates) will be needed to meet the 2°C goal.

Our report finds that the US would have to cut its GHG emissions by 2.3-2.8% per year to meet its post-2020 targets, up from an annual reduction rate of 1.6% in 2005-12. The EU would need to cut its emissions by 2.8% per year to meet its post-2020 goal, up from 1.8% per year over 2005-12. In short, rather than getting a head start in the early years, these major emitters will have to play catch-up in the years ahead.

Meanwhile, China and India, whose contributions to GHGs have risen sharply in the past two decades, are on course to meet their stated goals for 2020 if current trends continue, although these goals are expressed in terms of emissions relative to GDP rather than absolute levels.

Though coal, which is the most emissions-intensive energy source, accounts for 45% of electricity generation in the 44 countries surveyed, new coal power plants are still being built in significant numbers in some emerging economies. In contrast, nuclear power is being used less in several countries in the wake of the 2011 Fukushima nuclear accident, and this has led to increased use of coal and gas, as well as renewable energy sources.

Getting policy mixes right

Under such conditions, how can the world's reliance on fossil fuels be curbed and the transition to a low-carbon economy accelerated? It is a complex question.

Take carbon pricing, whether via taxes or emissions trading systems. The aim of both is to make it economically unattractive, if not uncompetitive, to emit carbon over time and to render cleaner alternatives more competitive, thereby attracting more users and more investors.

The number of such instruments is increasing. For example, emissions trading systems are now in place in the EU, Korea, New Zealand and Switzerland, as well as in several US states, Quebec and in Tokyo. China is in pilot phase and plans to have a national emissions trading system by 2017. Meanwhile, about 15 of the 44 countries studied had carbon taxes implemented or planned, including in emerging markets such as South Africa, which has one planned for 2016.

However, there remains plenty of scope to use carbon pricing policies more effectively. The carbon prices created to date have generally been too weak to shift consumer or investor behaviour enough to have a significant impact on emissions levels. This is often because markets for emissions permits are oversupplied (in the case of emissions trading systems) or the carbon tax rates are set too low. Also, the coverage of such policies may be too limited, leaving room for exemptions and carve-outs.

Some authorities are addressing this. With France's new Energy Transition Law the carbon price will increase from €22 per tonne of CO_2 in 2016 to €56 by 2020 and €100 by 2030. California and Quebec, meanwhile, have expanded the coverage of their emissions trading systems from 35% to 85% of total emissions in 2015.

Some governments are also taking action to reduce support for the production and consumption of fossil fuels, such as Indonesia, India, Mexico and the Netherlands.

Non-market approaches also count, and the best policy mix would include a combination of strong market mechanisms and well-designed regulations to encourage energy efficiency, as well as support for research and development into next-generation technologies.

Beyond energy

Tackling climate change is not only about energy, and other economic sectors such as agriculture, land use, industrial processes and waste are also major sources of powerful heat-trapping GHGs, including methane and nitrous oxides.

Progress on mitigating emissions from these sectors has been mixed. In general, little action has been taken by most countries to reduce emissions from agriculture, which accounts for around 8% of total emissions from OECD countries, largely because the number of affordable ways to reduce agricultural emissions while maintaining current food production and consumption is limited.

More progress has been made in other sectors, such as forestry, industry and waste. In the forestry sector in Brazil, for example, deforestation rates have been significantly lowered since 2004, leading to an 87% reduction in GHG emissions from the land use sector between 2000 and 2012. Policies being implemented to reduce emissions from industry and waste include mandatory landfill gas capture laws in the United States and market mechanisms such as India's Perform, Achieve and Trade (PAT) scheme for industrial energy efficiency.

Like the sides of a Rubik's Cube, the different aspects of the climate policy challenge are interlinked and a shift on one face can slow progress on another. However, shift all faces we must, since the concentration of GHGs in the atmosphere is still rising each year. We know the problem, we know how to solve it, and we know that the clock is ticking. It is time for stronger mitigation policies, because climate change is a puzzle we cannot afford to lose.

OECD (2015), *Climate Change Mitigation: Policies and Progress*, OECD Publishing.

Tackling the folly of fossil fuel subsidies

Jehan Sauvage, OECD Trade and Agriculture Directorate

There is a growing awareness that mitigating greenhouse-gas emissions is not only about introducing new climate policies, but also making sure that existing measures and regulations do not run counter to climate goals. In other words, governments should not undermine with one hand what they are seeking to achieve with the other. There is no better example of this problem than fossil fuel subsidies.

The OECD's *Inventory of Support Measures for Fossil Fuels* released in September found that governments in the OECD and the emerging BRIICS countries (Brazil, the Russian Federation, India, Indonesia, the People's Republic of China and South Africa) collectively support the production and consumption of fossil fuels to the tune of US$160-200 billion a year. With most of that support coming in the form of budgetary transfers and tax breaks–the OECD inventory identifies about 800 such measures–this effectively means that governments today still spend billions to encourage the extraction and burning of fossil fuels at taxpayers' expense. Adding in the consumer price subsidies measured by the International Energy Agency, this makes total subsidies and other forms of support for fossil fuels in the vicinity of US$500-600 billion a year.

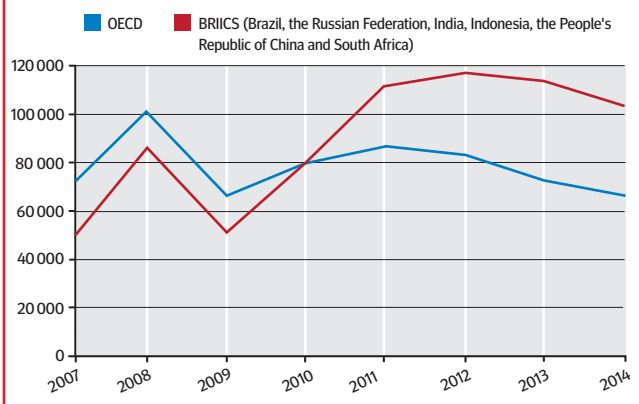
The problems with fossil fuel subsidies are by now well-known. They are distortive and costly, directing investment towards carbon-intensive sectors and activities with public funds that could be put to better use, such as in the education, skills and physical infrastructure that people most need and value in the 21st century. And because energy investment is often long-term, they lock societies into carbon-intensive pathways for decades to come at the expense of cleaner alternatives. But first and foremost, fossil fuel subsidies are evidently harmful to human health and the environment as they exacerbate global warming, local air pollution, and the damage to ecosystems caused by drilling and mining activities.

While the solution may seem obvious in today's context, it often proves very hard to eliminate fossil fuel subsidies. One difficulty stems from the effects of higher energy prices on poorer households, for whom energy can represent a large share of total spending. So while subsidies often benefit the rich disproportionately, such as those who can afford cars, the impacts of reform on vulnerable segments of society cannot be overlooked. It is therefore essential that some portion of the fiscal resources saved through subsidy reform be redistributed to households by way of direct cash transfers or improved access to basic services.

A number of countries are already moving in the right direction, with examples found across the Americas, Europe and Asia. For the first time in years, Mexico started charging positive rates of excise taxes on sales of motor fuels after having subsidised their consumption for years. In 2013 Austria and the Netherlands both removed tax concessions for diesel used in farming. In 2014, India completely eliminated its subsidies for diesel fuel. More needs to be done though, and the OECD stands ready to help by further improving transparency on all measures that sustain our dependence on fossil fuels.

Public support for fossil fuels remains high

Total support for fossil fuels, millions of current US$



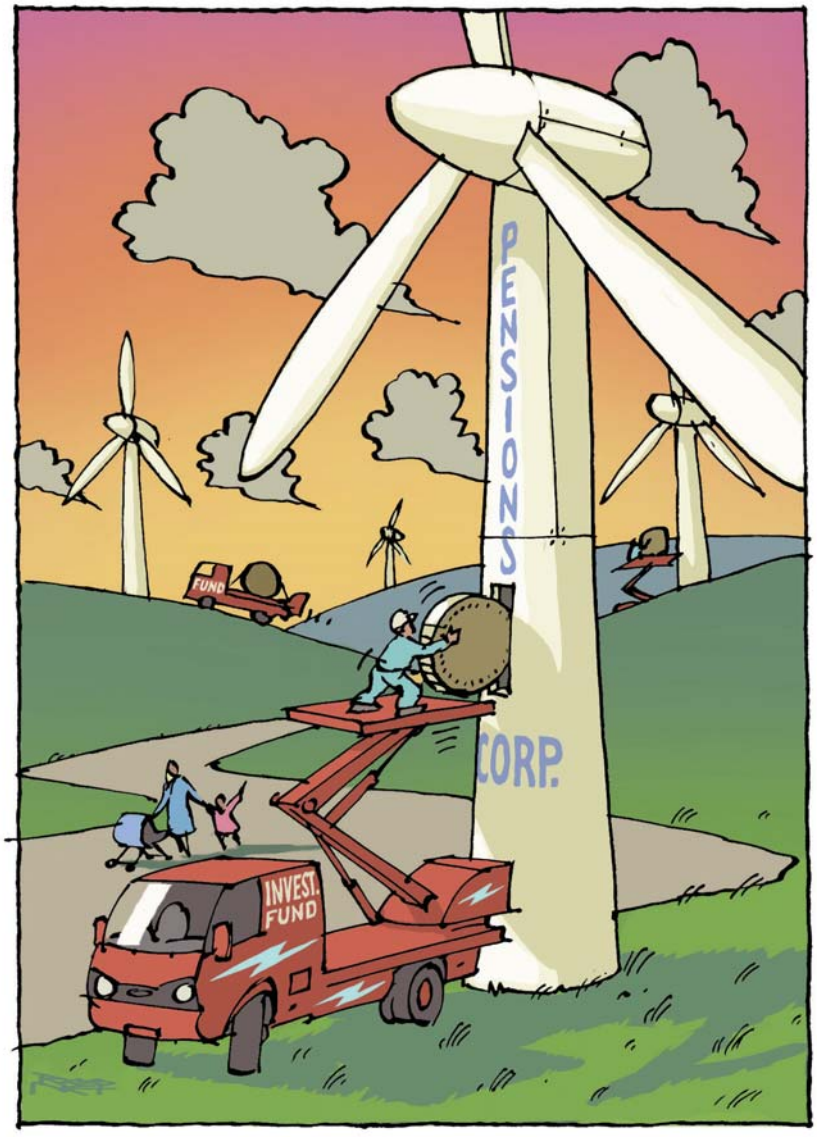
Source: OECD (2015), *Inventory of Support Measures for Fossil Fuels*

OECD (2015), *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015*, OECD Publishing.

OECD/IEA/Nuclear Energy Agency/International Transport Forum (2015), *Aligning Policies for a Low-Carbon Economy*, OECD Publishing, http://oe.cd/lowcarbon

Sustainable energy infrastructure, finance and institutional investors

Christopher Kaminker and Robert Youngman, OECD Environment Directorate



Policy makers should do much more to encourage pension funds and other institutional investors to put their ample assets into sustainable energy infrastructure. The wins would be significant. The question is how?

It is one thing to argue about shifting to a low-carbon economy, but quite another to make it happen. The shift requires massive investment in new types of infrastructure to tap and distribute energy from sources such as solar, wind, hydro and biomass. Wind farms and solar parks are starting to dot the landscapes of many countries, yet sustainable energy sources still account for a fraction of overall energy supply. Much more effort will be needed if these infrastructures are to scale up and eventually displace the likes of polluting coal-fired power stations and curb greenhouse gas emissions.

In fact, in the next 20 years over US$50 trillion in cumulative capital expenditure on energy supply and energy efficiency will be needed to place the world on a path consistent with a 2°C increase in temperature, the limit widely accepted to prevent catastrophic climate change. That is a lot of money–roughly equivalent to the GDP of the entire OECD area.

On the other hand, as the International Energy Agency (IEA) points out, the money invested would be more than offset by the massive fuel savings that would occur in a low-carbon scenario. Other studies back this view, arguing that, as energy investment would be needed anyway, there would be a lower net cost of shifting to low-carbon and climate-resilient infrastructure rather than continuing to invest in fossil-fuel sources, locking in economic systems and furthering greenhouse gas emissions.

The bottom line is that investing in sustainable energy infrastructure would be an investment in the planet's future, so the real question is not if, but how to raise the finances. For that, policy makers need a clear view of the array of public and private financing channels available, both domestically and internationally.

Moreover, with public budgets squeezed and balance sheets of utility companies affected by falls in asset prices and market capitalisation, a range of private-sector sources will have to be tapped.

One crucial and promising source to look to is institutional investors, such as pension funds, insurance companies and sovereign wealth funds, as these manage very large savings and investment funds. In OECD countries institutional investors held some US$93 trillion in assets in 2013, and this amount has continued to grow since. However, their involvement in low-carbon energy investments has been minimal at best. Take pension funds, for instance. These had inflows of some US$2.3 trillion in 2013, but the large pension funds surveyed by the OECD put just 1% of their assets directly into infrastructure of all kinds that year

(excluding listed shares, etc), and just 3% of that total amount went into sustainable energy projects.

This may seem surprising. After all, energy is a profitable sector, and there is ample ground to believe that sustainable energy will prove to be no exception, particularly when taking lower operating costs and no fuel costs, as well as health benefits, into account.

What can policy makers do to encourage institutional investors to unlock more funds and help scale up the low-carbon energy infrastructure that the global economy needs? It is a question that lies at the heart of an OECD report, *Mapping Channels to Mobilise Institutional Investment in Sustainable Energy: An OECD Report for G20 Finance Ministers and Central Bank Governors*.

Institutional investors may have their toes in the water, but climate change cannot wait, and convincing them to take the plunge sooner rather than later is the rub. For this, they need to be persuaded not of how green or clean an asset is, but what its risk-adjusted financial performance will look like over time. They need to feel confident that the investments are bankable, with "pledgeable" future income streams for themselves and their clients.

There are fast answers to this. For instance, unlike fossil fuels, sustainable energy sources are attractive because they are generally not subject to price volatility. Another comfort is that wind and solar projects have a 25-year lifespan, and often come with manufacturer warranties, power purchase agreements and government support, with mandates to encourage long-term contracting. Another argument is future public demand: consumers are increasingly anxious about the climate and pollution impacts of fossil fuels, which will affect long-term strategies for institutional investors, as will the energy security costs of fossil fuels.

Despite such arguments, institutional investors remain cautious. They see too many regulatory and market barriers in the way that create risk and render alternative investments, such as real estate, more compelling. Some countries restrict pension fund investment in infrastructure for instance, while some regulations treat sustainable energy infrastructure as a risky asset rather like hedge funds.

Ensuring an "investment-grade" policy environment is therefore important, as is sending the right political signals: there is nothing like uncertainty among policy makers about their own energy choices

> Issuance of green bonds tripled over the course of 2014 to reach US$36.6 billion

and strategies to undermine sustainable energy investment and drive up capital costs. Rather, tailored policies, instruments and funds, as well as concerted leadership, will be needed.

Policy makers must work with institutional investors, and try harder to understand their perspectives. This is not as easy as it sounds, particularly as they often do not speak the same language.

Indeed, it is quite a challenge to penetrate the web of technical terms that diverse institutional investors use. Beyond the usual financial jargon such as senior "secured loan" and "covered bonds" lie such notions as "transaction enablers", who provide interested investors with the expertise they need to make projects possible, and "risk mitigants", which are intended to enhance a project's creditworthiness. There are "cornerstone stakes", which pivotal investors take in a project often for a minimum period. For instance, when the UK Department for Business, Innovation and Skills invested some £50 million (US$75 million) with a no-resell clause of a year, this cornerstone investment made the Greencoat Wind Fund's first equity offering on the London stock exchange a success, and paved the way for other similar quotes funds entering the market.

This intricate tapestry of institutional investing is explained in detail in Mapping Channels. The report explains the key actors, including the very important financial intermediaries whose job is to mobilise private finance, such as national, regional and multilateral development banks and publicly sponsored green investment banks (GIBs).

It explains emerging instruments and platforms that are driving liquidity and growth in sustainable energy. It looks at publicly traded equity funds that pool projects, known as "yieldcos" or quoted funds, for instance, which have already raised billions of dollars from investors and which some believe could, under certain conditions, drive down solar and wind costs by 20% in the US. The report describes green and "climate" bond markets, which help issuers attract new investors while obtaining risk-adjusted returns. Valued by the OECD at US$15 billion in 2011, issuance of green bonds tripled over the course of 2014 to reach US$36.6 billion, and appear on course to meet, or even exceed, this amount in 2015.

Not all institutional investors will be interested in or suited to sustainable energy projects. But for those that are interested, the OECD provides many examples of infrastructure projects to draw on. It identifies 47 investment projects involving pension funds, mostly in wind and taking place mostly in developed countries: projects as far-flung as wind farms Parc des Moulins in Canada and London's Array, or Japan Solar, the Danish Brigg Biomass Plant and South African Touwsrivier solar plant, among others. On top of the 47, it examines another 20 investments made in sustainable energy companies to highlight the choice between investing in projects or companies.

The report presents a matrix to explain how these projects were financed using different combinations of equity, debt, funds, risk mitigants and enablers: there is the direct unlisted equity approach used by Dutch pension fund PGGM in consortium with Ampere Equity Fund to acquire a 24.8% stake in Walney offshore wind farm in the UK; the World Bank's first Australian dollar-denominated

"Kangaroo green bond" where Australian superannuation fund UniSuper was the cornerstone investor; the listed portfolio approach adopted by Teacher Retirement System of Texas to buy shares in the aptly sounding NRG Yield, which proposes diverse energy assets; the Pagdupud onshore wind farm which PINAI, a Philippines-focused infrastructure fund, invested some US$85 million in and whose limited partners include a state-owned pension fund and the Dutch APG pension fund; and many more.

To simplify this rich and detailed analysis, the authors sketch out a classification framework that policy makers can use to navigate the myriad investment channels that can be potentially used for sustainable energy infrastructure. The framework is an initial foray that is intended to be built upon and will help the OECD gather more data too, for instance, within specific investor classes, countries and technologies, and over time. The OECD strongly believes that institutional investors have everything to gain by investing far more in sustainable energy infrastructure, as long as governments keep their eye on the ball by fostering "investment grade" policy frameworks that will allow the bankable and investable project pipelines to emerge at scale. These are long-term commitments, but given the direction of climate change, the long term should start today, for all investors.

References

The report on *Mapping Channels to Mobilise Institutional Investment in Sustainable Energy* was delivered to the G20 Finance Ministers and Central Bank Governors meeting of 9-10 February 2015. See https://g20.org/wp-content/uploads/2015/02/Communique-G20-Finance-Ministers-and-Central-Bank-Governors-Istanbul1.pdf

See also the OECD's 2nd Annual Green Investment Financing Forum 2015, http://oe.cd/19V

IEA (2014), *Energy Technology Perspectives 2014: Harnessing Electricity's Potential*, IEA, Paris.

Kaminker, Christopher, Kate Eklin, Robert Youngman, Osamu Kawanishi (2015), *Mapping Channels to Mobilise Institutional Investment in Sustainable Energy: An OECD Report for G20 Finance Ministers and Central Bank Governors*, Green Finance and Investment, OECD Publishing. DOI: http://dx.doi.org/10.1787/9789264224582-en

Nuclear vision

What role can nuclear energy play in combating climate change? According to the OECD Nuclear Energy Agency (NEA), it can play a very pivotal one.

The world is not on track to limit the rise in global mean temperatures to 2°C. To stay within this threshold, the global power sector, which currently emits some 40% of global carbon emissions, will need to be virtually decarbonised by 2050.

A policy paper by the NEA explains how nuclear power can contribute to this goal (see references). Nuclear energy produces 11% of global electricity, the second largest source of low-carbon power after hydro. In its 2°C scenario, the International Energy Agency (IEA) projects that the share of nuclear energy in global electricity production would have to rise to 17% in 2050, and installed capacity from 390 GW to 930 GW over the same time frame.

Nuclear power saves almost 2 Gt of CO_2 emissions each year and avoided more than 60 Gt of CO_2 emissions over the 1970-2015 period, the NEA paper points out, adding that nuclear energy is the only large scale source of low-carbon electricity that is both dispatchable and scalable. In addition, according to the NEA, its contribution to sustainable economic, social and environmental development goes beyond reducing carbon emissions; the reliable, round-the-clock provision of electricity at predictable costs, the absence of local pollutant emissions, and security of supply, not to mention benefits in terms of skills, jobs and the economy.

There are challenges, including for financing and managing a complex construction process. There are also key issues, such as assuring non-proliferation and plant safety as nuclear energy grows, managing waste, and the fact that nuclear energy can itself be vulnerable to climate change, though the NEA is confident these issues are being addressed. Securing uranium supply will also be important, for although there is a 100 years of supply at current consumption rates, more investment in mines will be needed.

Also, though nuclear fission does not produce any CO_2 or other greenhouse gases, there are some indirect emissions that can be attributed to nuclear energy, in construction for instance, and from fossil fuels used in uranium mining. On the plus side, the NEA points out that the only local airborne emissions from the generation stage of the nuclear fuel cycle are minor.

In short, the contribution of nuclear power to combating climate change could prove more important than ever, and it could become the single most important source of electricity. But as the NEA warns, clear and sustained policy support from governments is needed before significant nuclear power expansion can begin in any country.

IEA-NEA (2015), *Technology Roadmap: Nuclear Energy*, Paris

OECD-NEA (2015), "Nuclear Energy: Combating Climate Change", OECD Publishing, available at http://oe.cd/1aD

Visit www.oecd-nea.org

The Amazon: Seeing more of the wood and the trees

Did you know that Brazil is among the most biodiverse countries in the world? Along with hosting one-tenth of all-known species of flora and fauna, it is home to the largest rainforest on the planet. The Amazon occupies nearly half of the country's territory, sheltering more than 600 types of terrestrial and freshwater habitats, hundreds of indigenous peoples, and traditional communities such as rubber and other farmers. Illegal logging and land grabbing, driven by unbridled growth, rapid agriculture expansion and unclear legal land tenure, made the region a deforestation hotspot in the 1990s and early 2000s. But a sharp reduction of deforestation in the Amazon has cut Brazil's carbon footprint by 40% since 2000, an OECD report says.

Annual deforestation of the Amazon massively declined over the last decade, from 27 000 km^2 in 2004 to about 4 800 km^2 in 2014–a 75% decline. Brazil still experiences the world's highest average annual loss in total forest cover though: an area equal to the size of Slovenia is lost every four years. However, progress must continue, as the OECD's first Environmental Performance Review of Brazil urges.

Much of the credit for the reductions goes to government efforts and the expansion of protected areas over thousands of square kilometres, with the launch of the Action Plan for Prevention and Control of the Legal Amazon Deforestation in 2004 and the implementation of the Amazon Region Protected Areas programme, which has created more than 500 000 km^2 of protected areas in the Amazon.

Since then, the forest cover–5 million km^2 of Amazon and other Brazilian forests–has been monitored by satellite imaging, run by the National Institute for Space Research. The pillars of government actions over the last decade included restricting access to credit for landholders in municipalities with high deforestation levels, clarifying land tenure to combat land grabbing–thousands of rural land holdings have been granted property titles while hundreds of protected areas have been established–and issuing timber certifications.

In 2012, Brazil continued along this path, approving a new Forest Code: rural landholders are now required to set aside a share of their land for forest conservation or restoration in the Amazon; landholders must also register their lands and set aside areas in the Rural Environmental Cadastre by May 2016, which will be a condition for accessing rural credits as of October 2017. The Forest Code also introduced tradable forest rights: landholders who did not meet their set-aside obligations prior to 2008 can restore their tree cover or purchase an equivalent quota amount.

Besides regulatory tools, economic incentives were also used. The Bolsa Floresta, a conditional cash-transfer programme launched by the state of Amazonas in 2007, compensates rural families for conserving the forest areas they live in. Having provided income to more than 35 000 people so far, the programme has led to less deforestation.

International support has been critical: through the Amazon Fund, created in 2008 and managed by the Brazilian Development Bank, international donors are able to invest in deforestation prevention and forest conservation. Between 2009 and 2015, the fund accumulated more than US$970 million, mostly from Norway and Germany, and supported more than 70 projects.

Business actors have been involved too, through the Soya Moratorium, for instance. In 2006, following pressure from civil society, 47 global companies like McDonald's and Wal-Mart decided to stop buying soya grown on cleared forestland in the Brazilian Amazon. As a result, the rate of soya field expansion through deforestation in the Amazon region fell from 30% in 2004 to about 1% in 2014.

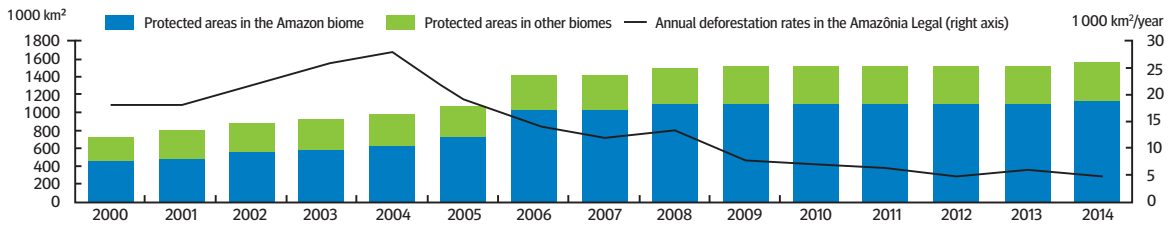
Such integrated approaches involving government departments and business have helped curb deforestation: protected areas now cover 17% of Brazil's territory, and only 5% of the deforestation that took place in the Amazon between 2008 and 2012 was within protected areas.

The OECD encourages environmentally friendly tourism in protected areas. It also recommends that Brazil continue to fully implement the new forestry code and complement it with programmes for more attractive livelihood options to discourage illegal clearing. *Neïla Bachene*

OECD (2015), *OECD Environmental Performance Reviews: Brazil 2015*, OECD Publishing, http://dx.doi.org/10.1787/9789264240094-en.

Expanded protected areas has helped reduce deforestation in the Amazon

Protected areas and deforestation rates in the Amazon, 2000-14



Note: The Amazônia Legal encompasses the Amazonian Forest (about 4.1 million km^2) and transitional vegetation (1 million km^2).
Source: INPE (2015), Projec to PRODES: Monitoramento da floresta Amazônia Brasileira por satelite; MMA (2015), *Cadastro Nacional de Unidades de Conservaçao.*

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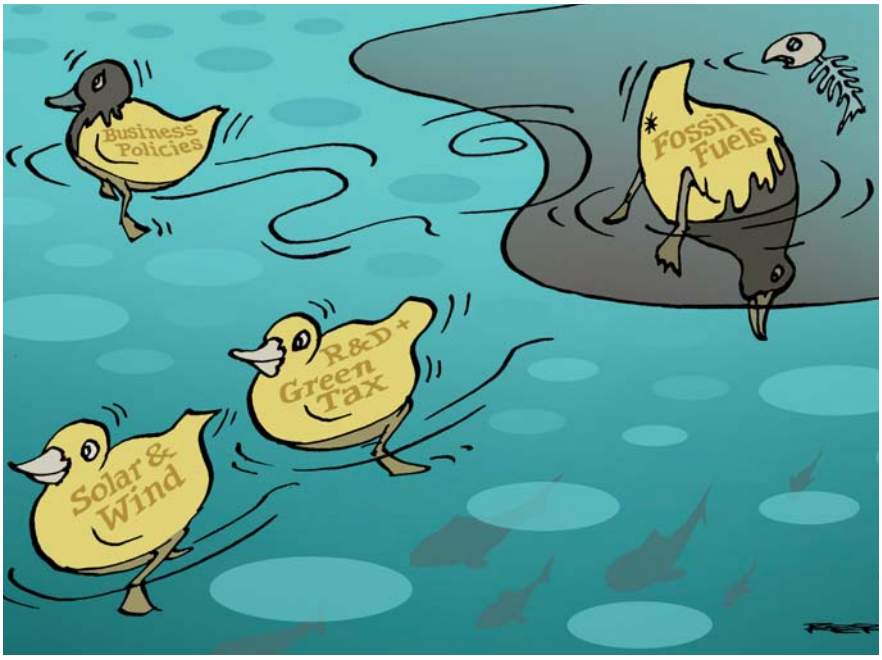
Getting public policies in line with climate goals

Richard Baron and Virginie Marchal, OECD Environment Directorate



Policies that are not aligned with efforts to fight global warming risk hindering the transition to a low-carbon economy, and can worsen climate change. They should be addressed.

Solar and wind parks, energy-efficient building norms and regulations, green taxes, carbon markets, R&D in clean technology, mass transit and electric car programmes: these are just some of the many ambitious initiatives put in place around the world to fight back climate change.

But however well-designed and ambitious these efforts are, they will be in vain if attention is not paid to policy domains that are not within the strict climate portfolio, such as general taxation, urban planning, development aid, industrial processes, education and more. Misaligned policies–and there are far too many–could seriously harm the effectiveness of climate policy. Aligning them better would accelerate progress towards a global economy with net zero greenhouse gas emissions by the end of the century, which is required to keep global temperature increase below 2°C.

A joint report from OECD, International Energy Agency, International Transport Forum and OECD Nuclear Energy Agency, *Aligning Policies for a Low-Carbon Economy*, identifies the key inconsistencies and clarifies action on how to rectify them.

Arguably the most visible misalignment of all is to be found in the public-sector support for fossil fuels: OECD and major emerging economies still spend US$160-200 billion annually to spur the consumption and production of fossil fuels. Around 800 tax breaks and spending programmes lower the exploration and exploitation costs for oil and gas companies and reduce prices for consumers. No wonder fossil fuels still account for over 80% of total energy supply worldwide.

Another misalignment is tax provisions on company cars–nearly a fifth of the car fleet in OECD countries. These provisions encourage workers to use bigger cars, and more intensively than they otherwise would, and should be addressed to help reduce greenhouse emissions.

Taxes and tax expenditures on corporate income should also be looked at; a preliminary survey of tax provisions for investment in the G20 countries shows occasional biases in favour of energy-intensive activities that could be evened out.

Tax differentials for diesel and normal petrol (gasoline) also send the wrong signals. On a per litre basis, diesel emits more CO_2 and other local pollutants than gasoline, and yet almost all OECD countries tax diesel less at the pump. This damaging distortion should be removed, with taxes set appropriately to encourage less fossil fuel use.

Now is a good time to tackle such anomalies by boosting "green" taxes and curbing subsidies on fossil fuels. With energy prices low, this would have less impact on incomes, while tax revenues can be redistributed through cuts in other distortive taxes, including any that penalise low-carbon technologies.

But fossil fuels are not the only culprits. Some green industrial strategies are also misaligned: such is the case of the implementation of local-content requirements that frequently turn up in

> Fossil fuels are not the only culprits, with some green industrial strategies also misaligned

the clean energy sector. Some 21 countries have designed green industrial policies to favour domestic manufacturers through local-content requirements, notably in the wind- and solar-energy sectors. While creating jobs is an understandable policy concern and everyone wants to benefit from this new growth sector, vigilance is needed. According to *Aligning Policies for a Low-Carbon Economy*, local-content requirements hinder inflows of investment into these "knowledge-

based" sectors, and risk increasing the cost of low-carbon solutions and hurting employment. Much low-carbon technology is still at an early a phase of development and needs open access to global value chains to avail itself of innovation and raw materials at affordable prices.

In the electricity sector, wholesale markets may be at odds with low-carbon systems. Electricity market liberalisation in the 1990s made electricity supply more efficient and helped to reduce costs.

> Triggering investment in low-carbon electricity requires a new organisation of competition

However, the resulting wholesale markets do a poor job at triggering investment in new electricity generation capacity. Low-carbon electricity from wind, solar, nuclear or coal plants fitted to sequester CO_2 is also more capital intensive than from CO_2-emitting plants. Triggering investment in low-carbon electricity requires a new organisation of competition, or it simply won't happen at the needed scale.

Misalignments can also be found in development assistance policies. While OECD policy makers understand that developing countries stand to be the hardest hit from climate change and increased their efforts to support mitigation and adaptation projects in the past ten years, climate-related development assistance still accounts for less than a fifth of total official development assistance.

Aligning rules for business practice is important. Moving from voluntary to mandatory greenhouse gas emissions reporting, as the UK did in 2013 with quoted companies, goes in the right direction. For energy-intensive industries such as cement and concrete, policy makers could provide clear regulations to encourage burning waste and other substitutes as fuel for instance. Also, firms encouraged to share and recycle resources among themselves in a sort of industrial symbiosis can yield lower emissions, as cases in Australia, Denmark and Korea have shown.

Mobility policies also matter. The transport sector accounts for nearly a quarter of global CO_2 emissions and several countries have been establishing battery-charging infrastructures and introducing priority road lanes for clean vehicles, while offering rebate schemes on electric vehicle purchases. In cities in developing and emerging economies, where much of the infrastructure is still being built, urban expansion can be managed to limit the demand for energy-intensive mobility and promote sustainable transport systems. Sub-national governments are critical decision makers for urban transport planning, but a range of national policies still limits local climate action. In China, city governments rely on the sale of land for their budget, leading to urban sprawl.

As for agricultural policies, the OECD report sees room to break silos and look for closer alignment between climate mitigation, adaptation and food security goals. Despite concerted efforts by OECD countries since the 1990s to reduce the most environmentally harmful subsidies to agriculture, almost half of their agricultural subsidies are still in the form of input subsidies and price supports that can lead to more environmental harm and greenhouse gas emissions.

Governance vision

One key clash to avoid is within policy making itself, whether in government departments or between countries. For *Aligning Policies for a Low-Carbon Economy*, an ambitious effort to align policies requires: a clear vision with measurable targets; an action plan backed by experts; and a system for monitoring progress that spans electoral cycles, engages opposition parties and reaches across borders. Three questions should preoccupy policy makers, and domestic and international regulators: Is their investment framework aligned with the low-carbon transition, and free of conflicting incentives in competition, trade, tax and innovation policies? Is regulation conducive to long-term investment? And are climate goals mainstreamed in public spending and development policies?

This point is crucial, as government consumption and public procurement should clearly be aligned with climate policies. An OECD recommendation from 2002 already encourages green procurement policies, and today some 72% of OECD countries already have policies encouraging green procurement at the central government level. Non-OECD countries are starting too.

Promoting low-carbon economies and fighting climate change is not easy, demanding a break from fossil fuel-based arrangements that have lasted for over a century. Ensuring other policies are not in conflict can help smooth the way forward.

References

OECD/IEA/NEA/ITF (2015), *Aligning Policies for a Low-Carbon Economy*, OECD Publishing, http://oe.cd/lowcarbon.

OECD (2015), *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015*, OECD Publishing.

OECD (2015), *Overcoming Barriers to International Investment in Clean Energy*, Green Finance and Investment, OECD Publishing.

Sutherland, Douglas, Sonia Araujo, Égert Balázs and Tomasz Koźluk (2009), "Infrastructure investment: Links to growth and the role of public policies", *OECD Economics Department Working Papers*, No. 686, OECD Publishing, http://dx.doi.org/10.1787/225678178357.

OECD (2002), *OECD Recommendation of the Council on Improving the Environmental Performance of Public Procurement*, OECD Publishing.

Business innovation and climate change: Policy makers must favour dynamism

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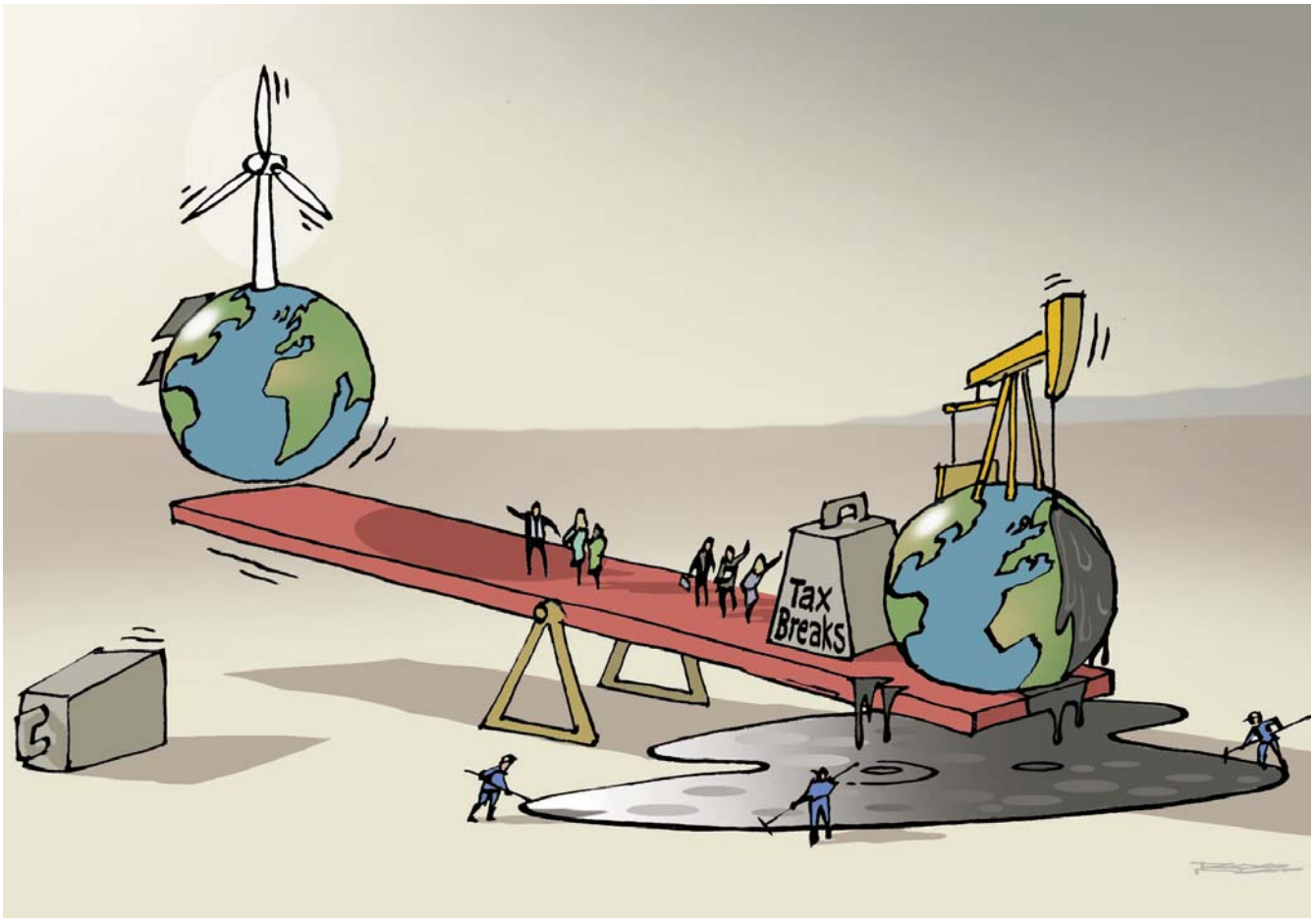

New innovative firms are needed to help step up the fight against climate change. That means new policies to encourage business dynamism, not least in the energy sector.

Everyone accepts that more innovation is needed for fighting climate change. Low-carbon infrastructure and products may well be developing fast, but as OECD and IEA reports indicate, new breakthroughs are needed to shift the balance away from fossil fuel options.

OECD experts have made this point repeatedly: that any effort to limit greenhouse-gas (GHG) emissions and hence global temperature increases to below 2°C will require not only strong policies in areas such as pricing and regulation, but complementary science and innovation policies as well.

However, such policies will be for nought in the absence of a dynamic business environment, particularly one which encourages the entry of new, adventurous firms and the exit of less innovative and less productive firms. "New" firms are often the vehicle through which radical, game-changing innovations enter the market, as older incumbent firms often focus on incremental changes to established technologies. To grasp this point, one only has to look back on how breakthroughs in information and communication technologies have transformed not only global telecommunications but entire economies. Can such a transition be replicated in energy and transport?

The link between business dynamics and the emergence of breakthrough technologies is a concern because start-up rates have been declining in all sectors across OECD countries in recent years. Moreover, the average age of firms in OECD countries has been increasing since 2001. Indeed, OECD analysis published in 2014 shows a negative relationship between firm age and indicators of the degree of radicalness of patented inventions–basically, older firms tend

to engage in relatively less radical innovation than young firms.

In the context of climate change mitigation the links between business dynamics and the emergence of radical technologies are particularly important for two additional reasons: first, political (or regulatory) uncertainty can compound market uncertainty, resulting in important disincentives for investment in the kinds of risky technologies which are likely to lead to breakthroughs; second, many of the GHG-intensive sectors, such as energy and transport, are large network sectors with long-term engagements in capital and skills that can act as additional barriers to firm entry and innovation.

Moreover, in the climate area, there is evidence that young firms are a relatively more important source of inventions than is the case in other fields. Firms that patent climate mitigation technologies tend to be younger than in other fields, with an even larger gap for climate mitigation technologies in the electricity sector. Moreover, the nature of the inventions generated by these young firms is different, with climate mitigation technologies drawing more heavily upon advances in basic "science" than in other fields, where inventions are more likely to build incrementally off other inventions.

The role of policy is central to encourage the growth of these young firms and their contribution to climate change mitigation. Insofar as younger firms have a comparative advantage in more radical innovations, and particularly for climate mitigation, good framework policies which encourage experimentation are essential. Since innovation is about trial and error, failure needs to be recognised as a learning opportunity. The policy environment should enable successful firms to grow, some to start anew, and other less productive or innovative firms to exit the market altogether.

Unfortunately, and paradoxically, environmental policies themselves can slow down the process whereby radical environmental innovations are invented and diffused. This is partly an incidental outcome of the fact that many regulations which impose fixed costs, by requiring investment in specific capital equipment, for instance, can serve as a barrier to entry even if entrants and incumbents are

> "New" firms are the vehicle through which radical, game-changing innovations enter the market

treated identically under the regulation. However, the problem can also be one of explicit and intentional policy design, treating entrants and incumbents in a differentiated manner.

Indeed, it is very common for environmental policies to treat production units of varying ages differently, with older plants facing relatively less stringent regulation than entrants. In some cases this may even take the form of "grandfathering" whereby units which have been in operation before some threshold date are exempted entirely from some new regulation. This can further slow capital turnover and exit rates for existing sources, and reduce new investment and the entry of new firms.

The grandfathering of regulations is particularly well-documented in the case of power plants. Researchers in the OECD Environment Directorate have developed a set of country-level measures of environmental policy stringency for different pollutants for "old" and "new" power plants of different sizes. This work shows that new plants often face more stringent regulations. For example, for a representative plant of 60 megawatts of thermal input, new plants have regulations which are 1.6 times and 2.3 times more stringent for particulate matter and nitrogen oxides emissions than is the case for older plants. This clearly has environmental and economic implications.

But it is not only the "sticks" which may be biased against entrants, but also the "carrots". For example, R&D tax incentives may be less generous to new firms, since they depend not only on R&D expenditures themselves, but also on profitability, as in the case of a credit on corporate income tax. This is hardly helpful for young companies as they strive to become profitable. Instead, such credits reward less productive incumbents, which tend to be less dynamic or innovative.

Meanwhile, climate change forges on, making it more urgent than ever for policy makers to stop favouring incumbents and to give much more room to young firms to experiment with new technologies and organisational models, and to foster their growth. By changing policy orientations in favour of innovation and business dynamism, leaders can unleash the dynamic low-carbon future we urgently need.

References

Andrews, Dan, Chiara Criscuolo and Carlo Menon (2014), "Do resources flow to patenting firms?: Cross-country evidence from firm level data", *OECD Economics Department, Working Papers*, No 1127, OECD Publishing.

Calvino, Flavio Chiara Criscuolo, and Carlo Menon (2015), "Cross-country evidence on start-up dynamics", *OECD Science, Technology and Industry Working Papers*, OECD Publishing.

Johnstone, Nick et al. (forthcoming) "Environmental policy design, innovation and efficiency gains in electricity generation", *OECD Environment Working Papers*, OECD Publishing.

Johnstone, Nick and Florian Egli (2015) "Emerging technologies and firm dynamics: The implications for green growth", paper to be presented at forthcoming meeting of the Green Growth and Sustainable Development Forum, Dec. 14-15, 2015.

OECD (forthcoming) "Environmental policy design, innovation and efficiency gains in electricity generation", *OECD Environment Working Papers*, OECD Publishing.

OECD (2015), *Aligning Policies for a Low-Carbon Economy*, OECD Publishing.

OECD (2015), *The Innovation Imperative: Contributing to Productivity, Growth and Wellbeing*, OECD Publishing.

Climate change: Towards clean energy investment and supporting disclosure

Adrian Blundell-Wignall, Director, OECD Directorate for Financial and Enterprise Affairs

He's lifting the lid

Achieving the transition to a low-carbon economy to meet the 2°C target requires shifting investment away from carbon-intensive options and towards low-carbon, climate-resilient infrastructure assets and technology. Over US$90 trillion will be needed in the next 15 years to meet global infrastructure needs across transport, energy and water systems, irrespective of climate change, according to the Global Commission on Climate and the Economy. But as the commission estimates, making these infrastructure investments "low-carbon" will impose additional costs of only 4.5% relative to business-as-usual, with benefits such as reduced local air pollution, improved energy security and lower traffic congestion.

The current period of economic stagnation presents an opportunity to shift the balance of investment towards low-carbon options such as clean energy and away from industries characterised by excess capacity. Clean energy investment, however, faces strong obstacles: clean energy returns are still low versus the cost of raising equity and even of debt, particularly in emerging markets, as highlighted by recent analysis of 10 000 of the world's largest companies in the OECD *Business and Finance Outlook 2015*.

The good news is that the cost of electricity generation from renewable energy sources against fossil fuels is going down in several countries. The price of solar crystalline silicon photovoltaic (PV) cells, for instance, has dropped by 80% since 2008, and by 99% since 1977. According to the International Energy Agency (IEA), new utility-scale solar PV can be contracted at a levellised cost of

electricity (LCOE) of $80-100/Megawatt-hours, with the best cases at $60/MWh that can already displace peaking gas generation in some countries.

These developments have been accommodated by strong policy support over the past decade, which has seen investment in renewable energy increase sixfold over the past decade. Annual investment in renewable electricity generation reached $270 billion in 2014. It would need to increase to $400 billion in 2030 to deliver a peak in global energy-related emissions by 2020, according to the IEA.

While the required renewable energy investment gap is reducing with respect to the 2°C target, this is not the case, however, for low-carbon technologies such as carbon capture and storage, electricity storage and smart grids. These are all severely lacking in investment, especially in research, development and demonstration (RD&D). Even relatively mature renewable electricity generation technologies still face barriers. These obstacles are associated with high upfront capital expenditures, market and policy failures such as ineffective carbon pricing, poor business environments such as regulatory uncertainty, and lack of appropriate financing vehicles.

The OECD has long-standing expertise in helping policy makers strengthen the domestic business environment for infrastructure investment, especially in clean energy, as highlighted in the OECD *Policy Guidance for Investment in Clean Energy Infrastructure*. Key areas for policy makers to consider include: applying proven investment policy principles such as non-discrimination; transparency and investor safeguards; providing predictable and targeted policy support to clean energy and reforming fossil fuel subsidies; and ensuring a fairer playing field between independent power producers of clean energy and incumbent fossil fuel-producing utilities; and addressing outstanding barriers to international trade and investment. For instance, policy makers should address the issue of local-content requirements in solar PV and wind energy that have become more prevalent

> Most mandatory disclosure schemes require companies to report only on emissions that are produced within national boundaries

since the financial crisis started, as these requirements can increase costs for downstream power producers and make it harder for this highly global and innovative sector to draw full benefit from global value chains.

Improving disclosure

Measuring performance is also essential for assessing outcomes and, in regard to fighting climate change, corporate climate change disclosure is particularly critical. Disclosure helps to rank and compare the performance of various companies, to develop environmental, social and governance metrics, and to manage risks more effectively. Joint research conducted by the OECD and the Climate Disclosure Standards Board shows that out of G20 countries, only 15 mandate corporate disclosures on climate change by large companies and main emitters of greenhouse gases.

Furthermore, most of these mandatory schemes only require companies to report on emissions that are produced within national boundaries, even though the bulk of greenhouse gas emissions is often produced throughout companies' supply chains, in other sectors or countries. Moreover, proper scrutiny is an issue, since few mandatory schemes require or recommend data to be third-party verified, and even fewer schemes ask companies to report on risks from climate change impacts and on strategies to address those risks. Also, these schemes use a range of different calculation methodologies, thresholds and reporting systems, which makes the use and comparison of data all the more difficult.

Clearly, if we are to check progress on addressing climate change, governments and stakeholders must collaborate more closely to improve and streamline corporate reporting standards and climate change disclosure. With better disclosure, we can turn lip service on low-carbon investment into measurable action.

References

IEA (2015), *Medium-Term Renewable Energy Market Report*, OECD/IEA Publishing.

IEA (2015), *World Energy Outlook Special Report: Energy and Climate Change*, OECD/IEA Publishing.

OECD (2015), *Policy Guidance for Investment in Clean Energy Infrastructure: Expanding Access to Clean Energy for Green Growth and Development*, OECD Publishing. http://dx.doi.org/10.1787/9789264212664-en

OECD (2015), *Overcoming Barriers to International Investment in Clean Energy, Green Finance and Investment*, OECD Publishing. http://dx.doi.org/10.1787/9789264227064-en

OECD (2015), *OECD Business and Finance Outlook 2015*, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264234291-en

OECD/CDSB (2015), "Climate change disclosure in G20 countries: Stocktaking of corporate reporting schemes", OECD Publishing, www.oecd.org/investment/corporate-climate-change-disclosure-report.htm

Jeannot Ahoussou-Kouadio
President of the Assembly of Regions and Districts of Côte d'Ivoire (ARDCI)

"Regional authorities in Africa are now getting involved in the fight against climate change by making concrete commitments

Interview with Jeannot Ahoussou-Kouadio, President of the Assembly of Regions and Districts of Côte d'Ivoire (ARDCI)

How would you describe ARDCI?

The Assembly of Regions and Districts of Côte d'Ivoire (ARDCI) was created on 13 August 2013, and includes the 31 regions and two autonomous districts of Côte d'Ivoire. It acts as a forum for permanent dialogue and collaboration; represents all the regions and districts to government bodies and third parties both nationally and internationally; delivers opinions on laws and regulations affecting regional authorities; examines and proposes the resources to be deployed to promote development and the smooth running of the regional authorities; and is establishing a tailored programme for the training, further training and conversion of regional councillors seeking to advance their skills and benefit fully from their right to training.

In your opinion, what role should non-governmental parties play in the fight against climate disruption?

Governments cannot work alone, without the support of the private sector, the public and, naturally, regional government. The role of regional authorities is particularly important: the powers that are transferred to decentralised bodies often focus on areas such as the scheduling of development, land planning, and the management of natural resources. In addition, their closeness to the local population allows them to involve all the other stakeholders in designing local policy and thereby boost buy-in and inclusivity. All too often, however, cash-strapped regional authorities lack the substantial resources they need. It is essential that governments give local authorities the means to play their role and fully assume their responsibilities.

The Summit of African Cities and Regions for Climate, held on 24 and 25 June 2015, has adopted the Yamoussoukro Declaration. What does this involve?

The Declaration sets out seven undertakings: 1) implementing good environmental governance; 2) encouraging the establishment of a clean energy mix, including energy efficiency; 3) developing a resilient agricultural sector to ensure food security; 4) sustainably managing our natural resources; 5) building sustainable cities; 6) putting new information and communication technologies to work for the environment and 7) promoting a financial framework for climate projects.

We have focused on two priorities: implementing a *Platform for African regions to debate and discuss issues related to climate change*; and creating a Climate and Regions of Africa fund; we are committed to spending 1% of our budget on these in order to develop a regional strategy for Africa in the fight against global warming.

The clear signal from the Yamoussoukro summit is that African authorities are ready to take action, and are now getting involved in the fight against climate change by making concrete commitments.

What are you hoping that COP21 will achieve?

We want COP21 to mark the effective engagement of all governmental and non-governmental parties. We want a binding agreement that restricts warming to under 2°C, with a possible move towards 1.5°C, taking account of the principle of shared but differentiated responsibility. The countries of the North must face up to their responsibilities in the current environmental crisis.

In Côte d'Ivoire, for example, two thirds of woodland was lost to deforestation between 1970 and 2005. The African Development Bank estimates that climate change costs Africa US$ 40 billion a year. We therefore want to see the sums promised to the Green Climate Fund materialise, and the real recognition of Losses and Damages in the final document.

Compared to other parts of the world, and despite the extent of its current challenges, Africa only receives a small proportion of international funds, and regional governments are often unable to access them directly. So work will need to be done in the wake of COP21 to find effective solutions to this problem.

There are no jobs on a dead planet

John Evans, General Secretary, Trade Union Advisory Committee to the OECD (TUAC)

A structural shift to a low-carbon economy will entail gains in jobs, but also losses, and the first jobs to be lost are not those that you think. A just energy transition will be needed, but how?

Climate action is a trade union issue. That is why the international trade union movement under the umbrella of the International Trade Union Confederation (ITUC), working closely with us at TUAC, is prioritising our advocacy on climate issues. From the protection of jobs and livelihoods that are in the front lines of climate change impacts, to organising new quality jobs in the emerging green economy, to fighting for what we refer to as a "just transition", so that workers gain and are not left behind when

> "Low climate ambitions would be a social progress killer

their sectors move to achieve a zero-carbon world. Climate change is clearly an immense challenge for workers and their families globally, but so is the transition. Practical policy solutions and targets that reinforce and go beyond COP21 will be needed.

Make no mistake: climate catastrophes and extreme weather conditions, including cyclones, floods, drought, fires, melting glaciers, season changes, threats to agriculture and more, are increasing and impacting working people everywhere.

In the United States, Hurricane Sandy left 150000 workers displaced and employment was overall reduced by 11000 workers in New Jersey alone in 2012. In Bangladesh, Cyclone Sidr disrupted several thousand small businesses and adversely affected 567000 jobs in 2007. Typhoon Haiyan that hit the Philippines in November 2013 affected around 800000 workers, with their source of livelihood damaged or displaced overnight. The effects of these weather events rippled through international supply chains, affecting workers in other countries.

Over the next 10-15 years, we will face ever more serious impacts across the board, which will destroy whole communities and their jobs, if not their lives. The disruption will be socially and economically destabilising across whole regions, and will be worse than anything we have witnessed so far. That's what catastrophic climate change means, and unless we prevent it, then decent work, social protection and rights for all will remain an illusion, particularly for the most vulnerable.

Much has been said about the potential for climate action to deliver on job creation. The trade union movement has strongly supported this enthusiastic view. We will certainly see jobs created in renewable energy, energy efficiency, public transport and organic agriculture among others. They may even outnumber those which might be lost in sectors that are not compatible with fighting climate change. The question of their quality (in terms of wages, benefits and working conditions, unions have launched a dedicated organising strategy to ensure that the jobs we consider critical for the future bring gender impact, etc.) remains to be assessed. Still, trade unions have launched a dedicated organising strategy to ensure that the jobs we consider critical for the future bring together the social and environmental dimensions of sustainability.

Leave no one behind

All economic sectors must change. But if there is something we can learn from past economic transitions since the Industrial Revolution, it is that they have been far from fair in terms of social justice. Some might think: then there is no need to do things differently and all should just stay the same. This is a false and dangerous assumption. Governments face opposition to climate action. Often it is from actors with vested interests. Sometimes opposition comes from working people who are afraid of losing their jobs or part of their income. It is an understandable fear. However, it can be addressed and resolved. Trade unions are convinced that a proactive, fair approach to this transition can accelerate change and keep us on course to stay below the 2°C limit. We want to see the transition happen on the ground with investment in skills and lifelong learning, income protection and other social protection measures for workers in sectors hit by climate policies. We believe that dialogue and participation have to be ensured to secure workers' involvement in the design of future jobs and adequate funding for transforming local economies and communities.

And COP21 in all of this? For the ITUC and TUAC, COP21 must respond adequately to these challenges. An agreement in Paris needs to ensure that country commitments are reviewed through an effective process so that the gap in emission reductions is absorbed fairly and quickly.

COP21 needs to make clear that financing commitments to the most vulnerable countries are not being given away as charity, but are the logical and considered international response to climate change and how it risks both undermining the development progress these countries have made in the last 20 years and hampering their ongoing efforts to achieve prosperity and decent work for all. Finally, COP21 needs to send a political message to workers: not only will governments commit to achieving a zero-carbon world, but they will also commit to a "just transition" for all workers concerned.

These three policy imperatives are still on the negotiating table. The way in which they will be addressed in December will be a crucial indicator in judging the final outcome.

For the labour movement, climate change is a challenge that puts everything we care about at risk. Workers must be fully involved in shaping that "just transition", in which their rights and prosperity are paramount and where they are able to build and decide their own future. Workers need strong policies on climate. Low climate ambitions would be a social progress killer.

ITUC (2015), "Trade unions' Topline demands for COP21", September, www.ituc-csi.org/trade-unions-topline-demands-for

ITUC (2015) "Climate Justice: Unions4Climate Action", Frontlines Briefing, May www.ituc-csi.org/ituc-frontlines-briefing-climate-16132

ITUC (2015), "Climate Justice: There are no jobs on a dead planet", Frontlines Briefing, March. www.ituc-csi.org/ituc-frontlines-briefing-climate

Decarbonising transport: From smart technology to smart use

Transport accounts for 23% of global CO_2 emissions from fossil fuels, making it the second-largest emitter after electricity and heat generation (42%). Transport CO_2 emissions have increased by 57% between 1990 and 2012, and the sector has lagged behind in decarbonising. In the EU, transport CO_2 emissions increased by 36% from 1990-2007, while other major sectors reduced theirs by about 15%. Recent decreases in transport CO_2 emissions had more to do with the economic crisis, rather than a shift to greener forms of transport.

The reality is, demand for CO_2-intensive transport is growing rapidly, with particularly strong growth coming from trade-driven freight transport and a dramatic motorisation in the urban areas of lower and middle-income countries. By 2035, transport's share of emissions could thus even reach 40% of the total.

What can be done? Waiting for technological breakthroughs to clean up engines could take a long time. Clearly how we use transport must also change. For the International Transport Forum (ITF), addressing both private vehicle use and trade freight to make them more climate-friendly could make a major contribution to curbing emissions in the meantime.

Sharing potential

Inefficient vehicle utilisation is a major cause of transport emissions. Occupancy rates for private cars are very low: barely above one person per car in many cities. In addition, these private cars only operate for an average of 50 minutes per day.

If, however, all private cars in a city were replaced by shared vehicles equipped with smart technology to facilitate sharing, we would see huge improvements: in a simulation based on real travel data for Lisbon, the ITF found that car occupancy rates doubled, making 95% of cars redundant and reducing car emissions by 30% - while maintaining a similar level of flexibility, comfort and availability as private cars. In fact, better than today because congestion would virtually disappear (30% less vehicle kilometres at the peak hour.)

This emissions reduction is achieved without any technological advances, simply through more efficient use of existing capacity. But shared vehicles also help speed up the introduction of cleaner technologies: the shorter life-cycle of better-utilised cars means fleets are replaced more quickly.

And there are further indirect effects that help reduce traffic emissions. The massive release of parking space would improve conditions for walking and cycling in the city, making these emission-free ways of moving about more attractive. The distribution of goods throughout built-up areas would become easier and more CO_2-efficient as well.

The ITF's simulation used two different vehicle types for this new type of urban mobility service: six-seater taxis that provide on-demand, door-to-door mobility and are shared by several users for part of a ride; complemented by taxibuses with up to 16 seats that extend the traditional bus concept beyond fixed routes and schedules, picking up and dropping off passengers within 300 metres of their origin or destination on routes that are dynamically aligned with demand and provide transfer-free service to all. Based on the model results, ITF thinks shared urban mobility services have the potential to develop into a new paradigm for public transport.

Trade starts at home

International trade-related freight currently accounts for about 30% of all transport emissions, and more than 6% of all global CO_2 emissions. By 2050, international freight transport volumes will grow more than fourfold, significantly faster than global

> Dealing with CO_2 from domestic freight could yield a quick win

trade. Average transport distances will increase 12%. As a result, in spite of the technological progress CO_2 emissions from freight transport could treble, and freight is set to replace passenger traffic as the main source of CO_2 emissions from surface transport.

These foreseeable developments have serious implications for climate change mitigation. Shifting trade patterns in a globalised economy are leading to longer and more complex supply chains. Growth in global trade thus translates into an even faster growth in volume of freight transport.

In Africa and Asia in particular, more intra-continental freight is translating into particularly significant increases in CO_2 emissions, as freight is mostly transported by trucks due to a lack of less carbon-intensive alternatives like rail or waterway. For Africa alone, freight emissions will increase by about 700% to 2050, and by more than 330% for Asia.

Addressing these trends is essential for combatting climate change, and dealing with domestic freight could yield a quick win. After all, though only 10% of the world's international trade-related freight transport takes place within national borders, this small share generates 30% of the CO_2 emissions that come from international trade freight. As these domestic emissions are subject to national regulations and do not require highly-negotiated international agreements, tackling them should be less complex.

As road transport in trucks remains the dominant means of moving goods from points of entry to the hinterland, developing inland waterways around ports or expanding rail links from ports and airports provide avenues for addressing this source of CO_2 emissions.

Visit www.internationaltransportforum.org
Contact: Michael Kloth, Head of Communications

ITF (2015), *ITF Transport Outlook 2015*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789282107782-en.

ITF (2015), *Urban Mobility System Upgrade*: Corporate Partnership Board Report, Paris, http://www.internationaltransportforum.org/Pub/pdf/15CPB_Self-drivingcars.pdf

IEA (2014), *CO_2 Emissions from fuel combustion 2014*, IEA Publishing, Paris, http://dx.doi.org/10.1787/co2_fuel-2014-en.

IEA (2013), *World Energy Outlook 2013*, OECD Publishing, Paris, http://dx.doi.org/10.1787/weo-2013-en.

European Commission (2015), "Reducing emissions from transport", http://ec.europa.eu/clima/policies/transport/index_en.htm.

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Build more, build right: Development finance, infrastructure and climate change

Naeeda Crishna Morgado and Juan Casado-Asensio, OECD Development Co-operation Directorate

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The UN Conference on Climate Change in Paris in November-December is the final crucial step in a year which has set forth several global milestones towards shaping a better common future. Tackling climate change is a determining factor in the 17 Sustainable Development Goals (SDGs) agreed in New York in September 2015 in particular; an agreement in Paris would not only bolster all the efforts that led to the historic SDGs, but lift the hopes of everyone on the planet, especially the most vulnerable.

Over 800 million people still live on less than $1.25 a day and need access to basic food, water, energy, shelter and transport–they need adequate, inclusive and climate-resilient infrastructure. What is standing between us and the vision of an ideal world in 2030–a world where the SDGs and low-carbon, inclusive development are finally becoming a reality? It is not so much a question of what is stopping us, but rather of what is missing?

To meet the infrastructure requirements of the SDGs, we definitely need to build more. Yet the financing gap we face is immense. An UNCTAD investment report estimates investment requirements in developing countries range from US$3.6 trillion to $3.9 trillion per year between 2015 and 2030. Current levels of investment are around $1 trillion per year–less than a third of the amount needed.

At the same time, today, a changing climate and extreme weather events threaten transport, energy and water infrastructure globally, while also impacting the potential return on the investments needed in the poorest countries to build infrastructure for the future. So, we need infrastructure that helps reduce poverty and encourages competiveness, and at the same time, we need to make sure that we reduce dependence on fossil fuels, and that all investments are climate resilient. The good news is that extra investment for low-carbon, climate-resilient future infrastructure would cost 5% more than business as usual over the same period. However, this shift requires a step change in the way new infrastructure

is designed and built in developing countries.

Development partners have a role to play here. While the overall importance of development financing for infrastructure in developing countries is relatively small (around 6-7% of total infrastructure financing) in low-income countries–where risks for other investors are high

> The lion's share of development finance goes into infrastructure that augurs badly for climate

and returns low–official development assistance (ODA) still finances significant shares of the basic infrastructure. Beyond this, ODA can play a key role in mobilising much needed private finance in middle-income countries and emerging economies, and in scaling up private finance.

However, development finance still has a way to go to "build right". In 2013, some 37% of bilateral and multilateral development finance for infrastructure could be considered low carbon and/or climate resilient, which means the lion's share still goes towards locking developing countries into infrastructure projects that augur badly for climate and the environment. There are financing gaps affecting individual sectors too. The majority of financing for energy can be considered to address climate change (57%), but the same cannot be said for transport and water sectors where only a third of development finance can be considered to support low-carbon and climate-resilient infrastructure.

The story is not all discouraging. Development co-operation providers increasingly recognise the need for development finance to address climate change. A global framework for development finance, known as the Addis Ababa Action Agenda, agreed by countries in mid-2015, stresses the need for a global framework for development finance, including aid, private investment and tax, that is environmentally sustainable. Development partners are also supporting and mobilising significant climate finance–around $62 billion in a recent OECD estimate–and this total is increasing year on year.

What is needed is for development finance to be truly transformational. This means that development co-operation providers need to "green" larger shares of their infrastructure portfolios in developing countries. Their finance should support the climate-proofing of water supply and sanitation infrastructure in particular. Similarly, with the rapid urbanisation of the developing countries, sustainable transport systems and multi-modal transport links should also receive new emphasis in financing efforts.

References

4th High Level Forum on Aid Effectiveness (2011), *Busan Partnership for Effective Development Co-operation*, Busan, www.oecd.org/dac/effectiveness/49650173.pdf.

Global Commission on the Economy and Climate (2014), *Better Growth, Better Climate: The New Climate Economy report*, The Global Commission on the Economy and Climate, Washington DC, http://newclimateeconomy.report/wp-content/uploads/2014/08/NCE_GlobalReport.pdf.

Miyamoto, Kaori and Emilio Chiofalo (2015), "Official development finance for infrastructure: Support by multilateral and bilateral development partners", *OECD Development Cooperation Working Papers*, No. 25, OECD Publishing, http://dx.doi.org/10.1787/5jrs3sbcrvzx-en.

OECD (2015), *Climate Finance in 2013-14 and the USD 100 Billion Goal*, in collaboration with Climate Policy Initiative, www.oecd.org/environment/cc/OECD-CPI-Climate-Finance-Report.htm.

United Nations Conference on Trade and Development (2014), *World Investment Report*, United Nations Publications, Geneva, http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf.

Energy transitions, renewables and rational energy use: A reality check

Vaclav Smil, Distinguished Professor Emeritus at the University of Manitoba, Canada*

Is replacing fossil fuels with renewable sources such as solar and wind really feasible? A lot has to happen first, including a change in how we use energy.

There is nothing new about energy transitions, though until the 19th century they unfolded very slowly. With the exception of the UK (where coal had already become the dominant fuel by the mid-17th century) all major Western societies remained predominantly wood-fuelled economies energised by traditional biomass, until the latter half of the 19th century. Coal began to supply more than half of French energy by the early 1870s, and more than half of the US demand by the mid-1880s. But in global terms the 19th century was still dominated by wood and the world began to use more coal than wood only at the very beginning of the 20th century.

By 1950 traditional biomass fuels supplied about 27% of the world's energy (and most of the energy in both China and India), and fossil fuels (mainly coal) provided about 72%, with hydroelectricity delivering just over 1%. By the end of the 20th century modern civilisation became even more dependent on fossil fuels: in absolute terms their extraction had more than quadrupled between 1950 and 2000, and they delivered about 78% of the world's primary energy. But traditional biomass fuels still provided nearly 12%, so if we count only modern primary energies, then coal, crude oil and natural gas supplied 90% of the world's energy in the year 2000, declining to 86% by 2015. We have always known that our reliance on fossil fuels would be a temporary affair, and that long before we would exhaust their immense resources, coal recovery from deep and thin seams and oil and gas production from small fields in extreme environments would become too costly to handle. A shift to nuclear energy or to modern conversions of renewable energy flows was always inevitable. If fuel resources and technical abilities to recover them at affordable price were the only limitations, we could anticipate at least another century or more of coal, oil and gas. Global warming has made the transition to non-carbon energies a matter of some urgency, but we must nevertheless be realistic about the size and speed of such a shift.

> "Less is more" has never been more desirable than in the case of tackling climate change

By 2015, the largest non-fossil contribution came from hydroelectricity (about 6%), and while large-scale opportunities to develop water power are still available in parts of Asia, Africa and Latin America, resource limitations and environmental consideration dim the prospects of even a doubling of this contribution. Nuclear fission now supplies less than 5% of the world's primary energy and while there are some bold plans for its expansion in

Asia, its use in OECD countries has been stagnating or declining, making it highly improbable that it could become a leading source of non-carbon energy in the near future.

Solar, wind and modern biofuels now supply no more than 3% of the world's primary energy, and in 2014 China, which has seen years of record-setting additions of solar and wind capacities, derived less than 2% of its energy from these conversions. Wind and solar electricity are much more prominent in some EU countries, but even Germany, the country that forced an accelerated adoption of new renewables through its *Energiewende*, produced about 15% of all electricity from wind and solar, compared to about 55% from fossil fuels in 2014. Going further, say to 40-50%, will be challenging technically and cost-wise, since producing higher shares of intermittently available electricitzy will require higher reserve capacities for night-time demand, and for overcast and calm days; better high-voltage interconnections; and more extensive electricity storage, including for entire cities, now home to more than half of the world population.

However, generating higher shares of electricity from wind and solar conversions is less challenging than displacing fossil fuels for transportation. Biofuels are an obvious alternative but very few countries can afford to divert so much of their cropland to their cultivation as the US has done, where biofuel still only supplies less than 8% of all of its transportation energy. Global production of modern biofuels (ethanol and biodiesel) is now equivalent to just 3% of nearly 2.5 billion tonnes of oil equivalent used by land, water and air transport. Low power densities, low energy returns, water demand and environmental degradation are among the most obvious limits on biofuel production, and the much touted second generation of such fuels (converting waste phytomass) has yet to reach large-scale commercial stage.

Most importantly, there are large segments of modern energy consumption where we do not have any readily available alternatives of the required scales of billions or hundreds of millions of tonnes. Worldwide, about a billion tonnes of coal goes to make coke, the critical raw material for producing iron, while direct reduction of iron accounts for only 5% of the metal's total output (and it is mostly energised by another fossil fuel, natural gas). Non-energy uses of fossil fuels are also critical: more than half a billion tonnes of crude oil and natural gas are used as feedstocks to produce a wide array of plastics, fertilisers and other chemicals, and more than 100 million tonnes of crude oil end up as lubricants and paving materials (asphalt).

> Generating higher shares of electricity from wind and solar conversions is less challenging than displacing fossil fuels for transportation

Slim that waste line

So there is work to do. A combination of subsidy changes–removing them from fossil fuels, enhancing them for new renewables–mandated production targets and intensified R&D could accelerate the transition to renewables, but it is unlikely to displace all fossil fuels in a few decades, particularly as many low-income countries will rely on them for their development. While fossil fuels will still dominate the global energy supply by 2050, their absolute consumption should be steadily declining, particularly in OECD countries and if we commit ourselves to a more rational energy use.

Mass adoption of the best available conversion techniques is not enough: after all, we now use more fuel by flying more frequently in better airplanes and moving more goods in more efficient ships and trucks. High-income economies simply have to find ways to reduce their average per capita energy use, such as by cutting their extraordinarily high food losses (about 40%), and rationalise their wasteful transport. Such actions would increase well-being and improve trade balances as well, while steadily reducing CO_2 emissions.

We should not forget that the environmentally least disruptive action is not to turn to new technical solutions to produce more energy in different ways, but simply to do with less. "Less is more" has never been more desirable than in the case of tackling the rising levels of atmospheric CO_2.

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Smil, Vaclav (2006), "21st century energy: Some sobering thoughts", in *OECD Observer* No 258-259, December 2006, OECD Publishing.

Planetary limits, social needs and economics for the Anthropocene

Joshua Farley, Professor, Community Development and Applied Economics, and Fellow, Gund Institute for Ecological Economics, University of Vermont

The human economy is a physical system embedded in society, which itself is embedded in a finite global ecosystem. The primary goal of the economy should be to meet basic human and social needs, now and in the future, without degrading the global ecosystem services upon which all life depends. How can this be done?

All economic activity must obey the laws of physics and ecology. It is impossible to create something from nothing: every physical thing an economy produces is the transformation of raw materials provided by our finite planet. All economic production also requires energy, over 80% of which is provided by finite fossil fuels. Burning them generates waste, greenhouse gases and other pollutants. Moreover, all economic products wear out, break down or fall apart.

It is also impossible to create nothing out of something: the economy transforms raw materials and energy into economic products and returns them to the ecosystem as waste. A law of ecology is that everything is connected to everything else, so when we transform raw materials and energy into economic products and waste, we inevitably degrade the ecosystems upon which all life depends. Furthermore, ecosystems are subject to thresholds beyond which a small change in human activity can cause catastrophic and potentially irreversible ecological outcomes. We cannot accurately predict where those thresholds lie, or what lies beyond them. But we do know that to maintain healthy ecosystems while ensuring that people's basic needs are met, those thresholds must be respected.

The trouble is, current rates of resource extraction and waste emissions are changing ecological functions and geochemical processes so rapidly that many scientists claim we have entered a new geological epoch–the Anthropocene–in which we run growing risk of crossing these ecological thresholds (see for instance, Steffen et al., 2015). Meanwhile, nearly a billion people are still chronically malnourished. We need a new economic system capable of meeting basic needs without exceeding planetary boundaries.

Can the market economy meet this challenge? The strengths of markets are that, under certain conditions, they maximise the monetary value of production and consumption as determined by the subjective preferences and free choices of individuals, and incentivise innovation. Unfortunately, for the challenge of remaining within planetary boundaries, markets are unlikely to achieve these outcomes, while for the challenge of meeting basic needs, their desirability is questionable. These claims require elaboration.

The most obvious problem is that many essential ecological functions, such as climate stability, cannot be owned. Markets therefore ignore their values,

treating them as "externalities", and will produce long past the point where the ecological costs of additional output exceed the market benefits. Individuals cannot choose how much to consume. For this reason, decisions to bolster ecosystem resilience must be collective.

Another serious problem with markets is that they weight preferences by purchasing power, favouring the whims of the rich over the needs of the poor. During the food crises of 2007-08 and 2011-12, the prices of staple grains doubled in response to small decreases in supply. In countries consuming over 3 500 calories per person per day, where the marginal utility of eating more food is zero or negative, our research found that consumption remained stable and people continued to throw away some 30-40% of the food they purchased. In countries

> If we are to use a pricing policy, prices should reflect both ecological and humanitarian costs

where people were already consuming too little to meet basic needs, they cut their consumption even further, exacerbating already high levels of malnutrition and increasing political unrest. If our goal is to maximise monetary value, then it is more efficient to allocate a loaf of bread to a wealthy, possibly overfed Western consumer who throws a third of it away, rather than to a destitute African woman desperate to feed her starving children simply because the former can pay more. Ironically, a small reduction in the supply of essential resources causes their price, and hence the revenue they generate, to skyrocket, thus boosting GDP.

This perverse outcome raises serious alarms about internalising ecological costs into market prices as a solution to planetary boundaries–it would force the greatest sacrifices from those who contributed the least to causing the problems. If we are to use a pricing policy, prices should reflect both ecological and humanitarian costs: an appropriate price signal should make it vastly more expensive to buy fossil fuels for a private jet than for the satisfaction of basic needs such as food, water and shelter.

Markets may also be poorly designed for stimulating appropriate innovations at lowest cost. The profit motive provides little incentive for innovations that meet the needs of the poor, who have negligible purchasing power. In a classic example, drug companies halted production of the drug called eflornithine to cure African sleeping sickness because it made no profit, but continued to market the same compound in wealthy countries to slow the growth of unwanted facial hair.

Market incentives for innovation also require patents, which raise the cost of using existing information and slow the rate of scientific advance, as several researchers have shown. This is hardly the way to address pressing climate change. Furthermore, once a green technology has been developed, its social value is maximised when it is made freely available to all. If society developed clean, dependable and inexpensive solar energy, it would be counterproductive to limit use to those who could pay monopoly prices, while leaving others to burn coal. It is true that patents last only 20 years and then become part of the public domain, but can we afford to delay the widespread adoption of green technologies for that long?

Competitive markets worked well for a fossil fuel economy far from planetary boundaries. Now however, the physical boundaries of the planet compel us to make a transition to a zero-carbon, solar energy future. Countries need not compete for solar energy, since one country's use leaves no less for others and technological innovations for capturing solar energy improve through sharing. The maximisation of monetary value largely excludes the poor, and unbridled economic growth exacerbates climate change. This is why governments must act together, which is what the UN climate change summit in Paris is about.

New approaches are needed. One would be for the richest countries to fund a global research effort into green technologies–especially alternative energy–with results made freely available to all, on the condition that any improvements are also open access. Open source software and the Internet have used this approach to unleash innovations. This "sharing economy" approach could stimulate the conditions of trust and reciprocity required to develop co-operative solutions to other global problems. Another would be to ensure that basic needs are met before selling essential resources to the highest bidder. We cannot simply assume that markets are always best.

An economics for the Anthropocene must be grounded in science but guided by moral values. Together, we must first decide on the socially, morally and psychologically desirable ends of economic activity–perhaps using the UN's Sustainable Development Goals as a start–and then assess how to achieve them. Only then can we determine what economic institutions will meet our goals.

References

Farley, Joshua, and Skyler Perkins (2013), "Economics of Information in a Green Economy", *Building a Green Economy*, Michigan State University Press, East Lansing, Michigan.

Farley, Joshua, Abdon Schmitt Filho, Matthew Burke, and Marigo Farr (2014), "Extending market allocation to ecosystem services: Moral and practical implications on a full and unequal planet", *Ecological Economics*, Volume 117, http://dx.doi.org/10.1016/j.ecolecon.2014.06.021.

Heller, Michael, and Rebecca Eisenberg (1998), "Can Patents Deter Innovation? The Anticommons in Biomedical Research", *Science*, Volume 280, http://dx.doi.org/10.1126/science.280.5364.698.

Steffen, Will, Jacques Grinevald, Paul Crutzen, and John McNeill (2011), "The Anthropocene: Conceptual and historical perspectives", *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, Volume 369, http://dx.doi.org/10.1098/rsta.2010.0327.

Steffen, Will, Katherine Richardson, Johan Rockström, Sarah E. Cornell, Ingo Fetzer, Elena M. Bennett, Reinette Biggs, Stephen R. Carpenter, Wim de Vries, Cynthia A. de Wit, Carl Folke, Dieter Gerten, Jens Heinke, Georgina M. Mace, Linn M. Persson, Veerabhadran Ramanathan, Belinda Reyers, and Sverker Sörlin(2015), "Planetary boundaries: Guiding human development on a changing planet.", *Science*, Volume 347, http://www.sciencemag.org/content/347/6223/1259855.

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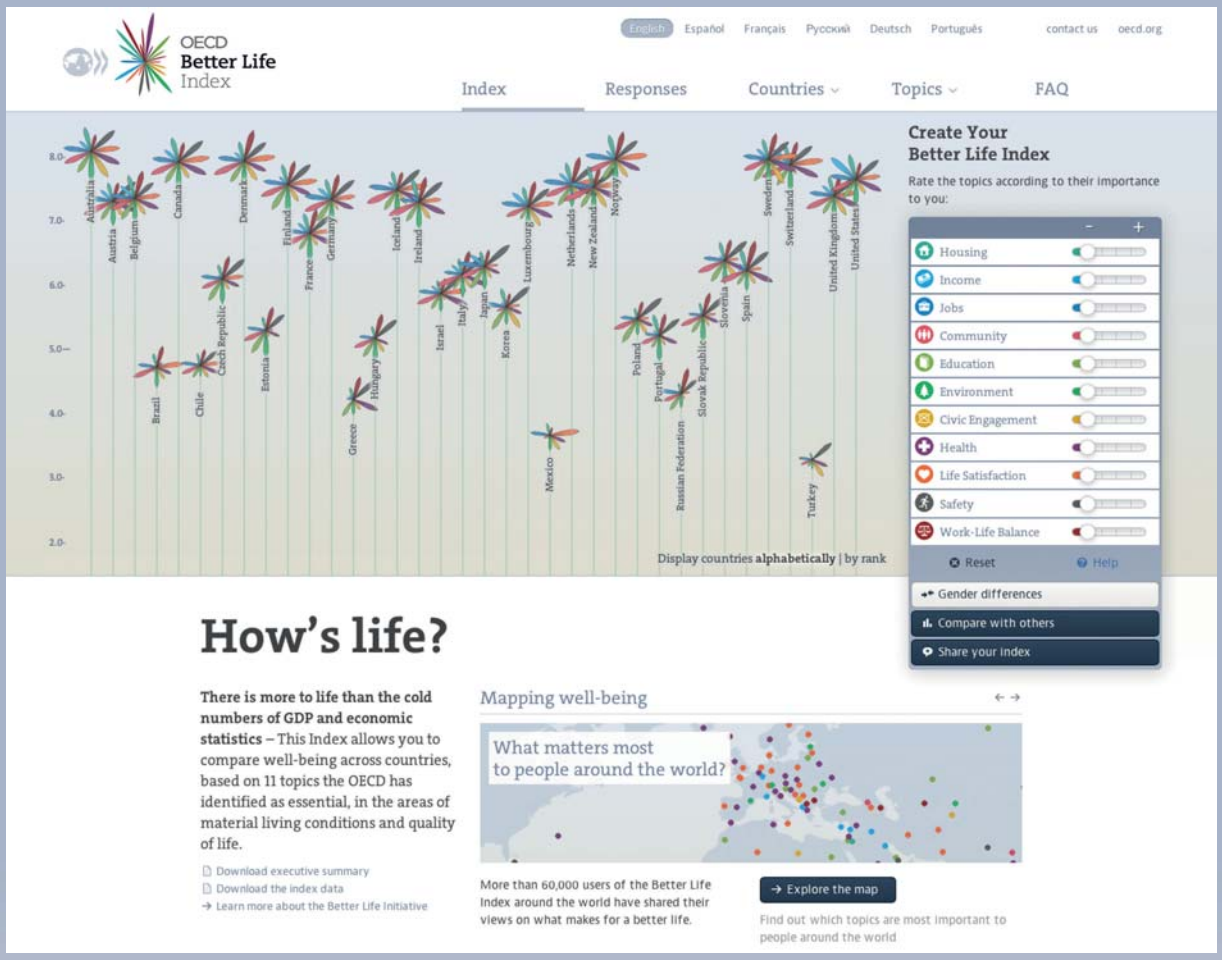

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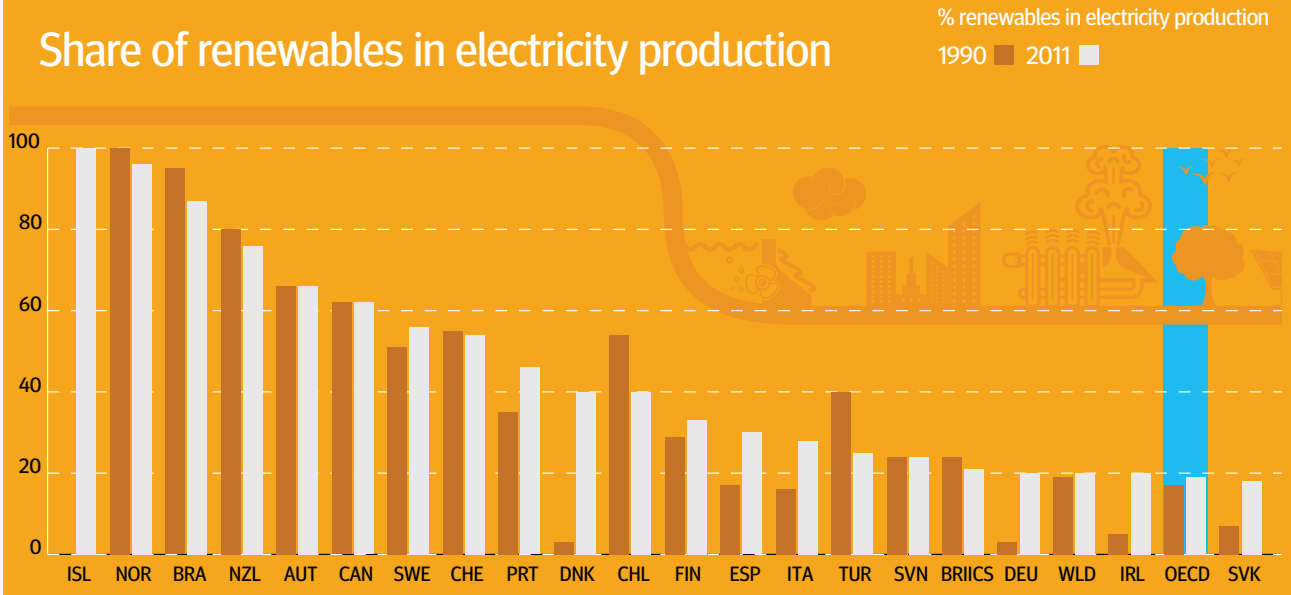

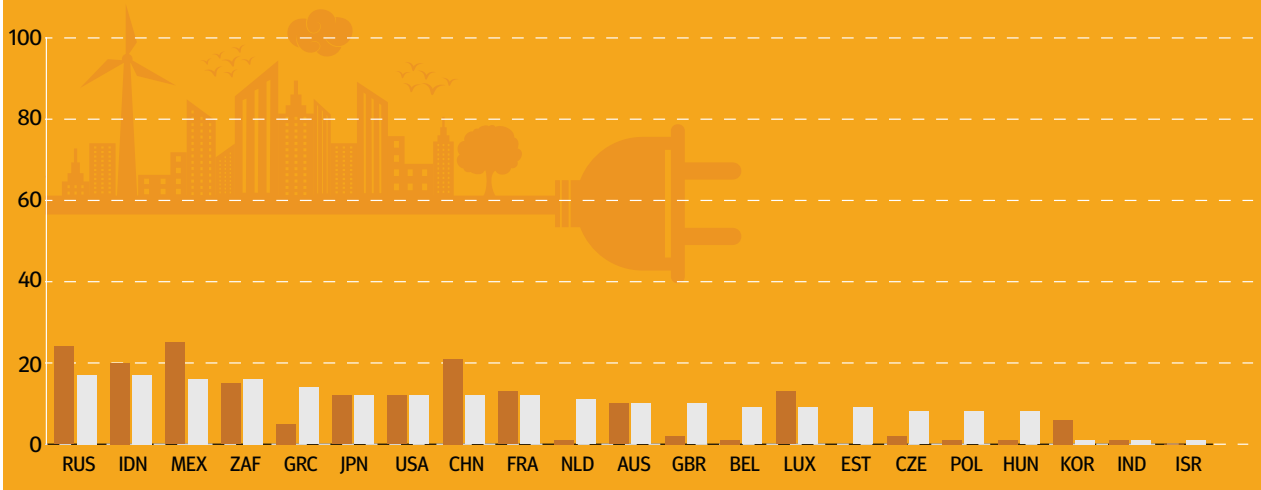

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Fuel fraud perpetuates further harmful auto emissions and increased fuel consumption

In accordance with Articles 4 and 12 of the United Nations Framework Convention on Climate Change, countries that are parties to the convention submit national greenhouse gas (GHG) inventories to the Climate Change secretariat. The measures are aggregated in CO_2 equivalent.

In a recent study[1] the Asian Development Bank concluded that fuel fraud, on top of robbing nations of much needed fiscal revenue, "perpetuates extensive secondary effects such as harmful auto emissions, increased fuel consumption, disrupted supply chains, and loss of confidence in national governance systems. While fuel-marking systems have been in use since the 1950s, recent developments in marker technologies, coupled with advances in analytical capacity, now provide the technical foundation for extremely accurate and effective fuel-marking programs".

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3. Some use of non-robust dyes as a marking solution may create large amounts of waste when criminals wash out the dyes. For example, Japan is suffering from huge amounts of waste created by washing out quinizarin used to dye fuels. The same problem exists in Ireland, which has led to an enquiry about the use of cleaner marking technologies. With this in mind a robust marker is critical to the solution.
4. The marker itself should be proven to be environmentally friendly when added to the fuels. This requires emission and engine tests of marked fuels to meet environmental standards and engine compatibility.

Safe international trade is essential for the economic growth governments are currently seeking, but is threatened by the ever-evolving asymmetrical threat of fraud and illicit activity. These crimes, be they through sale of counterfeits, contraband, tax evasion, avoidance of quality controls or theft of intellectual property, damage governments' revenues, undermine policies and put public health and citizens' well-being at risk.

The work of international organisations such as the OECD in promoting co-operation and best practice between governments is crucial to tackling the issue. So is direct action by national governments to reinforce their own capabilities and build robust systems which can be linked across borders to build an interoperable international network.

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[1] Asian Development Bank. The Governance Brief. "Fuel-Marking Programs: Helping Governments Raise Revenue, Combat Smuggling, and Improve the Environment" Issue 24. 2015.

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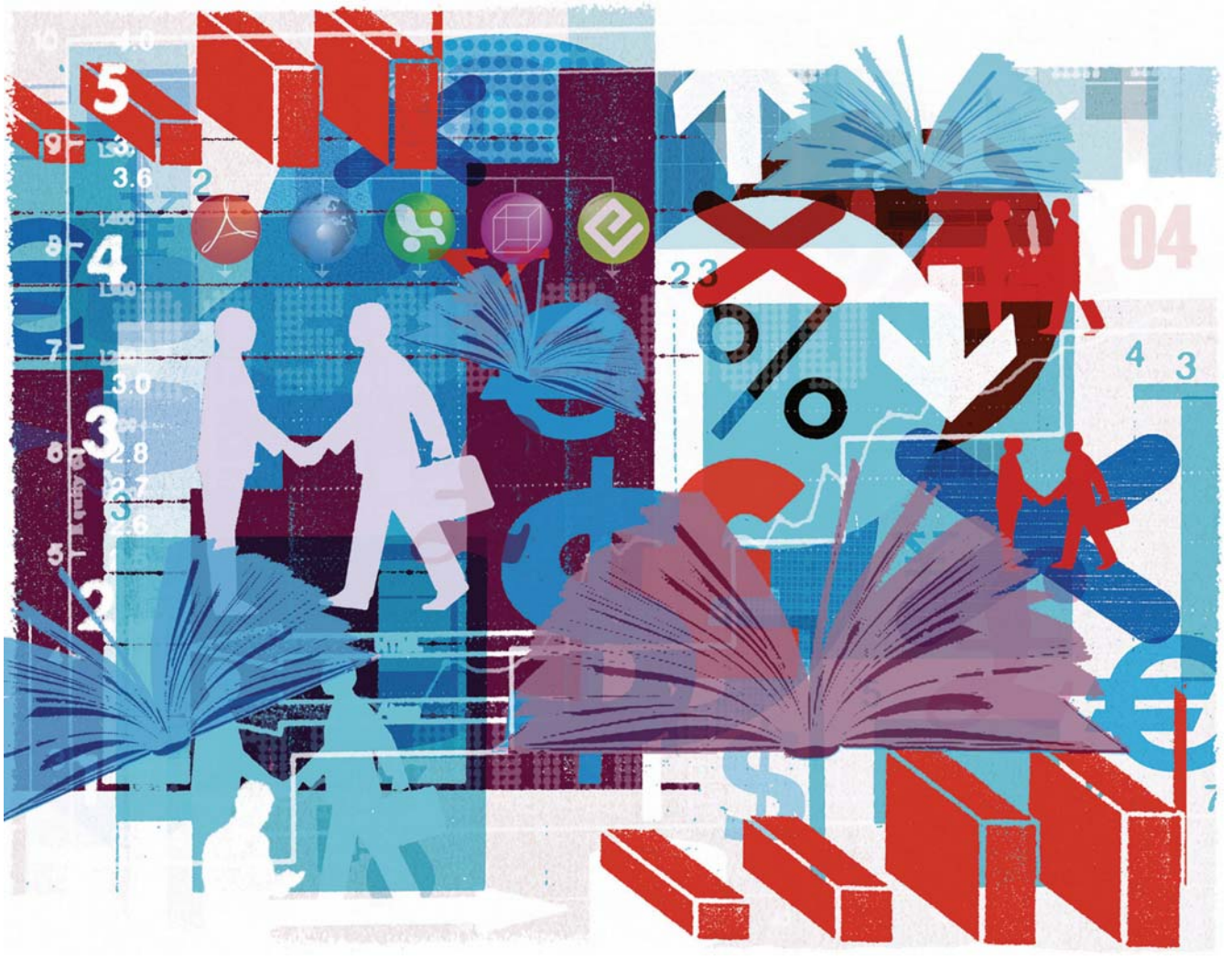

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Ville Lumière
Paris lights the way on climate

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OECD

Special to UN Conference on Climate Change,
Paris-Le Bourget, 30 November-11 December 2015

Cities at the forefront of fighting climate change

We want to step out of the vicious circle of an economy which is an increasing drain on resources, and enter another circle

Anne Hidalgo
Mayor of Paris

An ecological transition has been necessary for many years. It has now become vital. Faced with the prospect of the total destruction of people and the environment, we must send out an equally uncompromising wake-up call on the ties that bind humans and nature.

Only a radical overhaul of our way of living can put a stop to environmental degradation. And sustainable solutions need to come from cities, which are the leading public investors, trailblazers in testing ideas, and the driving force behind social and technological innovation.

Cities know how to create precious synergies between citizens, businesses and institutions. They have valuable human resources at hand, which can guarantee creativity and unique expertise. By forging a direct link between residents and users, cities can unite large communities tasked with thinking and doing. Thanks to their responsive modes of governance, they only need a few months to test ideas that would require years of negotiation in national and international bodies.

Local authorities must play their full part in this effort. Paris is fully committed to combating climate change and determined to move forward as quickly as possible. And I know that this objective is shared by many local leaders both in France and abroad. We intend to turn words into actions, which will benefit our lives and our cities.

This means placing the circular economy at the heart of the way we operate. We want to step out of the vicious circle of an economy, which is an increasing drain on resources, and enter another circle, one which respects human dignity, health and environmental balance. It is a circle in which humanity fights not against our possibilities, but against everything blocking the way to a freer future. The circle integrates, includes and involves everyone in a shared journey.

Local authorities need to work towards the emergence of this new economy, so that we learn how to produce without destroying, consume without wasting, and recycle without dumping.

This is precisely the direction that the City of Paris has chosen to take. And we are determined to make the UN Climate Change Conference (COP21) in Paris a milestone in the fight to save our environment.

On the occasion, some 1 000 local leaders from around the world will come and fly the flag for cities and regions. Every day, local authorities implement concrete solutions at grass-roots level, which must be used to add impetus to negotiations. The Climate Summit for Local Leaders will be an opportunity to acknowledge those innovations that local authorities and their networks have put in place in their daily efforts to preserve our planet.

It is by giving all these voices the platform they deserve in order to be properly heard that we can reach an agreement that is crucial for safeguarding and freeing the future. The Climate Summit for Local Leaders will be an opportunity to deliver a powerful collective message with a single voice.

Another world is within our reach, and within the reach of all humankind, based on our ideals of unity and sharing. It is up to us to bring that world to life.

Visit http://next.paris.fr/english and www.paris.fr

Fighting climate change: What city mayors are doing

Oil, gas and coal represent over 80% of energy use worldwide, and are a major cause of greenhouse gas emissions and other unhealthy pollutants. These fossil fuels also drive the likes of transport, industrial output, lighting, heating and construction, and naturally their use is heavily concentrated in urban areas. Roughly half the world's population live in urban areas, and as towns and cities are an important generator of emissions, they must also play a key role in the fight against climate change.

As this OECD Observer Roundtable of Mayors indicates, authorities in a range of global cities are leading the charge, both in their own urban areas and through closer international co-operation. We asked mayors from Libreville, Madrid, Montreal, Rio de Janeiro, Seoul, and Stockholm:

"How is your city engaged in the fight against climate change and what policy actions are you taking?"

Libreville

A local action priority

Rose Christiane Ossouka Raponda,
Mayor of Libreville, Gabon

In December, at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21, UNFCCC), participants will seek to secure a universal agreement on action to combat climate change.

Since September 2002, Gabon has been taking steps in this direction, such as the decision to designate 27% of the country's territory as national parks. The adoption of a Climate Action Plan, submitted to the UNFCCC on 1 April, is designed to integrate climate-related issues into all national public policies.

To date, efforts by Libreville to combat climate change are in line with central government initiatives in accordance with the current legal and institutional context. The Commune of Libreville has integrated environmental issues into its local development programme. At present, the focus is on hygiene, planting and helping the state implement the restructuring plan for Libreville.

The environment has to be at the heart of every decision taken by local authorities. The challenge for each and every one of us is to make the public aware of the risks that humanity faces unless we change our behaviour and stop the warming of the biosphere. I think it is important that we remind ourselves

> The environment has to be at the heart of every decision

that, as local authorities, it is our job to ensure that climate change vulnerability is given priority in local action plans. It must be subject to individual surveillance and assessment. However, it is just as important to mobilise city dwellers on the importance of adopting environmentally friendly behaviour, and encourage them to do so. The future of mankind is at stake.

Visit www.mairielibreville.org

Madrid

Building resolve

Manuela Carmena, Mayor of Madrid

The City of Madrid is aware of the consequences of climate change and the weak political will of most governments to deal with this global challenge. Cities are responsible for a major share in the emissions of greenhouse gases and local authorities must lead the transition to a low-carbon economy.

We share the objective of achieving an efficient local economy in the use of energy that should be 100% renewable by 2050. Madrid is far from this objective. Our metropolis consumes a huge amount of energy, mostly from fossil-based sources, while we produce almost no energy at all.

We recycle less than 30% of our urban waste. The priority of public institutions in past decades has been to build motorways

in order to encourage the use of cars as the main means of transportation. We suffer the consequences of these policies: a public debt equal to the rest of Spain's

> We suffer the consequences of past policies

municipalities put together, and heavy pollution with its harmful effects on health.

The good news is that we have the political will for a necessary transition to a cleaner, greener and more efficient city. Housing rehabilitation in search of efficiency is a must. We must reduce the use of cars, improve public transport and promote the use of bicycles.

We must increase our energy independence by taking advantage of our sunny climate. The Spanish government must allow and promote the production of renewable energies. We have to turn urban waste into value and employment, as part of a "zero waste" strategy.

Finally, we have to encourage the participation, co-operation and understanding of the population. The education of our children about the values of sustainability is our most important ally for the huge cultural change we seek.

Visit www.madrid.es

Montreal

Towards a model of sustainability

Denis Coderre, Mayor of Montreal*

The City of Montreal has a longstanding commitment to promoting sustainable development and combating climate change. It is a member of the Compact of Mayors and the only Canadian city in the 100 Resilient Cities network. Our aim is to reduce greenhouse gas (GHG) emissions by 30% by 2020, compared to 1990.

But this figure does not reflect the full breadth and depth of the measures that we are putting in place to make our city a model of sustainability in sectors such as transport, urban design and waste management. There are too many to list, but examples include our bike-share system called Bixi, plans to plant 300 000 trees, and the construction of biogas and organic waste processing plants, which will help remove the need for landfill sites in a few years.

However, what makes Montreal stand out is our desire to provide concrete support to private and public initiatives, so that these sectors contribute to the ecological transition of the Montreal economy. To this end, the Transition Montreal 21 programme aims to transform some of our environmental liabilities into productive assets while generating business opportunities.

More specifically, our priority is to develop two innovative industries: green chemistry, creating products which will help reduce our dependence on fossil fuels and clean up our contaminated sites; and electrified transport, based on Quebec's large hydropower production capacity and the City of Montreal's desire to electrify its fleet of vehicles, create a network of self-service electric vehicles and install a network of charging points across its territory.

This ecological transition can only succeed with the help and support of our citizens. That is why, during the implementation of our initiatives, comprehensive public consultation will be carried out to ensure that this is a genuine social project.

*Mr Coderre is the climate change ambassador for the Metropolis association.

Visit http://ville.montreal.qc.ca/portal/

Rio de Janeiro

Climate action protects the poor

Eduardo Paes, Mayor of Rio de Janeiro

Climate action is protecting the poor and is a duty of global leaders, not a choice. We can't submit the population to the hazards of climate change, which affects the most vulnerable citizens first.

In Rio, we have a particular topography, with hills that were inhabited and became our *favelas*. Due to tropical rains, the residents of these favelas are subject to mudslides, which have even caused deaths in the past. These storms will get more intense as the climate changes, making the whole city more vulnerable to landslides and flooding.

Rio has another characteristic: it faces the Atlantic Ocean and has 635 kilometres of coastline, bathing its beaches. We now know of the dangers of rising sea levels, and this is a source of concern to my home city. To prepare for this and avoid the terrible scenes that could unfold if we don't do anything, we are acting on different fronts. One of them is mitigating risks, by setting goals to decarbonise our development and stop the problem from worsening. For this, it is necessary to decouple urban growth from carbon emissions. We can no longer postpone actions against consequences of climate change, that may occur as soon as in 2020. So we are acting right now in Rio, currently changing the mobility paradigm, from cars to mass transport, by delivering four BRT lines, the dedicated corridors for articulated buses and a Light Rail Vehicle in the revitalised Port Area. Rio also has

the largest number of bike lanes in Latin America.

On another front, we are preparing the city to face climate change with the Rio Resilient programme that is developing solutions for the likes of heat waves, mudslides and flooding. We have already implemented our Operation Centre, which concentrates different players in one place to accelerate action, including triggering alarms in the favelas whenever there is a risk of heavy rains. As chair of the C40 Cities Climate Leadership Group (see www.C40.org) which connects megacities in the fight against climate change, I oversaw the process that led Rio to become the first global city to comply with the Compact of Mayors.

My advice is for cities to work together to fulfil this compact, by implementing goals to reduce greenhousegas emissions and share their experiences with the rest of the world. Together, in networks such as the C40, cities can help each other and fight for support from other levels of society.

Visit www.rio.rj.gov.br

Seoul

Sending a clear message on climate

Park Won-soon, Mayor of Seoul

With Pope Francis urging the world to join in collective efforts to safeguard our common home by addressing climate change and protecting the environment, a new post-2020 climate agreement is one of the defining tasks of our generation.

The City of Seoul has sent a clear message to the world that energy conservation, cuts in greenhouse gas emissions and sustainable urban development are all compatible via our implementation of the One Less Nuclear Power Plant since 2012. At the International Council for Local Environmental Initiatives (ICLEI) World Congress held in Seoul April 2014, we unveiled the Promise of Seoul, a commitment by citizens, businesses and the administration to cut citywide carbon emissions by 40% from 2005 levels by 2030, thereby effecting a transition towards a low-carbon and high energy-efficient city.

At the 2014 UN Climate Summit I, along with Michael Bloomberg, the UN Secretary-General's special envoy for cities and climate change, and Eduardo Paes, mayor of Rio de Janeiro, presented the Compact of Mayors, launched by ICLEI (www.ICLEI.org), the C40 Cities Climate Leadership Group (www.C40.org) and United Cities and Local Governments (www.UCLG.org) in order to showcase local climate action in a transparent way. Seoul is committed to fully comply with the compact by November 2015.

I would like to strongly encourage other cities to join the 106 cities that have signed up to the Compact of Mayors to prevent global warming from worsening. Moreover, I hope all cities set a vision that departs from the old development-centred path to a low-carbon one that values environmental protection and saving energy. Also, I would like to urge other mayors to develop goal- and action-oriented plans to turn their pledges into reality.

Visit http://english.seoul.go.kr/

Stockholm

Willing front runners for future solutions

Karin Wanngård, Mayor of Stockholm

Stockholmers are committed to environmental and climate issues, thus putting high demands on me as a politician to continue doing even more.

Stockholm is a city by the sea, built on islands. This means that rising sea levels as a consequence of a changing climate are a very tangible threat to our city. This,

and a wide range of other issues, means that we address the challenge with a local as well as global focus.

I have set ambitious goals for our city. Stockholm will not only be carbon neutral by 2040, but fossil fuel free, too! To reach this goal we must excel on all fronts: our district heating needs to be even more effective than today, and our new dwellings (as well as those we refurbish) must be made very energy efficient, if not carbon positive [meaning that any extra energy produced on site will not be lost but be fed to other uses].

Transport is a huge challenge for Stockholm, as for most other cities. We want to make sure that pedestrians, cyclists and public transport commuters are prioritised.

Stockholm is an acknowledged leader in the global green economy, and has experience and good practices to share. We are willing and able to act as front runners for future solutions and as test bed for the many companies within the green economy sector that we host in Stockholm. We also see this as a business opportunity.

We are also eager to learn from other cities and to copy their best examples for the Stockholm context.

I am certain that cities hold many of the solutions to the climate crisis in our hands. Now is the time to be bold and do what is right. The time to wait and see has long gone. I want to be able to tell my children that my generation of leaders faced the biggest challenge ever, and we stood tall. The alternative to that story would be inconceivable.

Visit http://international.stockholm.se

Paris leads the way in electro-mobility

Antoine Dusart, Communication Manager, National Association for the Development of Electro-mobility

©Jackie Naegelen/Reuters

Faced with heavy pollution and congested roads, Paris is turning to electric vehicles to restore air quality. Its incentive policies for all forms of transport should inspire cities all over the world to follow suit.

Though 2015 is set to be a landmark year for France's fight against climate change, notably with Paris welcoming world leaders at the UN Climate Change Conference, the French capital has not waited until now to take action. Local government has been pursuing change for many years, and nowhere more than in transport mobility. The transport sector is France's leading source of CO_2 emissions, generating 36% of the national total, and this includes a large share of fine particles and pollutants.

In the light of this pressing public health issue, alternative forms of transport urgently need to be found. Electric mobility is one of the preferred technological solutions because it combines the introduction of new practices with clear environmental benefits, and its introduction by the City of Paris has met with considerable success.

Paris is something of an electro-mobility pioneer. Electric vehicles have been entitled to free parking since 1993, and the provision was immediately followed by the creation of public charge points. Few people are aware of this last point, however, simply because most of them think that electric mobility started in Paris with the introduction of the Autolib' car scheme in 2011.

There is no denying that Autolib' was the catalyst for electro-mobility in France. As the world's first electric car-sharing rental service, it brought electric vehicles into the mainstream with a fresh new image that they badly needed.

It worked. Users were thrilled with a convenient service and the advantages of electric cars: silent, instant torque, and zero pollution from exhaust while driving. The project's success quickly reached further afield, and Autolib' is now operational in 82 towns within the

Greater Paris region, just four years after its initial launch. It now has over 93 000 subscribers and recorded four million rentals in 2014.

The service's real advantage is allowing users to access a vehicle whenever they want, including times when public transport options are limited, while

> Electric vehicles have been entitled to free parking in Paris since 1993

saving the cost of car ownership. From an environmental perspective, Autolib's 3 000 cars have generated a total saving of 12 500 tonnes of CO_2 since the scheme was launched. Even charging is exemplary: the cars are exclusively recharged using energy from renewable sources.

Paris has worked tirelessly to promote the use of electric vehicles ever since. Images of the Eiffel Tower obscured by a thick cloud of pollution have added a certain impetus to the adoption of an ambitious plan to improve air quality.

The city authority's response has been an incentive-based policy towards electro-mobility, starting with building up the charge point network, which is a prerequisite for the widespread adoption of electric vehicles.

Indeed, while users in France are legally entitled to have a charge point installed in any car park in an apartment building, things are more complicated in practice. Many Parisians live in apartments with no garage, and the procedures involved might seem somewhat off-putting. The City of Paris is therefore offering financial support to encourage the installation of charge points in such homes.

Moreover, as of November 2015, some 120 new 22 kilowatt public charge points and a few fast-charge terminals will be added to the network of Autolib' stations. Further additions will be made as necessary.

There is also a service for business users. In 2014 there was the launch of Utilib', the utility version of Autolib', created for professional users and consisting of a pool of 50% hybrid and 50% electric shared vehicles.

Business and trades people in Paris and the immediate suburbs are being encouraged to lead by example, with grants to encourage them to replace their conventionally powered vehicle with an electric vehicle. The wholesale food market in Rungis south of the city, which is the largest in the world for agricultural produce, has also decided to make the switch.

These developments are encouraging for the electric utility market, because the crucial question of whether the supply side or the demand side should take the first step has paralysed innovation and is holding back the transition away from the internal combustion engine. The City of Paris is aware of this, and has launched a grouped order for low-carbon solutions with around ten other European cities–something that should encourage automakers to release new models.

The current policy offers many incentives, but motorists will soon run out of other options. In September 2015, the City of Paris introduced a restricted zone to which only the greenest cars will eventually have access.

> The City of Paris has launched a grouped order for low-carbon mobility solutions with around ten other European cities

On paper, then, this looks like a success–but with a few provisos. For one thing, the police must fine offenders. Checks should be simplified in 2016 with the adoption of air quality certificates that the owners of authorised vehicles will have to display on their windscreen. Local councils in the suburbs will also have to adopt similar measures to prevent traffic pollution being displaced to these areas.

Electric mobility is not just about cars, however. Congestion on the roads, demands on public space–there are myriad reasons to opt for soft modes of transport and public transport.

Since 2011 the City of Paris has been offering grants to Parisians buying electric bicycles in a very popular move that has led to the approval of 10 000 applications (including the editor of the *OECD Observer*!). It also wants to control traffic by imposing a speed limit of 30 km/h, which would make electric bikes the fastest form of transport in the capital. So it makes sense that integrating this technology in the next generation of Vélib' bikes should be the next idea on the table.

After lagging behind other modes for many years, public transport is catching up in leaps and bounds. The energy transition law sets a deadline of 2025 for transport operators to convert their vehicle fleets to alternative power trains. RATP, the Paris transport operator, will open its first line of all-electric buses in early 2016. At the same time, a succession of different models will be trialled on the streets of the capital, because a lot of hard work remains to be done before the current high-capacity stock can be replaced at equivalent cost. From batteries to induction to trickle charging, every technology must be tested before the right one can be identified.

As Paris faces these choices that will be decisive for the future of our cities, it is emerging as the laboratory for the whole of France. By cleverly balancing incentive and constraint, the City of Paris is changing the attitudes of businesses and consumers to mobility, encouraging them to choose economical solutions that are better for the environment.

References

Autolib Métropole (2015), "Autolib' Métropole 2014 activity report", www.autolibmetropole.fr/le-rapport-dactivite-2014-est-disponible

Avere-France (2015), "Law on the energy transition: What will change for electric mobility?", www.avere-france.org/Site/Article/?article_id=6241

City of Paris (2015), "Measures to combat air pollution in Paris", www.paris.fr/actualites/lutte-contre-la-pollution-de-l-air-les-mesures-d-accompagnement-sont-lancees-2601

Clichy-Batignolles: Where urban planning meets the climate

Nicolas Rougé*, Founder and Consultant, Une Autre Ville (Responsible Planning Consulting)

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In Paris, a major redevelopment in the illustrious Clichy-Batignolles district has set environmental goals of unprecedented ambition, paving the way for contemporary urban planning that offers better solutions to energy and climate concerns.

The 17th arrondissement district of Clichy-Batignolles in the north-west of Paris will be home to a 10-hectare park, 3 400 new homes, offices, businesses and infrastructure, as well as the new complex housing law courts and the criminal investigation police, covering a total area of 50 hectares. The authorities here are setting their sights higher than ever before by aiming to be a model of energy efficiency in the fight against climate change.

The site had originally been earmarked for the Olympic village as part of Paris's unsuccessful bid to host the 2012 Summer Games, and so from the very outset of the design phase the planners had been aiming for environmental excellence. This goal was therefore retained for the Clichy-Batignolles eco-district proposal and incorporated into the Climate Plan adopted by the City of Paris in 2007, which set the project a target of zero CO_2 emissions.

> "Several companies have leveraged the opportunities generated by this dynamic project

Paris Batignolles Aménagement (PBA), the public limited company entrusted with executing the project, was given a clear brief from the outset, allowing it to mobilise all stakeholders in pursuit of this target. Providers of social housing, who are building 50% of the project's new homes, see it as an opportunity to control operating costs and cut their tenants'

energy bills. Private property developers, who have the advantage of a relatively buoyant market despite the crisis, have also lent their full support to the project's innovation drive.

This stakeholder engagement has opened new avenues to explore in "post-Kyoto" city-building. First of all, the proclaimed objectives of the project have prompted experimentation with new technologies: the City of Paris, for example, is introducing an innovative vacuum waste collection system, which cuts CO_2 emissions and protects air quality. Some property managers have successfully trialled other techniques, including heat recovery using grey water from showers to name but one.

The homebuilders taking part in the operation have been able to prepare for the stringent regulations in the pipeline: the energy standards applied at Clichy-Batignolles in 2008 are the same standards the authorities are planning to introduce nationwide in 2020. They have also learned to use technologies that are still used only relatively rarely, such as photovoltaics, which will be installed on the rooftops of all new residential buildings to boost local production of renewable energy, in a first for most of the developers involved.

Several companies have even gone so far as to branch out from their traditional core business activities in order to pool investments or leverage the opportunities generated by this dynamic project. For example, Eau de Paris, the public company responsible for producing and distributing water in the French capital, is installing a €12 million geothermal system that will provide heating and hot water. A single 650 metre well in the Albian aquifer will both secure the drinking water supply and provide Clichy-Batignolles with renewable heating. In fact, the project's potential production of photovoltaic electricity is such that the City of Paris has created a semi-public entity through its subsidiary, SEMAVIP, for investing in and operating photovoltaic installations, to support the property developers and optimise the economic model.

To achieve the project's objectives, PBA has devised and implemented new ways of working with the property industry. On the legal front, very precise environmental targets have been included in the sales agreements for building lots, and fines may be levied in the event of non-compliance. PBA has commissioned experts to both monitor every project and ensure that environmental commitments are met.

> "Raising local awareness of energy challenges can be fun as well as participatory

In terms of architecture and city-scaping, upstream of technical solutions, the plan was shaped to optimise the buildings' energy performance, using the sun to provide light and heat, compact building design, rooftops oriented to maximise photovoltaic production, etc. These design choices were thoroughly analysed and debated in the workshops attended by the Clichy-Batignolles planners, the contracting authorities and project managers, and the experts. These workshops examined collections of several building lots in order to include interactions among the different buildings.

By the end of 2015, 2 500 people will already be living on the site. Now that most of the undelivered programmes are either under way or on the point of being launched, attention is shifting from the design of the eco-district to its management. The City of Paris and city planner are currently launching a new drive in partnership with the property managers to increase the use of digital technology in the next buildings to be delivered, with a threefold objective: first, to transition from the initial calculation of theoretical performance to the continuous measurement of actual performance; second, to help residents and users take ownership of energy issues; third, to encourage the synchronisation of local energy use and production by making buildings smarter, ie by enabling them to communicate with each other and with utility networks, in order to restrict energy imports in real time.

Raising local awareness of energy challenges can be fun as well as participatory: Clichy-Batignolles entered its own team for the government's Familles à Énergie Positive initiative to promote responsible energy use among the public.

Controlling energy consumption and CO_2 emissions was not the project's sole approach to the climate issue. The 10-hectare park in the centre of the district has wetlands and exemplary water management. Abundant vegetation in the public spaces and buildings help to cool the city and offset the urban heat island, as well as making the city greener and promoting biodiversity.

PBA has just started an assessment programme for the first buildings delivered. This vital feedback is extremely valuable to the future planning projects in the city and the Grand Paris (Greater Paris) programme, and could also be useful in taking up the challenge of the energy transition and climate change in the existing city.

* Nicolas Rougé has been a consultant for Paris Batignolles Aménagement since 2008.

Visit www.clichy-batignolles.fr.
See also www.uneautreville.com.

Energy boost

How to carry out a perfect retrofit

Yann Miginiac, Technical and Sustainable Development Director, RIVP, Régie immobilière de la Ville de Paris

©Charlotte Moreau

A residential site on the rue Saint Charles in the 15th arrondissement of Paris was the first retrofit under the Climate Plan led by the city's property management agency, Régie Immobilière de la Ville de Paris (RIVP). The project proved complex but exemplary, not just in its implementation and execution, but also in terms of managing relationships.

The retrofit concerned 250 homes in four buildings erected in the 1980s. Priority had to go to the most effective insulation and energy efficiency solutions under the terms of the Climate Plan. "First of all, we worked on the buildings' external thermal insulation and choice of heating. Two of them were fitted with new, high-efficiency gas boilers, with a yield of over 110% and reduced CO_2 emissions", explains structural works inspector Bruno Fricard, who helped draw up the technical specifications with the project manager.

Other renovation work was carried out in the communal areas and to ensure fire safety compliance–changing the ventilation and smoke-extraction systems.

The operation required advanced insulation studies, says architect Dominique Desmet from Equateur Architecture. "The main problem was that the four buildings were designed by four different architects, so we needed to research specific insulation principles for each one, within the framework of the Climate Plan, fire safety and budget. I think I can safely say that I compiled the most exhaustive detail booklet on external insulation ever produced by an architect! It's a useful database for everyone and RIVP can use it for reference in other projects."

Georges Frasca, director of GTM Bâtiment's retrofit unit, emphasises the complex architecture of the facades. "There were far more building-specific details than for a standard retrofit."

Good relations

A certain amount of preparation was needed for the 18-month retrofit of an inhabited building. There were public meetings to explain the nature and process of the work involved, and the resulting disturbances. After the workmen moved in, communication became even more important. Franck Charvet, manager of the RIVP Grenelle agency, says: "When the tenants are faced with the reality of the process, you need to offer support and reassure them about safety, because of the scaffolding; you have to make choices if there are issues with the work carried out in their home. And you have to support the liaison staff on the front line."

Ms Estevès, the caretaker, admits that it wasn't a particularly restful time: "Yes, there was a bit more to do. This kind of work is very messy. And you always have to deal with the usual malcontents, even though there was a complaints log for tenants in my office."

Franck Charvet relates a story that sums up the support role that everybody had to play: "One day representatives of the Caisse des Dépôts, a French financial organisation, came to visit the site. Everybody there simply couldn't believe their eyes to see one of the workmen on his scaffolding watering a tenant's flowers!"

Lower charges, greater comfort

The efficiencies gained from the retrofit have led to the buildings' energy requirements falling by two-thirds from 300 kilowatt hours per square metre to just 90 kWh/m^2 per square metre per year. This change has not gone unnoticed by the tenants. Clarisse Crevier, who has lived in one of buildings for 20 years, says: "There is no comparison with what it was like. So much heat was lost and you couldn't get properly warm. Now that the loggia has been closed off and double-glazing put in, it's not just the insulation that has improved but noise levels as well. Financially, it makes a big difference too: between the end of 2012 and the end of 2013, I saved €500 on my gas bill! And it looks really good. You would never believe that this is a social housing project."

> The efficiencies gained from the retrofit have led to the buildings' energy requirements falling by two-thirds

Reducing energy charges is a priority for RIVP, which has been tracking charges for a selected panel of tenants since the end of the retrofit.

Everybody agrees that the retrofit project was an enriching human experience. Bruno Fricard talks about the chemistry between the different operators, emphasising their professionalism and responsiveness in finding the best solutions. Franck Charvet highlights the team spirit and commitment of everybody involved.

For Georges Frasca: "A project like this is first and foremost about people. If you don't work together, you can't do it. And this was a really successful project in every way—technically, aesthetically and personally." Dominique Desmet agrees: "Everybody I dealt with at RIVP was open-minded and did things in the right way to make it work."

Visit www.rivp.fr/

A natural capital for a circular economy

©Orelie Grimaldi

Over the last century, resource extraction from non-renewable stocks has grown while extraction from renewable stocks has declined, reflecting the shift in the global economy base from agriculture to industry. Once accounting for some 75% of global material extraction, biomass today accounts for less than a third of total extraction, according to a 2013 OECD report; non-renewable resource extraction now represents over two-thirds of global material extraction. In just 30 years, the quantity of materials extracted for consumption has increased by 60%, a fifth of which ends up as waste. As an OECD Insights blog points out, that is over 12 billion tonnes of waste per year, or the equivalent in weight of more than 21,000 Airbus A380s. Breaking the link between economic growth and material extraction is fast becoming a public policy concern, giving rise to a "circular economy" in which rather than being extracted, consumed and thrown away, products are reused and remanufactured in a loop, with waste reworked or kept to a minimum in a bid not just to preserve diversity and resources, but to restore them. The City of Paris is a proponent of the circular economy, though as these three examples show, closing the loop is a resource challenge in its own right.

Klep, Maroussia (2014), "Making obsolescence obsolete: design to reduce waste", on OECD Insights blog, OECD Publishing, http://oe.cd/KG

OECD (2013), *Material Resources, Productivity and the Environment*, OECD Publishing, http://oe.cd/1aL

Creative recycling at the Ressourcerie Créative

The Ressourcerie Créative, a new social and solidarity economy (SSE) organisation created with the support of the City of Paris, has taken up residence on the site of the old Saint-Vincent de Paul hospital in the 14th *arrondissement* (district).

The basic premise is to provide a place where, using a social and supportive approach, people can donate unwanted objects, find bargains and attend creative workshops.

Sabine Arrondelle, co-ordinator of the recycling centre and originator of the project, is delighted with the progress. "Since we opened on 1 September, over ten tonnes of 'rubbish' have been upcycled. We want to collect and reuse as much as we can."

To start with, objects in good condition are put on display in the store, where anything and everything can be found. The remaining items are used in various creative and repair workshops covering areas and objects such as small electrical appliances, woodwork, furniture customisation, sewing and small decorations. The result is a new lease of life for a wide range of products and materials.

In addition, partnerships with sustainable waste treatment organisations like Valdélia and Éco-mobilier help with the recycling

of furniture which has been donated or remains unsold. A lot of items are donated to the association Aurore, which has premises on the same site where it operates as a refuge for people in crisis or distress. The close relationship with Aurore is very rewarding, as many of the Ressourcerie's volunteers are housed by Aurore.

From the outset, the Ressourcerie Créative wanted to join the national network of sorting and recycling centres (Réseau des Ressourceries) in order to benefit from its experience, and Sabine Arrondelle successfully completed its training course on how to set up a recycling centre. At present, the Ressourcerie Créative has four employees and numerous volunteers. Visitors receive a warm welcome, regardless of whether they have come to donate or to visit the store.

That said, its future remains uncertain. The main challenge when opening a sorting and recycling centre, especially in Paris, is to find premises. The Ressourcerie Créative currently has a three-month lease, with a guarantee of a renewal until mid-2017. After that, it will have to find another site, unless the City of Paris manages to find it a place in a future eco-district.

Other than premises, financing has to be found. The Réseau des Ressourceries advocates financial autonomy, with a maximum number of service agreements. Lastly, a real ability to generate cash flow is required at the start, as aid is often conditional on expenditures.

www.laressourceriecreative.com

UpCycly

At the end of 2013, a young father called Wassim Chelfi was looking for a way to generate environmental and social value by using his professional expertise in information technology. He noticed that our built-up urban environment, while cruelly lacking in green spaces, has a plentiful supply of reusable waste. So he set about testing different ways of reintroducing greenery into the city by using waste products as a raw material,

©By Nat

and began by organising workshops for children to make things with plants.

The success of his initiative encouraged Wassim Chelfi to reach out to a wider audience. He planned and organised the first UpCycly Fest in the *murs à pêche* district of Montreuil in the east of the city, a hands-on event in which everyone was invited to transform waste materials into furniture and support structures for plants. This event was a major success and attracted over 500 visitors who helped create composters, planters and the like, and provided proof of both the validity and the feasibility of the concept.

The next challenge was to use this experience to create an economically self-sufficient business model without compromising any values. Thanks to the support of Sensecube, an incubator of social start-ups, Wassim Chelfi defined UpCycly's mission and developed several activities using the expertise acquired in his public workshops, such as courses in landscaping, team building and creating customised furniture. The challenge now facing UpCycly is to scale up its activities in order to increase its impact and expand into other regions. *Marc Jourdaine, UpCycly*

www.upcycly.com

Paris, food and biowaste

Moulinot Compost & Biogaz, a young start-up specialised in collecting, sorting and recycling biowaste from hotels and restaurants, is gearing up for a its latest challenge: to manage the biowaste generated by COP21, the UN Conference on Climate Change in November/December 2015.

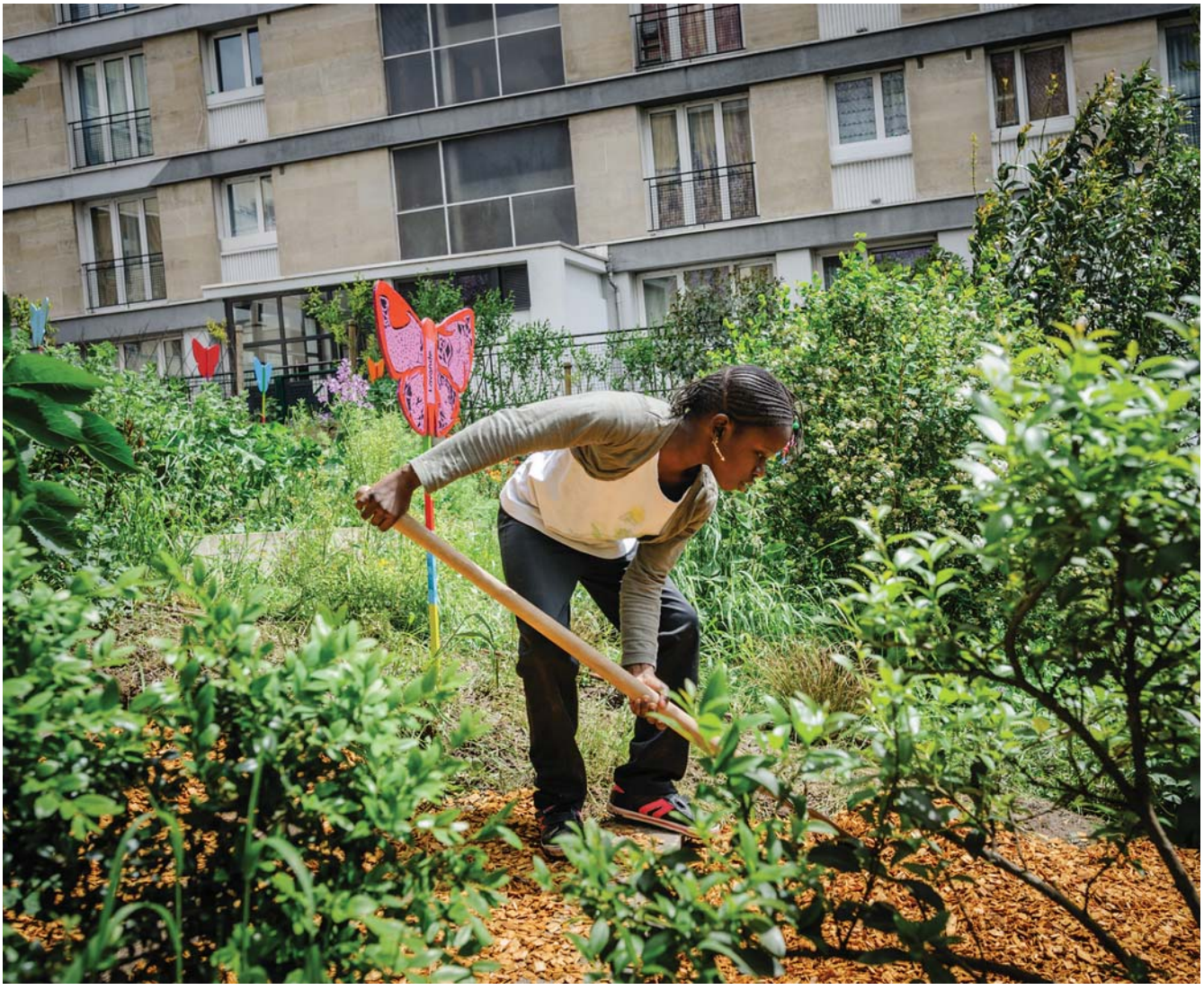
Stéphan Martinez, who founded the company, is an environmentally conscious restaurant owner. In 2007, he started looking into ways to transform leftovers and kitchen scraps into soil using worm-based methods called vermicomposting. In 2012, with the support of the National Union of Hotel, Restaurant and Café Owners and Caterers, he launched a vast pilot project to recover biowaste from 80 Parisian hotels and restaurants. Between February and November 2014, Moulinot trucks collected 580 tonnes of biowaste which were transported to a biogas processing plant in the nearby Essonne department for transformation into natural gas and heat. The test phase was a resounding success, exceeding the projected targets almost threefold. The aim now is to pursue this initiative on a sustainable basis and extend it nationwide in order to help all establishments producing at least 10 tonnes a year of biowaste a year (versus 20 tonnes at present) meet their obligation as of 2016 to separate biowaste at source for organic recovery.

Many restaurant owners already choose to recycle their biowaste, even when they are not obliged to do so by law. For Martinez, this is "genuine civic commitment" and he deplores "the financial surcharge on professionals who have to pay for biowaste collection, even though they already pay the tax on the removal of household refuse". In his opinion, environmental tax is a key issue in the development of this practice, as volunteers have to pay out of their own pockets while nothing is levied on those who do nothing. As he says, "It's a reward for bad behaviour, and it needs to stop". *Fabien Delory, Director, Moulinot Compost & Biogaz*

www.moulinot.fr/moulinot

Urban cultivation: Protecting nature in the city

Sylvie Faye, Project Leader, Multi'Colors



©CBADET

Near to the Paris ring road, shielded from the din of the motorway by an apartment block, nestled between two high-rises, lies an oasis of peace. It is a community garden created by Multi'Colors, and is just one of the many "urban sanctuaries" it has created in underprivileged neighbourhoods in and around the French capital.

For the past 12 years, the Multi'Colors association has been organising activities which are designed to promote urban greening and which attach equal importance to the social and natural environment. These initiatives also address educational and cultural issues. The resultant projects are aimed at people who, for the most part, live in difficult conditions that prevent them from participating in a shared garden. Their hand-to-mouth existence means that it would never cross their mind to create a garden and spend time and money on it without a guarantee of a substantial harvest at the end.

Fortunately, the members of Multi'Colors are not afraid of difficulties: we are optimistic and love a challenge! Our projects are aimed at reducing social inequalities, whether it be in terms of accessing resources such as green spaces, or of being involved in decisions concerning the transformation of one's immediate surroundings by encouraging

> "Gardens bring a touch of poetry to these very soulless places

the creation of gardens in public places and in front of tower blocks where children gather to play. The gardens are for gardening and for visiting, but they always retain a wild side, thereby bringing a touch of poetry to these very soulless places.

Our decision to use these gardens as a means of educating about nature was also

> Multi'Colors has created 14 educational gardens in large social housing estates

driven by a sense of urgency. The planet's resources are fast being exhausted by an economic system primarily founded on the mistaken belief that the only form of well-being is material. The gardens, born from a desire to inject some beauty into the often neglected areas of deprived neighbourhoods, are designed and fashioned from start to finish by the participants, regardless of their age. Often they are children who then convince their parents to get involved. The collective creation of these gardens, based upon principles of sustainable gardening, is underpinned by the simple message that we are all an intimate part of nature. By recovering rainwater, sorting and composting waste, respecting biodiversity, and preserving wasteland, the garden becomes a sanctuary for living things as well as a place of learning, with the teaching resources needed to help people gain a better understanding of the environment so that they can better protect it. Multi'Colors is convinced that gardening to protect biodiversity is an essential political and civic act in the defence of our earth, which is humanity's greatest treasure.

Our objective is to put city dwellers in touch with the everyday nature surrounding them in these dense urban environments. To date, a total of 900 children have been able to learn about nature first-hand by volunteering to attend free workshops in towns, grow their own gardens with Multi'Colors, and use art workshops to organise a photo exhibition and create a practical guide for birdwatching gardeners, along with other content that can be downloaded on the association's website.

The garden is a place for everyone to inhabit; it is also a way of giving children the keys to their future, as gardening is about having fun while watching the environment in action and discovering flora and fauna. It is also a chance to tell stories, transmit knowledge, and create bonds of friendship and trust among members of the same and different generations. For children, being in contact with nature is an experience which encourages autonomy, creativity, self-confidence and fosters co-operation. These children, who rarely get to leave their neighbourhood, can become a part of something, and develop their identities in contact with nature and with the support of caring adults who respect their individual differences and their needs.

Since 2003 Multi'Colors has created 14 educational gardens in large social housing estates, a children's garden, an education centre with a class for the newly arrived children of migrants, and a garden for horticultural therapy in a day-care centre for Alzheimer's sufferers. Our most recent example is the Little World Garden, which is special because it is on a site which belongs to the City of Paris, Reuilly train station in the 12th *arrondissement*. This reflects the political will of the elected representatives of the City of Paris to open every available space to urban vegetation projects. At this location, we welcome children from the neighbouring nursery school and any local residents looking for advice on their own vegetation projects. The garden also contains medicinal and kitchen plants grouped together by their continent of origin.

The planted surface area of these 14 small gardens amounts in all to half a hectare, and they produce enough vegetables to allow a weekly cookery class to be organised–because while a lot of the children involved know what a Halloween pumpkin looks like, few of them actually know what it tastes like.

Multi'Colors has managed to create these gardens thanks to the collective efforts of paid members and volunteers in partnership with the offices of the City of Paris, local and environmental associations, foundations, and social landlords. We also offer advisory services to social landlords and local authorities in the Île-de-France region for the creation and delivery of sustainable gardens designed to let nature reclaim its place in the city.

Multi'Colors' ambitions to make the city greener do not end at the garden gate. In the 20th *arrondissement* of Paris, we have brought nature into the street! The Saint-Blaise district is one of the most populated places in Europe, where a built environment dominated by concrete allows very little room for vegetation. Multi'Colors has installed a 600-metre-long green corridor connecting different ecological gardens. It is made up of 100 flowerpots which have been individually decorated in art workshops by young and old residents alike. These flowerpots, which are cared for by children and local residents, have been mounted on the top of the bollards separating the pavement from the road. By organising participative initiatives targeting urban vegetation, we are contributing to the overall reclassification of a district as a major urban renewal project. This pilot scheme is part of the Biodiversity Plan adopted by the Council of Paris in 2011.

In the near future, Multi'Colors is going to experiment with new urban spaces by transforming a rooftop terrace into a community garden designed to host a variety of media providing information on good practices to adopt in urban agriculture. Cookery workshops using produce from the gardens are a way of discovering the benefits of a healthy diet using seasonal foods. Sharing healthy, lovely, tasty cooking is undoubtedly one of the keys to happy urban co-habitation, in harmony with nature!

Visit www.multicolors.org (in French)

Tour de force: The Eiffel Tower's new clean view

©SETE - Photopoint.com

Wind turbines on the Eiffel Tower

Already a showcase when it was opened for the 1889 World's Fair, the Eiffel Tower continues to light the way forward today, with sustainability being a feature on the monument's new first floor unveiled in 2014.

One of the driving forces behind a recent renovation of the first floor of the Eiffel Tower some 57 metres above ground was a strong desire to reduce its ecological footprint as part of the City of Paris Climate Plan.

An exemplary approach to sustainable development was adopted when work began on renovating the near 5 000 square metres floor area in 2012, even though there are no actual "high environmental quality" building standards for the monument.

The Eiffel Tower Operating Company fulfilled this approach first by installing two vertical axis wind turbines in February 2015. Each one is seven metres high with a three-metre span, and they were deployed 127 metres above ground on the second floor, the most suitable location for optimal windage.

Together, the wind turbines can produce up to 10 000 kilowatt hours per year, which is equivalent to the energy consumption of the shop on the first floor.

In addition, the positioning of the windows in every pavilion on the first floor was reviewed, without compromising the visual impact of the view. This initiative to protect against the sun's heat will help cut thermal absorption by over 25% in the summer, thereby reducing the energy used for air-conditioning. In addition, LED lighting is now used virtually everywhere on the first floor.

The roof of the Ferrié Pavilion on the first floor has been equipped with solar panels deployed across a 10 metre area. They cover about 50% of hot water requirements in both pavilions, which also use heat pumps to ensure an even temperature. The Ferrié Pavilion also has a rainwater retrieval system which supplies the toilets.

Lastly, on 1 January 2015, when renewing its electric power supply contract, the Eiffel Tower chose GEG (www.geg.fr), a company from Grenoble, to supply the monument with 100% renewable energy.

Visit www.toureiffel.paris/en/the-new-1st-floor/discover-the-new-1st-floor.html

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New Centre for Opportunity and Equality opens

In recent years, the OECD has pioneered monitoring of income distribution and the effects of inequality on well-being and growth. With some of its flagship publications–*Growing Unequal? Income Distribution and Poverty in OECD Countries* in 2008, *Divided We Stand: Why Inequality Keeps Rising?* in 2011 and *In It Together: Why Less Inequality Benefits All* in 2015–the OECD has acted as a front runner among organisations working on inequality.

On 26 October 2015, the OECD launched the new Centre for Opportunity and Equality. The event was moderated with two panel discussions to address the extent to which inequalities challenge our societies and a concluding session to underscore the need for inclusive growth. Participants included OECD Secretary-General Angel Gurría, Professor of Economics of the Paris School of Economics François Bourguignon and President of the US think tank Demos Heather McGhee. The main objective of the centre is to focus on various dimensions of inequality, from income, wealth and economic growth to employment, education, health, housing, access to public services, energy and financial markets, and the environment. It will also consider inequalities by gender, age and socio-economic background.

In more practical terms, the centre will prepare reports, with an emphasis on improving metrics and statistics for comparing countries. It will also provide a forum for policy discussion. As part of the Inclusive Growth Initiative, a series of seminars with high-level speakers–policy makers, academics and civil society–will be organised.

Visit www.oecd.org/inclusive-growth/launch-centre-for-opportunity-and-equality.htm

Mali co-operation

©Herve Cortinat/OECD

Malian president Ibrahim Boubacar Keïta at an international conference for the economic recovery and development of Mali, held at the OECD, 22 October 2015.

Uruguay joins OECD Development Centre

Uruguayan president Tabaré Vázquez signs Uruguay's accession to the OECD Development Centre, 30 October 2015.

©Herve Cortinat/OECD

Coffee space

In the context of the Coffees of the Secretary-General, European Space Agency Astronaut Samantha Cristoforetti visited the OECD on 26 October, sharing her experience at the International Space Station with OECD staff.

©Michael Dean/OECD

G20 and BEPS

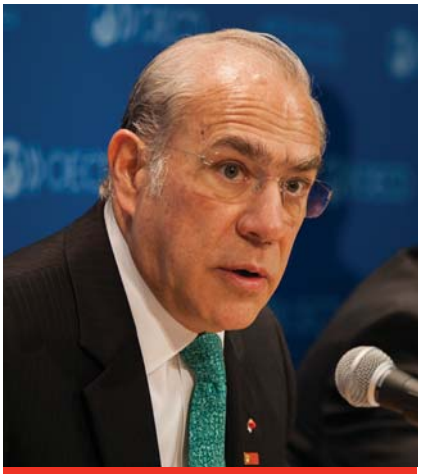
At their summit in Antalya, Turkey, 15-16 November 2015, the leaders of the G20 endorsed newly overhauled global standards to crack down on tax avoidance; they committed to the implementation of the Base Erosion and Profit Shifting project (BEPS) which closes gaps that allow corporate profits to be moved to low or no tax environments. Leaders also reaffirmed the OECD's central role in helping governments ensure strong, sustainable and inclusive growth.

Visit www.oecd.org/G20

(Front row L-R): Chinese President Xi Jinping, Turkish President Recep Tayyip Erdogan, US President Barack Obama, Brazilian President Dilma Rousseff; (2nd Row L-R) Australian Prime Minister Malcolm Turnbull, German Chancellor Angela Merkel, Japanese Prime Minister Shinzo Abe, Indian Prime Minister Narendra Modi; (3rd row L-R) ILO Director-General Guy Ryder, UN Secretary-General Ban Ki-moon, World Bank President Jim Yong Kim, OECD Secretary-General Angel Gurría, Bank of England Governor & Financial Stability Board Chair Mark Carney

©Berk Ozkan/Anadolu Agency, 15 November 2015

Recent speeches by Angel Gurría



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For a complete list of the speeches and statements, including those in French and other languages, go to: **http://www.oecd.org/about/secretary-general/**

Antalya G20 summit

Remarks at pre-summit press briefing,Antalya, Turkey, 14 November 2015

Launch of the *OECD Economic Outlook*, November 2015

Presentation in Paris, France, 9 November 2015

New World Forum 2015

Keynote address in Paris, France, 9 November 2015

Building a positive agenda for Brazil

Speech delivered at the OECD-FIESP Seminar in São Paulo, Brazil, 5 November 2015

2015 Global Forum on Competition

Opening remarks in Paris, France, 29 October 2015

Public Governance Ministerial Meeting

Plenary session remarks in Helsinki, Finland, 28 October 2015

A cross-cutting, comprehensive and global platform to promote inclusive growth

Speech delivered at the launch of the OECD Centre for Opportunity and Equality in Paris, France, 26 October 2015

Making science, technology and innovation work for better lives

Remarks at OECD Committee for Scientific and Technological Policy Ministerial Meeting in Daejeon, Korea, 21 October 2015

6th OECD Roundtable of Mayors and Ministers

Opening remarks in Mexico City, Mexico, 16 October 2015

Putting well-being statistics to work to transform policies and change lives

Opening address at the 5th OECD World Forum on Statistics, Knowledge and Policy in Guadalajara, Mexico, 13 October 2015

Current state of mobilisation of climate finance

Remarks at the Climate Finance Ministerial Meeting in Lima, Peru, 9 October 2015

G20's ownership and support to BEPS deliverables

Speech delivered during a joint OECD/G20 press conference in Lima, Peru, 9 October 2015

The slowdown in global trade

Address at G20 Trade Ministers Meeting in Istanbul, Turkey, 6 October 2015

OECD/G20 Global Forum on International Investment

Opening remarks in Istanbul, Turkey, 5 October 2015

A conversation on the sustainable development agenda

Speech at a Global Parliamentary Network meeting in Paris, France, 1 October 2015

2015 enlarged debate of the Parliamentary Assembly of the Council of Europe (PACE) on the activities of the OECD

Remarks delivered in Strasbourg, France, 30 September 2015

Launch of the Global Partnership for Sustainable Development Data

Keynote address in New York, US, 28 September 2015

Ambassadors

Mr Marten Kokk, Estonia

Ms Berglind Ásgeirsdóttir, Iceland

Mr Nicholas Bridge, United Kingdom

Mr Michael Forbes, Ireland

Mr Paul Dühr, Luxembourg

Mr Pavel Rozsypal, Czech Republic

Mr Paulo Vizeu Pinheiro, Portugal

Mr Dionisio Pérez-Jácome Friscione, Mexico

Ms Marlies Stubits-Weidinger, Austria

Mr Klavs A. Holm, Denmark

Mr Okko-Pekka Salmimies, Finland

Mr Noé Van Hulst, Netherlands

Mr Kazuo Kodama, Japan

Mr Mithat Rende, Turkey

Mr Iztok Jarc, Slovenia

Ms Annika Markovic, Sweden

Ms Claudia Serrano, Chile

Mr Daniel Yohannes, United States

Ms Elin Østebø Johansen, Norway

Mr Ulrich Lehner, Switzerland

Mr Carmel Shama-Hacohen, Israel

Mr Jakub Wiśniewski, Poland

Mr Zoltan Cséfalvay, Hungary

Mr Gabriele Checchia, Italy

Mr Pierre Duquesne, France

Mr James Kember, New Zealand

Ms Michelle d'Auray, Canada

Mr Brian Pontifex, Australia

Mr George Krimpas, Greece

Mr Matei Hoffmann, Germany

Mr José Ignacio Wert Ortega, Spain

Mr Jean-Joël Schittecatte, Belgium

Mr Jong-Won Yoon, Korea

Mr Juraj Tomáš, Slovak Republic
Chargé d'Affaires a.i.

European Union

Ms Maria Francesca Spatolisano

Calendar highlights

Please note that many of the OECD meetings mentioned are not open to the public or the media and are listed as a guide only. All meetings are in Paris unless otherwise stated. For a comprehensive list, see the OECD website at **www.oecd.org/newsroom/upcomingevents**

NOVEMBER

4	Launch of *Health at a Glance 2015*, London, UK.
4	Launch of *OECD Environmental Performance Reviews: Brazil 2015* and *OECD Economic Surveys: Brazil 2015*.
4	Launch of *OECD Development Co-operation Peer Reviews: Germany 2015*.
4-6	The international CSO's leaders forum, Bangkok, Thailand.
6	Launch of *The State of Public Finances*.
9	Launch of *Economic Outlook, Volume 2015 Issue 2*.
9-10	New World Forum 2015, Paris, France.
10	Launch of *IEA World Energy Outlook 2015*.
13-14	L20 Summit, Antalya, Turkey.
14-15	B20 Summit, Antalya, Turkey.
15-16	G20 Summit, Antalya, Turkey.
17	Launch of *OECD Environmental Performance Reviews: the Netherlands 2015*.
24	Launch of *Education at a Glance 2015: OECD Indicators*, Brussels, Belgium.
26	Launch of *OECD Economic Surveys: Chile 2015*.
26	Launch of *Innovation, Agricultural Productivity and Sustainability in the Netherlands*.
28-30	India Economic Summit, New Delhi, India.
30 Nov-11 Dec	UN Climate Change Conference (21st Conference of the Parties, COP 21), Paris, France.

DECEMBER

1	Launch of *Pensions at a Glance 2015*.
2-3	OECD Global Strategy Group meeting, Paris, France.
3	Statistics Day 2015.
5-6	Global Landscapes Forum, Paris, France.
14-15	2015 Green Growth and Sustainable Development Forum, Paris, France.

2016

JANUARY

20-23	World Economic Forum Annual Meeting 2016, Davos-Klosters, Switzerland.

FEBRUARY

3-5	4th OECD Parliamentary Days

MARCH

3-4	International Summit on the Teaching Profession
8	International Women's Day
14-17	World Investment Forum 2016, Lima, Peru.

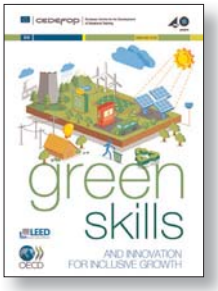
MAY

31 May-2 June	OECD Week 2016

NOVEMBER

28 Nov-2 Dec	Global Forum on Competition

Renewable workers



How will workers' current skills match new requirements for labour in a green economy? So far, few countries have put in place real plans to address this question, yet there is risk of a significant mismatch between skills and jobs. Would you know who to call if your geothermal system crashes? Should construction workers learn new skills for retrofitting buildings?

With a bit of planning for the transition, *Green Skills and Innovation for Inclusive Growth* proposes that we can take advantage of this opportunity to diversify and improve employment. Following two OECD forums on the topic, *Green Skills* provides evidence and policy analysis to guide the green shift, with emphasis on the ways that better policy co-ordination among environment, economy and labour can minimise the skills gap and maximise employment growth. This builds on the 2014 report *Greener Skills and Jobs*, which outlined a three-part policy approach: i) upgrading skills in minimally impacted sectors; ii) gearing up educational institutions to teach the new skills needed for mitigation; eco-innovation and renewable energy, for instance; and iii) retraining in emissions-intensive sectors, which will be particularly affected by a shift to low carbon.

With the recent financial and economic crisis, greening the labour force has not been a high priority for most policymakers. This study shows that skilled jobs from the old carbon-intensive industries, such as engineers, electricians, analysts, fitters and marketers, will be largely transferable and adaptable to low-carbon energy sectors. Moreover, with some basic skills training or retraining programmes, production, construction, and other lower skilled workers can make the shift from fossil fuel sectors as well.

OECD-Cedefop (2015), *Green Skills and Innovation for Inclusive Growth*, OECD Publishing.
DOI: http://dx.doi.org/10.1787/9789264239296-en

See also: OECD-Cedefop (2014), *Greener Skills and Jobs*, OECD Green Growth Studies, OECD Publishing.
DOI: http://dx.doi.org/10.1787/9789264208704-en

Groundwater is not so well

Fresh water is essential for life, yet makes up only a tiny fraction of all water on earth. In many areas, especially arid and dry regions, underground aquifers are the only source. Even in less arid regions, groundwater provides an essential resource. In fact, some 2.6 billion people worldwide rely on groundwater resources. Farming is one major reason: over 60% of irrigated agriculture in the US uses groundwater, and in Spain more than 70% of irrigation comes from below-ground reserves.

The economic effects are huge. Take Australia, for instance, where an estimated A$11 billion of economic activity is contributed annually to the economy by groundwater use in agriculture alone. Poor management and over-exploitation by farmers, households and industry have resulted in over-extended groundwater aquifers which are pushed beyond the point that they can be replenished. In the US for example, the High Plains aquifer, which irrigates more than 20% of American cropland, faces 70% depletion in 50 years.

Groundwater depletion subsequently leads to other serious environmental effects, such as disruption of wetlands, salinisation of surrounding land and actual land collapse into emptied aquifers.

Drying Wells, Rising Stakes: Towards Sustainable Agricultural Groundwater Use reports on the threats to groundwater, and implications for future fresh water access. Groundwater is an accessible, reliable and, so far at least, largely pollution-free source of water. It is seen as a safety net for the future, as surface water increasingly falls short of filling our water needs. The UN even has a programme in parts of Africa to drill for new aquifers. However, droughts, pollution, increased demand from exploding population growth, and potentially fracking put the sustainability of groundwater into question.

Drying Wells, Rising Stakes proposes a three-part plan for policies to implement better management of groundwater usage, in particular for agricultural crop production, based on regulatory frameworks, economic instruments and collective management programmes.

OECD (2015), *Drying Wells, Rising Stakes: Towards Sustainable Agricultural Groundwater Use*, OECD Studies on Water, OECD Publishing.
http://dx.doi.org/10.1787/9789264238701-en

See also: www.oecd.org/water and www.oecdobserver.org/water

Most popular

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OECD Employment Outlook 2015

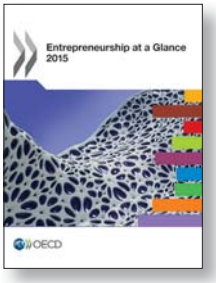
The OECD Employment Outlook 2015 reviews recent labour market trends and short-term prospects in OECD countries, looking at: recent labour market developments, especially around minimum wages; skills and wage inequality; activation policies and inclusive labour markets; and job quality.

ISBN 978-92-64-23418-5 August 2015, 290 pages
€80 $112 £72 ¥10 400

OECD Digital Economy Outlook 2015

This book provides an integrated analysis of trends, indicators and policy developments in the expanding digital economy.

ISBN 978-92-64-23227-3 August, 2015 282 pages
€90 $126 £81 ¥11 700



Entrepreneurship at a Glance 2015

Entrepreneurship at a Glance presents an original collection of indicators for measuring the state of entrepreneurship, along with key facts and explanations of the policy context. The 2015 edition features a special chapter on the international activities of SMEs.

ISBN 978-92-64-23220-4 September 2015, 140 pages
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Are there computers in the classroom? Does it matter? *Students, Computers and Learning: Making the Connection* examines how students' access to and use of information and communication technology (ICT) devices has evolved in recent years.

ISBN 978-92-64-23954-8 September 2015 200 pages
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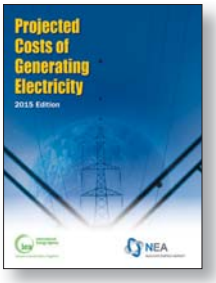
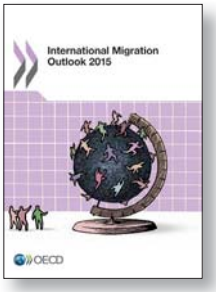


Projected Costs of Generating Electricity 2015

This joint report by the International Energy Agency (IEA) and the Nuclear Energy Agency (NEA) is the eighth in a series of studies on electricity generating costs. As policy makers work to ensure that the power supply is reliable, secure and affordable, while making it increasingly clean.

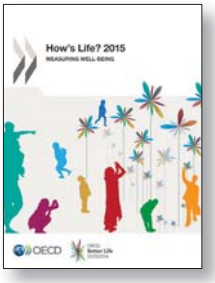
ISBN 9789264244405 October 2015 215 pages
€70 $84 £56 ¥9 100



International Migration Outlook 2015

This publication analyses recent development in migration movements and policies in OECD countries and some non-member countries as well as the evolution of recent labour market outcomes of immigrants in OECD countries. It includes a special chapter on: "Changing Patterns in the international migration of doctors and nurses to OECD countries", as well as country notes and a statistical annex.

ISBN 978-92-64-23694-3 October 2015, 360 pages
€95 $133 £85 ¥12 300



How's Life? 2015: Measuring Well-being

How's Life? describes the essential ingredients that shape people's well-being in OECD and partner countries. It includes a wide variety of statistics, capturing both material well-being. This third edition includes a special focus on child well-being.

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€70 $84 £56 ¥9 100

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This report improves the evidence base on the role of Data Driven Innovation for promoting growth and well-being, and provide policy guidance on how to maximise the benefits of DDI and mitigate the associated economic and societal risks.

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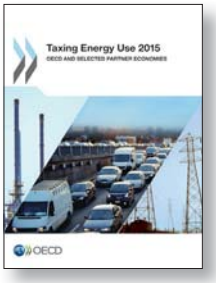

Taxing Energy Use 2015: OECD and Selected Partner Economies

This report provides a systematic analysis of the structure and level of energy taxes in OECD and selected other countries; together, they cover 80% of global energy use.
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Aligning Policies for a Low-carbon Economy

This report produced in co-operation with the International Energy Agency (IEA), the International Transport Forum (ITF) and the Nuclear Energy Agency (NEA) identifies the misalignments between climate change objectives and policy and regulatory frameworks across a range of policy domains.
ISBN 978-92-64-23326-3 July 2015, 192 pages
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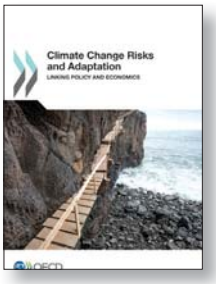

Climate Change Risks and Adaptation: Linking Policy and Economics

Building on the experience of OECD countries, this report sets out how the latest economic evidence and tools can enable better policy making for adaptation.
ISBN 978-92-64-23460-4 July 2015, 145 pages
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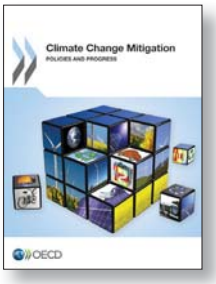
OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015

This publication is concerned with all policies that directly support the production or consumption of fossil fuels in OECD countries and in a selection of partner economies.
ISBN 978-92-64-23960-9 October 2015, 62 pages
€24 $29 £19 ¥3 100

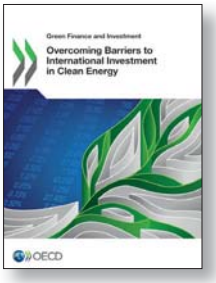


Climate Change Mitigation: Policies and Progress

This report reviews trends and progress on climate change mitigation policies in 34 OECD countries and 10 partner economies (Brazil, China, Colombia, Costa Rica, Indonesia, India, Latvia, Lithuania, the Russian Federation and South Africa), as well as in the European Union.
ISBN 978-92-64-23267-9 November 2015, 116 pages €24 $34 £22 ¥3 100

The Economic Consequences of Climate Change

This report provides a new detailed quantitative assessment of the consequences of climate change on economic growth through to 2060 and beyond.
ISBN 978-92-64-23540-3 November 2015, 110 pages
€30 $36 £24 ¥3 900



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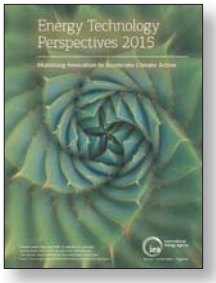

Energy Technology Perspectives 2015

As climate negotiators work towards a deal that would limit the increase in global temperatures, interest is growing in the essential role technology innovation can and must play in enabling the transition to a low-carbon energy system.
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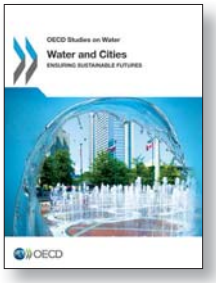

Water and Cities: Ensuring Sustainable Futures

This report focuses on the urban water management challenges facing cities across OECD countries, and explores both national and local policy responses with respect to water-risk exposure, the state of urban infrastructures and dynamics, and institutional and governance architectures.
ISBN 978-92-64-23010-1 April 2015, 180 pages
€50 $70 £45 ¥6 500

Environment at a Glance 2015: OECD Indicators

Environment at a glance measures the decoupling of environmental pressure from economic growth and sheds light on the progress made by OECD countries in addressing climate change, air and water pollution, the management of waste and natural resources and the protection of biodiversity.
IISBN 978-9-26-423518-2 November 2015,
154 pages €28 $34 £22 ¥3 600

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Fossil folly

If the world is to make a dent on climate change, breaking the armlock of fossil fuels is inevitable. After all, limiting the rise in global temperatures to no more than 2°C by the end of the 21st century demands curbing greenhouse-gas emissions between 40% and 70% by 2050 compared with 2010 levels, which means replacing fossil fuels–coal, oil and gas–with low-carbon energy sources and developing technologies to capture and store CO_2. But OECD countries and leading emerging nations are still spending US$160-200 billion a year to support fossil fuel production and consumption, by lowering exploration and exploitation costs for oil and gas companies and reducing prices for consumers. Besides undermining efforts to tackle climate change, these subsidies make it hard for competing energy sources, aggravate pollution problems and represent a strain on public funds. This means fewer resources for other strategic investments.

The *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015* identifies almost 800 tax breaks and spending programmes subsidising fossil fuels in OECD countries and emerging economies.

The report assesses the progress made on this front over the past three years in OECD countries: fossil fuels subsidies are indeed on a downward trend since 2011-12, largely owing to the collapse of international oil prices last year, but to policy changes also. In Mexico, the government eliminated its support to the consumption of gasoline and diesel fuel through a new tax, the Excise Tax on Products and Services on Gasoline and Diesel *(Impuesto Especial sobre Producción y Servicios por Enajenación de Gasolinas y Diesel)*. Outside the OECD, support has receded too since 2012 in emerging economies, though less so: India's government, for instance, has decided to reform incentives that encourage consumption of diesel.

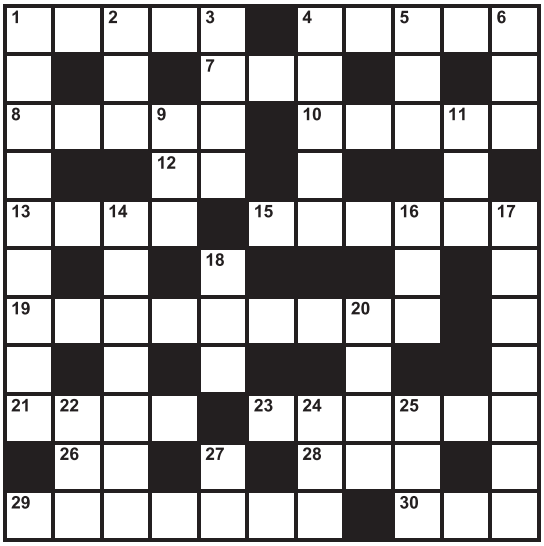
Although total support to fossil fuels remains too high, the data compiled in the database show some progress compared with the 2013 edition.

OECD (2015), *OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015*, OECD Publishing. http://10.1787/9789264239616-en

To access the online tool, visit www.oecd.org/site/tadffss/data/

See www.oecd.org/env/cc/cop21.htm and http://oe.cd/12D

OECD Observer Crossword No 3, 2015



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Across

1 Natural form of energy
4 Bear threatened by the melting of the ice caps
7 Words before budget or mission, 2 words
8 Cars
10 Majestic fir?
12 I, at the Eiffel Tower
13 Erodes, with away
15 A principal contributor to global warming (goes with 19 across)
19 See 15 across
21 Cause
23 Higher temperatures and extreme climatic changes worldwide- goes with 29 across
26 __ Monde (French daily)
28 Unified
29 See 23 across
30 Naval rank, for short

Down

1 Their rise is predicted to threaten low-lying coastal areas, 2 words
2 Rent
3 Increased
4 Bear that eats shoots and leaves
5 Science-class feature
6 Road in Rouen?
9 Orange juices, for short
11 Tolstoy or Buscaglia
14 Rodin sculpture, with The
16 Undergrad degrees, abbr.
17 Pine leaves
18 Volcanic eruption emission
20 When shadows are short
22 In the spirit of, 2 words
24 Flight record
25 Insect threatened by colony collapse
27 'Life of ___ ' (2012 movie)

For crossword soloutions do the OECD crossword online.
See www.oecdobserver.org/crossword

Mapping carbon emissions

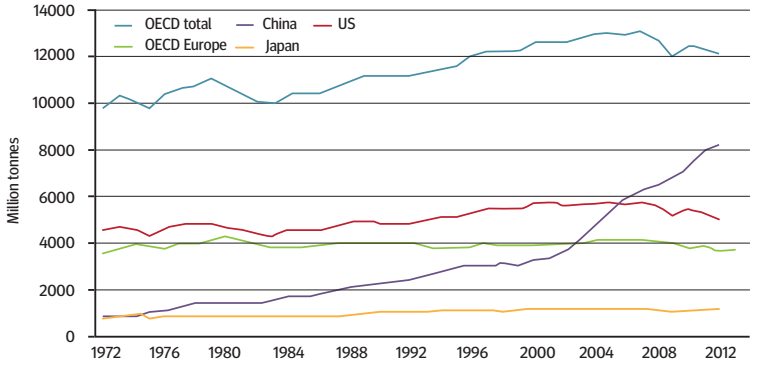
Carbon dioxide (CO_2) emissions worldwide have been trending upwards for decades. A small group of large countries is responsible for the lion's share of these global emissions.

Carbon emitted from the US steadily rose during the 1990s, but levelled off during the mid-2000s, with latest data in 2012 showing 5.7 billion tonnes of CO_2 emissions. This positions the country as the second largest emitter globally, after China, who overtook it by around 2006. From 2000 to 2012, China's emissions rose sharply from 3.3 billion tonnes to 8.2 billion. Rather than promising reductions, as many countries are, leading up to COP21, China says their emissions will peak by 2030.

The US and China on their own each emit more than all the European OECD countries together. European emissions have long been fairly flat around the 4 billion tonne mark, with a slight decline beginning around 2008. Most countries showed some decrease following the crisis, while China continued its climb. Japan's carbon emissions have trailed those of the US, China and OECD Europe, but have been edging upwards, with the country remaining the second largest single emitter in the OECD in 2012.

See StatLink to compare more countries. Visit www.oecd.org/environment/cc/

CO_2 emissions trends by region



Note: World total rose from 14779 million tonnes in 1972 to 31734 million tonnes in 2012

Source: OECD (2014), "Air and GHG emissions" (indicator).

StatLink http://dx.doi.org/10.1787/93d10cf7-en

Breaking down carbon emissions

In tackling climate change, it makes sense for policy makers to know which sectors greenhouse-gas emissions are coming from. Our chart shows the main sources for European carbon dioxide (CO_2) emissions, including electricity supply, manufacturing, households and transportation. Household emissions are largely generated from fossil fuel energy used to heat dwellings, but some of the other industry sources are more complex.

Energy, made up of "electricity, gas, steam and air conditioning supply", accounts for the largest portion of CO_2 emissions, at about 31%, and is the top industrial (non-household) emitter. Policies that focused on electricity generation and supply, by shifting to low-carbon or zero-carbon sustainable energy sources, while costly, would be effective in curbing emissions.

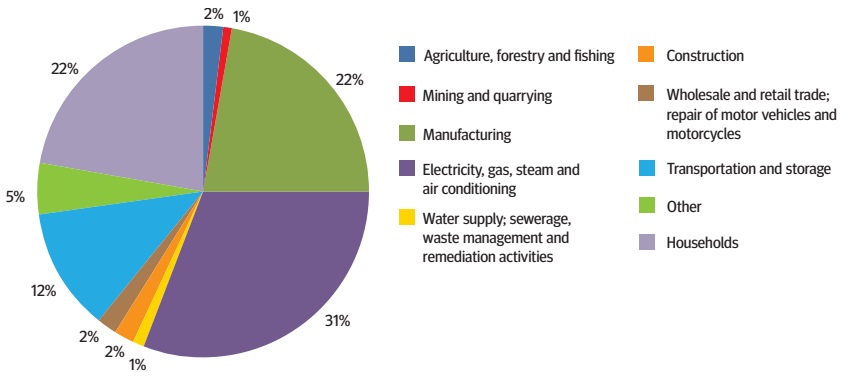
Manufacturing is the second biggest source of industrial emissions, accounting for about 22% of the CO_2 emitted into the atmosphere. Within manufacturing, emissions are quite split across product types (see StatLink for chart). "Rubber, plastic and other non-metal material construction" is responsible for the most manufacturing emissions at 26%. Also accounting for about a quarter of emissions in this category is "basic metal and metal product fabrications" at 23%. "Coke and refined petroleum products" make up another 16%, with "chemicals and chemical products" manufacture just behind at 15%.

Transportation comes in third for industrial carbon emissions, with the largest slice of 42% coming from land transport, including passengers and freight over road and rail, and freight through pipelines.

See StatLink for further breakdown.

CO_2 emissions by sector

OECD European countries, 2012



Source: OECD (2015), "Air and greenhouse gas emissions by industry", *OECD Environment Statistics* (database).

StatLink http://dx.doi.org/10.1787/data-00735-en

			% change from: previous period	% change from: previous year			level: current period	level: same period last year
Australia	Gross domestic product	Q2-2015	0.2	2.0	Current balance	Q2-2015	-14.8	-8.5
	Industrial production	Q2-2015	-1.2	1.3	Unemployment rate	Q2-2015	6.1	6.0
	Consumer price index	Q2-2015	0.7	1.5	Interest rate	Q3-2015	2.2	2.6
Austria	Gross domestic product	Q2-2015	0.1	0.7	Current balance	Q1-2015	2.8	-0.8
	Industrial production	Q2-2015	-1.4	0.8	Unemployment rate	Q2-2015	5.9	5.6
	Consumer price index	Q2-2015	1.2	1.0	Interest rate	Q3-2015	0.0	0.2
Belgium	Gross domestic product	Q2-2015	0.4	1.3	Current balance	Q1-2015	2.6	1.6
	Industrial production	Q2-2015	-0.5	-1.7	Unemployment rate	Q2-2015	8.8	8.4
	Consumer price index	Q3-2015	0.2	0.8	Interest rate	Q3-2015	0.0	0.2
Canada	Gross domestic product	Q2-2015	-0.1	1.0	Current balance	Q2-2015	-14.2	-9.3
	Industrial production	Q2-2015	-2.1	-2.2	Unemployment rate	Q2-2015	6.8	7.0
	Consumer price index	Q2-2015	1.1	0.9	Interest rate	Q3-2015	0.7	1.2
Chile	Gross domestic product	Q2-2015	0.0	2.2	Current balance	Q1-2015	0.3	-1.5
	Industrial production	Q2-2015	-1.5	-0.2	Unemployment rate	Q2-2015	6.3	6.2
	Consumer price index	Q2-2015	1.4	4.2	Interest rate	Q2-2015	2.9	3.8
Czech Republic	Gross domestic product	Q2-2015	1.1	4.6	Current balance	Q1-2015	1.8	1.9
	Industrial production	Q2-2015	1.2	4.9	Unemployment rate	Q2-2015	5.1	6.2
	Consumer price index	Q2-2015	0.7	0.7	Interest rate	Q3-2015	0.3	0.4
Denmark	Gross domestic product	Q2-2015	0.2	1.8	Current balance	Q1-2015	5.3	4.6
	Industrial production	Q2-2015	0.9	3.2	Unemployment rate	Q2-2015	6.3	6.5
	Consumer price index	Q2-2015	0.7	0.6	Interest rate	Q3-2015	-0.1	0.3
Estonia	Gross domestic product	Q2-2015	0.7	1.9	Current balance	Q1-2015	0.0	-0.2
	Industrial production	Q2-2015	-0.3	-1.7	Unemployment rate	Q2-2015	6.3	7.1
	Consumer price index	Q2-2015	1.1	-0.1	Interest rate	Q3-2015	0.0	0.2
Finland	Gross domestic product	Q2-2015	0.2	0.0	Current balance	Q1-2015	-0.6	-1.7
	Industrial production	Q2-2015	-0.1	-2.8	Unemployment rate	Q2-2015	9.4	8.6
	Consumer price index	Q2-2015	0.2	-0.1	Interest rate	Q3-2015	0.0	0.2
France	Gross domestic product	Q2-2015	0.0	1.1	Current balance	Q1-2015	-1.3	-10.1
	Industrial production	Q2-2015	-0.7	1.0	Unemployment rate	Q2-2015	10.4	10.2
	Consumer price index	Q2-2015	0.9	0.2	Interest rate	Q3-2015	0.0	0.2
Germany	Gross domestic product	Q2-2015	0.4	1.6	Current balance	Q1-2015	66.4	69.9
	Industrial production	Q2-2015	0.3	1.2	Unemployment rate	Q2-2015	4.7	5.0
	Consumer price index	Q2-2015	0.6	0.5	Interest rate	Q3-2015	0.0	0.2
Greece	Gross domestic product	Q2-2015	0.9	1.6	Current balance	Q1-2015	-0.2	1.2
	Industrial production	Q2-2015	-5.6	-2.6	Unemployment rate	Q2-2015	25.2	26.9
	Consumer price index	Q2-2015	1.5	-2.1	Interest rate	Q3-2015	0.0	0.2
Hungary	Gross domestic product	Q2-2015	0.5	2.5	Current balance	Q1-2015	1.8	1.2
	Industrial production	Q2-2015	1.7	6.1	Unemployment rate	Q2-2015	7.0	8.1
	Consumer price index	Q2-2015	1.5	0.2	Interest rate	Q3-2015	1.2	2.1
Iceland	Gross domestic product	Q2-2015	3.3	6.0	Current balance	Q2-2015	0.2	0.0
	Industrial production	Q1-2015	4.2	19.6	Unemployment rate	Q2-2015	4.4	5.0
	Consumer price index	Q2-2015	1.3	1.5	Interest rate	Q3-2015	6.2	6.1
Ireland	Gross domestic product	Q2-2015	1.9	7.3	Current balance	Q4-2014	4.2	3.4
	Industrial production	Q2-2015	-3.2	9.6	Unemployment rate	Q3-2015	9.5	11.1
	Consumer price index	Q2-2015	1.0	-0.4	Interest rate	Q3-2015	0.0	0.2
Israel	Gross domestic product	Q2-2015	0.0	2.1	Current balance	Q1-2015	2.9	4.7
	Industrial production	Q2-2015	-1.6	2.9	Unemployment rate	Q2-2015	5.1	6.1
	Consumer price index	Q2-2015	0.8	-0.4	Interest rate	Q3-2015	0.1	0.4
Italy	Gross domestic product	Q2-2015	0.3	0.6	Current balance	Q1-2015	9.6	9.2
	Industrial production	Q2-2015	0.6	0.7	Unemployment rate	Q2-2015	12.4	12.5
	Consumer price index	Q3-2015	0.1	0.2	Interest rate	Q3-2015	0.0	0.2
Japan	Gross domestic product	Q2-2015	-0.3	0.9	Current balance	Q1-2015	32.5	-12.9
	Industrial production	Q2-2015	-1.3	-0.6	Unemployment rate	Q2-2015	3.3	3.6
	Consumer price index	Q2-2015	0.7	0.5	Interest rate	Q2-2015	0.2	0.2
Korea	Gross domestic product	Q2-2015	0.3	2.2	Current balance	Q1-2015	30.5	21.8
	Industrial production	Q2-2015	-0.9	-1.8	Unemployment rate	Q2-2015	3.8	3.7
	Consumer price index	Q2-2015	0.3	0.5	Interest rate	Q3-2015	1.6	2.5
Luxembourg	Gross domestic product	Q1-2015	0.7	4.9	Current balance	Q1-2015	0.8	0.3
	Industrial production	Q2-2015	-0.6	1.2	Unemployment rate	Q2-2015	5.9	6.0
	Consumer price index	Q2-2015	1.0	0.5	Interest rate	Q3-2015	0.0	0.2
Mexico	Gross domestic product	Q2-2015	0.5	2.2	Current balance	Q1-2015	-9.8	-10.3
	Industrial production	Q2-2015	-0.1	..	Unemployment rate	Q2-2015	4.4	4.9
	Consumer price index	Q2-2015	-0.2	2.9	Interest rate	Q3-2015	3.3	3.3

			% change from: previous period	% change from: previous year			level: current period	level: same period last year
Netherlands	Gross domestic product	Q2-2015	0.2	2.2	Current balance	Q1-2015	21.3	24.4
	Industrial production	Q2-2015	-5.8	-5.7	Unemployment rate	Q2-2015	6.9	7.6
	Consumer price index	Q2-2015	1.6	0.9	Interest rate	Q3-2015	0.0	0.2
New Zealand	Gross domestic product	Q2-2015	0.2	2.7	Current balance	Q1-2015	-1.3	-0.7
	Industrial production	Q2-2015	0.4	1.3	Unemployment rate	Q2-2015	5.9	5.7
	Consumer price index	Q2-2015	0.4	0.4	Interest rate	Q3-2015	3.0	3.7
Norway	Gross domestic product	Q2-2015	-0.1	1.2	Current balance	Q1-2015	9.7	17.5
	Industrial production	Q2-2015	-1.4	1.2	Unemployment rate	Q2-2015	4.3	3.3
	Consumer price index	Q2-2015	0.9	2.2	Interest rate	Q3-2015	1.2	1.7
Poland	Gross domestic product	Q2-2015	0.9	3.6	Current balance	Q1-2015	1.9	-1.5
	Industrial production	Q2-2015	-0.5	4.4	Unemployment rate	Q2-2015	7.5	9.2
	Consumer price index	Q2-2015	0.5	-0.8	Interest rate	Q3-2015	1.7	2.5
Portugal	Gross domestic product	Q2-2015	0.5	1.6	Current balance	Q1-2015	0.4	-0.3
	Industrial production	Q2-2015	3.3	2.2	Unemployment rate	Q2-2015	12.5	14.4
	Consumer price index	Q2-2015	1.8	0.7	Interest rate	Q3-2015	0.0	0.2
Slovak Republic	Gross domestic product	Q2-2015	0.8	3.1	Current balance	Q1-2015	0.4	0.6
	Industrial production	Q2-2015	-3.4	3.6	Unemployment rate	Q2-2015	11.4	13.4
	Consumer price index	Q2-2015	0.5	-0.1	Interest rate	Q3-2015	0.0	0.2
Slovenia	Gross domestic product	Q2-2015	0.7	2.5	Current balance	Q1-2015	0.7	0.8
	Industrial production	Q2-2015	0.7	5.0	Unemployment rate	Q2-2015	9.6	9.7
	Consumer price index	Q2-2015	1.2	-0.6	Interest rate	Q3-2015	0.0	0.2
Spain	Gross domestic product	Q2-2015	1.0	3.1	Current balance	Q1-2015	4.5	2.9
	Industrial production	Q2-2015	1.8	3.2	Unemployment rate	Q2-2015	22.6	24.7
	Consumer price index	Q2-2015	1.8	-0.3	Interest rate	Q3-2015	0.0	0.2
Sweden	Gross domestic product	Q2-2015	1.1	3.3	Current balance	Q1-2015	9.3	10.5
	Industrial production	Q2-2015	3.3	3.7	Unemployment rate	Q2-2015	7.6	7.9
	Consumer price index	Q2-2015	0.4	-0.2	Interest rate	Q3-2015	-0.5	0.2
Switzerland	Gross domestic product	Q2-2015	0.2	1.3	Current balance	Q1-2015	14.4	9.8
	Industrial production	Q2-2015	-1.4	-2.6	Unemployment rate	Q1-2015	4.4	4.8
	Consumer price index	Q2-2015	0.1	-1.1	Interest rate	Q3-2015	-0.9	0.0
Turkey	Gross domestic product	Q2-2015	1.3	4.2	Current balance	Q2-2015	-5.8	-11.0
	Industrial production	Q2-2015	1.7	4.0	Unemployment rate	Q2-2015	10.2	9.6
	Consumer price index	Q2-2015	2.9	7.7	Interest rate		..	..
United Kingdom	Gross domestic product	Q2-2015	0.7	2.4	Current balance	Q1-2015	-43.5	-40.7
	Industrial production	Q2-2015	0.7	1.5	Unemployment rate	Q2-2015	5.6	6.3
	Consumer price index	Q2-2015	0.6	0.0	Interest rate	Q3-2015	0.6	0.5
United States	Gross domestic product	Q2-2015	1.0	2.7	Current balance	Q1-2015	-113.3	-96.4
	Industrial production	Q2-2015	-0.7	1.4	Unemployment rate	Q3-2015	5.2	6.1
	Consumer price index	Q2-2015	1.2	0.0	Interest rate	Q2-2015	0.2	0.1
European Union	Gross domestic product	Q2-2015	0.4	1.9	Current balance		..	..
	Industrial production	Q2-2015	0.1	1.6	Unemployment rate	Q2-2015	9.6	10.3
	Consumer price index	Q2-2015	..	0.1	Interest rate		..	..
Euro area	Gross domestic product	Q2-2015	0.4	1.5	Current balance	Q2-2014	85.1	80.6
	Industrial production	Q2-2015	-0.2	1.2	Unemployment rate	Q2-2015	11.1	11.6
	Consumer price index	Q2-2015	..	0.2	Interest rate	Q3-2015	0.0	0.2
Non-members								
[1]Brazil	Gross domestic product	Q2-2015	-1.9	-2.4	Current balance	Q4-2014	-25.6	-18.7
	Industrial production	Q2-2015	-2.4	-6.4	Unemployment rate		..	..
	Consumer price index	Q2-2015	2.8	8.5	Interest rate		..	..
[1]China	Gross domestic product		..	..	Current balance		..	..
	Industrial production		..	..	Unemployment rate		..	..
	Consumer price index	Q2-2015	-0.3	1.4	Interest rate	Q1-2015	5.2	5.6
[1]India	Gross domestic product	Q2-2015	1.6	7.2	Current balance		..	..
	Industrial production	Q2-2015	1.4	3.3	Unemployment rate		..	..
	Consumer price index	Q2-2015	1.8	5.9	Interest rate		..	..
[1]Indonesia	Gross domestic product	Q2-2015	1.1	4.7	Current balance		..	..
	Industrial production		..	..	Unemployment rate		..	..
	Consumer price index	Q2-2015	0.9	7.1	Interest rate	Q2-2015	8.5	8.5
Russian Federation	Gross domestic product	Q2-2015	-2.0	-4.5	Current balance		..	..
	Industrial production	Q2-2015	-2.2	-4.1	Unemployment rate		..	..
	Consumer price index	Q2-2015	2.3	15.8	Interest rate	Q2-2015	14.1	8.8
[1]South Africa	Gross domestic product	Q2-2015	-0.3	1.6	Current balance		..	..
	Industrial production		..	..	Unemployment rate		..	..
	Consumer price index	Q2-2015	2.3	4.5	Interest rate	Q3-2015	6.1	6.0

Gross domestic product: Volume series; seasonally adjusted. **Leading indicators:** A composite indicator based on other indicators of economic activity, which signals cyclical movements in industrial production from six to nine months in advance. **Consumer price index:** Measures changes in average retail prices of a fixed basket of goods and services. **Current balance:** Billion US$; seasonally adjusted. **Unemployment rate:** % of civilian labour force, standardised unemployment rate; national definitions for Iceland, Mexico and Turkey; seasonally adjusted apart from Turkey. **Interest rate**: Three months.

Current balance data are reported according to the BPM6 classification except Mexico and non-members.

..=not available, [1]Key Partners.

Source: *Main Economic Indicators*, October 2015.

Supporting green growth in Southeast Asia

Southeast Asia's booming economy presents major environmental challenges: during the past decades, the region's growth model has relied on intensive resource exploitation. Natural capital accounts for more than 20% of total wealth, well above the 2% average in OECD countries.

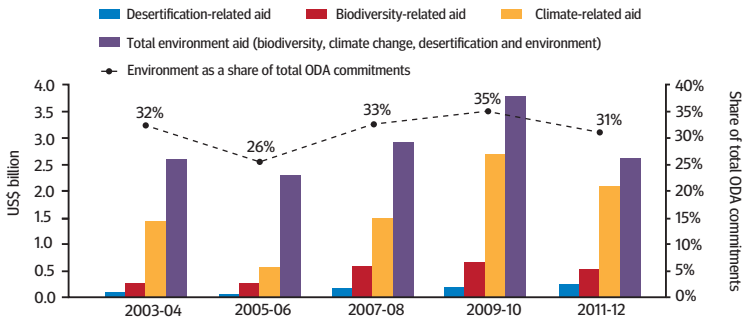
Growing rates of pollution threaten productivity and health, while ASEAN countries' share of global greenhouse gas is expected to surge, albeit from a low base. But pursuing green growth requires substantial investment, in infrastructure, for instance: while Singapore and Malaysia are likely to be able to mobilise domestic and international finance, poorer Southeast Asian countries need to attract resources from official development assistance (ODA) or other forms of official development finance.

Although ODA is already supporting green growth in ASEAN countries, the scope for further increases in the years ahead may be limited, according to the OECD Development Assistance Committee. Between 2003-04 and 2009-10, ODA commitments to environmental objectives in Southeast Asian countries increased from about US$2.5 billion to more than $3.5 billion, to reach more than 35% of total ODA commitments. Yet during 2011-12, ODA commitments, both to the environment and in total, fell markedly, consistent with a trend seen in other regions of the world. However, worldwide ODA reached an all-time record of $135.2 billion in 2014, an encouraging sign.

See www.oecd.org/greengrowth/ and www.oecd.org/dac/

Development aid for environmental objectives in Southeast Asia

Official development assistance (ODA), two-year annual averages, US$ billion, constant 2012 prices



Source: OECD Development Committee Assistance Creditor Reporting System data, http://stats.oecd.org/index.aspx?DataSetCode=CSRI, accessed July 2014.

StatLink http:// dx.doi.org/10.1787/888933167762

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