

5. Moldova's sustainable infrastructure investments

This chapter describes sustainable infrastructure planning in Moldova and presents current trends in investment in large-scale infrastructure projects. It compares Moldova's infrastructure plans in the energy, transport, industry and water sectors against its international commitments under the Paris Agreement on climate change and the Sustainable Development Goals (SDGs). The chapter also explores Moldova's strategic documents for long-term economic development, sectoral development and the environment, including those related to climate change mitigation and adaptation. It identifies misalignments between stated goals and observed investment flows and provides recommendations to improve strategic planning for sustainable infrastructure.

State of play: economy, investment and climate change in Moldova

Economy and trade

Table 5.1. Key indicators on Moldova's economy

Population (2019)	2 657 637
Urbanisation rate (2019)	42.7%
Annual population growth (2019)	-1.8%
Surface area	33 850 km ²
GDP (USD, current price, 2019)	11 955 million
GDP per capita (USD, current price, 2019)	4 499
Real GDP growth (year-on-year change, 2019, 2020)	3.6%, -4.5%
Inflation (average consumer price, y-o-y change, 2020)	7.5%
Exports of goods and services (% of GDP, 2019)	30.5%
Imports of goods and services (% of GDP, 2019)	55.2%
FDI, net inflows (% of GDP, 2019)	5.0%
General government net lending/borrowing (% of GDP, 2019, 2020)	-1.5%, -5.5%
Unemployment (% of total labour force, 2019)	5.5%
Remittances (% of GDP, 2019)	16.0%
Transparency, accountability and corruption in the public sector rating (1= most corrupt, 6 = least corrupt, 2018)	2.5

Source: World Bank (2021^[1]), *World Development Indicators (database)*, World Bank, <https://datacatalog.worldbank.org/dataset/world-development-indicators>; IMF (2020^[2]), *World Economic Outlook: October 2020*, International Monetary Fund https://www.imf.org/external/datamapper/GGXCNL_NGDP@WEO/OEMDC/ADVEC/WEOWORLD

Economy and demographics

Moldova is a landlocked, lower-middle income country in Eastern Europe between Romania and Ukraine. Its population, among the smallest in Eastern Europe, has declined since its peak of 3 million in 1992 to 2.7 million in 2019. Moldova's demographic decline is linked to waves of emigration following independence, initially to Russia and, more recently, also to the European Union. Unlike all other former Soviet republics, except the Baltic states, Moldova did not join the Soviet Union until 1940, with most of its territory previously belonging to the Kingdom of Romania. As such, according to Romanian law, many Moldovans are eligible to apply for citizenship. Between 2002 and 2018 over half a million Moldovans received Romanian citizenship, and demand continues to grow (Point.md, 2018^[3]). According to a recent study, Moldova's population may decrease to just over 2 million by 2035 due to a low fertility rates and consistently high net emigration (UNFPA Moldova, 2016^[4]).

Immediately following independence from the Soviet Union in 1991, Moldova's GDP plummeted. Transnistria, a highly industrialised region in the east of the country that accounted for 40% of Soviet-era Moldova's economic output, effectively broke away from Moldovan political and economic control in 1992. Transnistria's *de facto* secession compounded with the economic impacts of the Soviet Union's dissolution severely impacted the Moldovan economy throughout the early 1990s, but then growth resumed, particularly after 1999 (Bertelsmann Stiftung, 2018^[5]). With the exception of the 2008-2009 Global Financial Crisis and a major contraction in 2014-2015, Moldova's GDP has consistently increased since 1999, growing from USD 4.1 billion in constant 2010 USD to USD 9.9 billion by 2019. GDP per capita has increased substantially in Moldova but is still among the lowest in the countries of the EU Eastern Partnership (EaP),¹ higher only than Ukraine's.

Personal remittances remain an important source of funds for Moldovan households, but the total volume has decreased in recent years. Between 2003 and 2014 they were equal to over 20% of Moldova's GDP, reaching a peak of 34.9% of GDP in 2006. In 2019 they accounted for 16% of GDP, higher than in any other Eastern Partnership country (Georgia, 12.7%; Armenia, 11.2%; Ukraine 10.4%; Azerbaijan, 2.7%; Belarus 2.3%) (World Bank, 2021^[1]).

Like neighbouring Ukraine, Moldova is a service-oriented economy with a comparatively large agricultural sector. In 2019, services accounted for 54.3% of Moldova's GDP, almost identical to Ukraine's figure of 54.4%, while agriculture accounts for 9.9%, second only to Armenia (12%) among the Eastern Partner countries. Industry (including construction) and manufacturing make up 22.8% and 10.9% of Moldova's GDP respectively (World Bank, 2021^[1]).

As of February 2021, Moldova had the third highest number of confirmed COVID-19 cases per capita among EaP countries after Georgia and Armenia. Since the beginning of the pandemic, Moldova has diagnosed about 40.5 cases per thousand inhabitants compared to 56.5 in Armenia, 22.8 in Azerbaijan, 27 in Belarus, 65.4 in Georgia and 29.3 in Ukraine. Moldova's death rate (937 deaths per million inhabitants) has also been relatively high, second only to Armenia (1 049) in the region, much higher than in Azerbaijan (311), Belarus (562) and Ukraine (187) (Roser et al., 2020^[6]).² Moldova declared a state of emergency and restricted travel throughout the country, including on public transport, and internationally to slow the virus's spread. Schools transitioned to distance learning, public gatherings were limited and non-essential businesses were closed for several months.

Like elsewhere in EaP countries, the economic consequences of the pandemic have been substantial. Moldova's GDP contracted by about 4.5% in 2020, while neighbouring Ukraine's GDP fell by 7.2%. Some economic stimulus measures announced by the Moldovan government, such as the elimination of certain taxes related to natural resource extraction, could have potentially negative consequences on the environment, while others, like state support for greening small and medium enterprises, could help Moldova's transition towards a greener economy (OECD, 2021^[7]).

Trade

Moldova has been a member of the World Trade Organisation since 2001. Like Georgia and Ukraine, Moldova signed an Association Agreement with the European Union, which came into force in 2016. However, Moldova has also expressed interest in the Eurasian Economic Union. Although not a member, it has held observer status in the Union since 2017. Observer status does not constrain Moldova to follow any of the bloc's rules nor does it afford Moldova any rights beyond participation in Union's events, but it may signal a move towards closer integration with Russia and the other Eurasian Economic Union member states rather than with the European Union. To date, Moldova is the only country to which the Eurasian Economic Union has granted observer status (Russell, 2017^[8]).

The European Union's Eastern Partnership (EaP) is a key initiative for continued cooperation between the EU, its member states and Moldova. It aims to strengthen ties and encourage reform on a number of policy areas, including on governance, connectivity, economic development and environmental protection.

Moldova has been a Contracting Party of the European Union's Energy Community since 2010. The Energy Community's Secretariat supports Moldova's implementation of reforms in the energy sector, including on energy efficiency, renewable energy development and environmental protection, and Moldova has made considerable progress. The Secretariat rates Moldova's overall implementation as 45% complete (Energy Community, 2020^[9]).

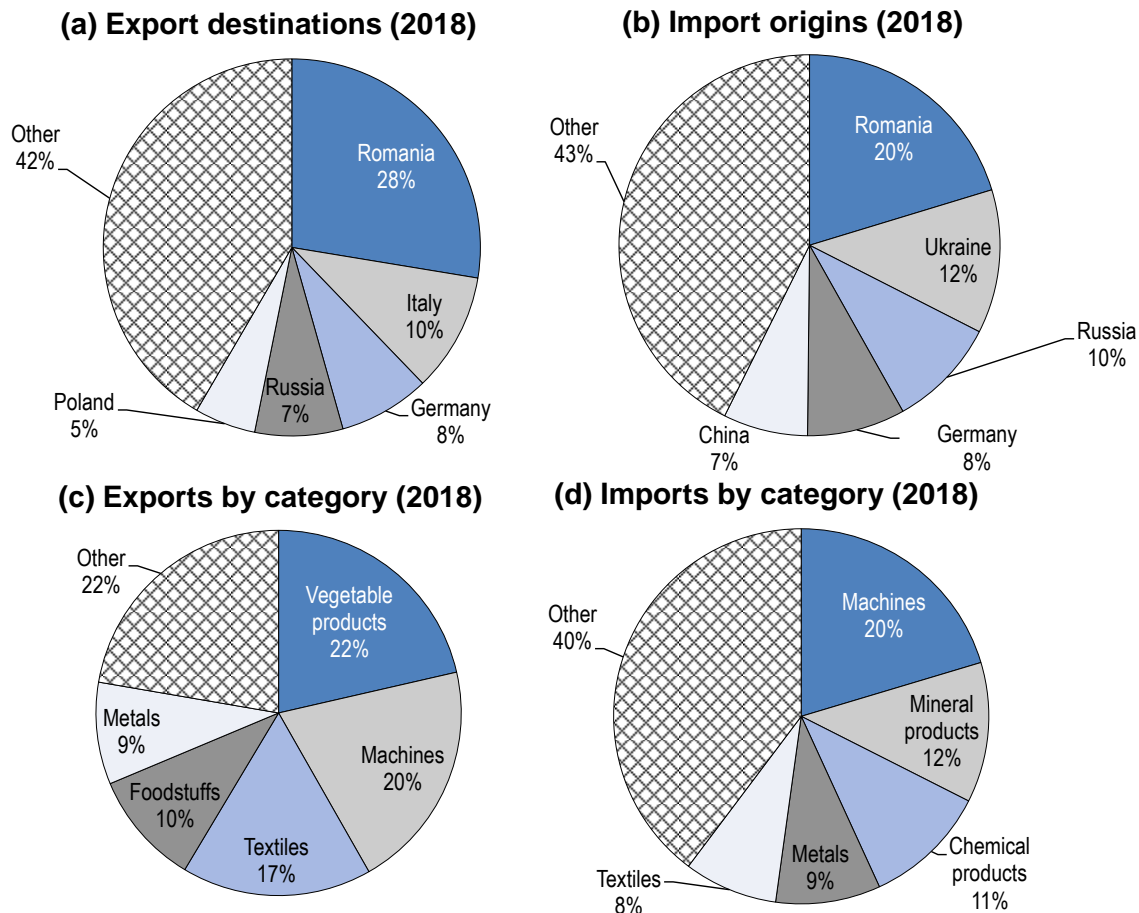
Moldova does not have complete sovereign control of its eastern border, which complicates its ability to oversee trade flows. A breakaway region, Transnistria or the self-proclaimed Pridnestrovian Moldavian Republic, occupies a narrow strip of land between the Dniester river and Moldova's internationally recognised border with Ukraine. Like other breakaway states in the EaP countries (Abkhazia and South

Ossetia in Georgia and Artsakh/Nagorno-Karabakh in Azerbaijan), no sovereign state recognises the independence of Transnistria. In stark contrast with these other breakaway regions, however, Transnistria has entered into an agreement with Moldova and Ukraine to facilitate movement across both the internationally recognised and self-proclaimed borders. Since the 2005 agreement and with the support of the European Union Border Assistance Mission to Moldova and Ukraine, cross-border trade has been made easier and more secure. Nevertheless, important issues remain unsolved in the areas of abolition of tax and customs regulations favourable to the illegal re-export business, custom and tax collection and enforcement of border and customs control.

Moldova's most important trade partner is Romania, which accounts for 28% of Moldova's exports and 20% of imports (Figure 5.1(a) and (b)). Over half of Moldova's exports go to European Union member states, most notably Romania (28%), Italy (10%), Germany (8%) and Poland (5%). Russia also remains an important export market (7%) as well as Belarus (2.6%), Turkey (3.7%) and neighbouring Ukraine (3.8%). The European Union accounts for about 40% of Moldova's imports; other key import origin countries include Ukraine (12%), Russia (9%) and China (7%).

Moldova's agriculture and food processing sectors produce about a third of Moldova's exports, including key products like sunflower seeds (6% of exports), corn (3.4%), wheat (3%) and wine (4%). Machine parts, especially insulated wire (17% - Moldova's most important export product), textiles and metals (especially iron products – hot-rolled iron bars, 5%; raw iron, 2%) are also important export sectors. Due to limited domestic supply, Moldova imports refined petroleum to cover local demand. Petroleum alone accounts for 10% of Moldova's imports, the vast majority of the 12% from mineral products. Machinery (20%), chemical products (11%, especially packaged medicaments, 3.3%), metals (9%) and textiles (8%) make up the largest shares of Moldova's imports.

Figure 5.1. Trade of Moldova



Source: Observatory of Economic Complexity (2019_[10]), *Moldova: Exports, Imports and Trade Partners*, Observatory of Economic Complexity, <https://oec.world/en/profile/country/mda>

Investment climate

Although Moldova has made progress in adopting market principles since independence in 1991, the country's investment climate requires significant reform. Corruption remains deep-rooted and widespread; it poses the greatest barrier to Moldova's efforts to attract foreign investment. Transparency International ranked Moldova 120th out of 198 countries in the 2019 edition of its annual Corruption Perceptions Index, down from 117th in 2018. While Moldova outperforms Azerbaijan and neighbouring Ukraine (tied for 126th place in 2019), institutions in Armenia (77th), Belarus (66th) and Georgia (44th) are perceived as considerably less corrupt (Transparency International, 2019_[11]).

The 2014 bank fraud scandal, a large-scale international scheme that resulted in the disappearance of USD 1 billion of largely public money from the Moldovan banking system, dealt a heavy blow to public trust in institutions. However, financial and technical support from the IMF, the World Bank, the EU and some of its member states have begun rebuilding confidence in Moldova's banking sector (Wrobel, 2019_[12]).

Commitment to market-oriented reforms and closer cooperation with the European Union has fluctuated in recent years. The 2019 constitutional crisis led to the formation of two successive governments in less than a year, with relations to the European Union on the one hand and Russia on the other as key policy differences.

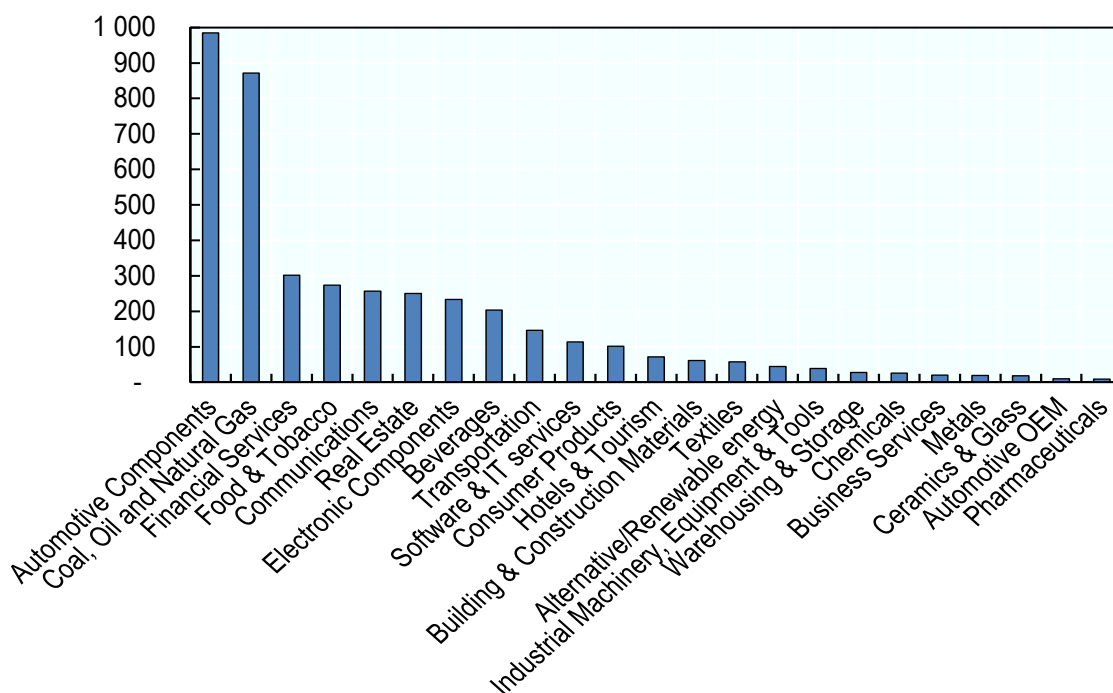
According to Moldovan law, foreign companies enjoy the same treatment afforded to domestic firms, and its competition laws align with EU practice and legislation. Risks to investors continue to undermine confidence, resulting in low FDI flows. There is, for instance, a track record of state expropriations of both domestic and foreign-owned assets justified as in the interest of public utility (US Department of State, 2019^[13]).

Moldova ranks 48th in the World Bank's 2020 Ease of Doing Business report, between its EaP peers Armenia (47th) and Belarus (49th). Although Moldova's regulatory environment is considered more conducive to starting and running a business than that of neighbouring Ukraine (64th), it is significantly more onerous than the systems of Azerbaijan (34th) and Georgia (6th). Construction permits are the weakest point of Moldova's regulatory system, with the country ranking 156th out of 190 countries. On most other indicators, however, Moldova has made consistent progress. For instance, it reduced the time required to open a business (12 days in 2004 compared to 3 days in 2020) and the complexity of the tax system (53 payments requiring over 230 hours on average per year in 2006 compared to 10 payments requiring approximately 180 hours per year in 2020) (World Bank, 2020^[14]).

Between 2003 and 2017, Moldova attracted USD 4.2 billion of FDI to greenfield projects. Compared to Armenia, with a GDP only slightly larger than Moldova's, this figure is low: Armenia attracted USD 7.4 billion to greenfield projects over the same period. In Moldova, most greenfield FDI flows concentrated in automotive components (24%) and hydrocarbons (21%) (Figure 5.2). Infrastructure-related investments were much smaller in volume. Alternative/renewable energy sources and the transportation sector attracted only 1% and 4% of FDI inflows respectively.

Figure 5.2. Greenfield FDI in Moldova by economic activity, 2003-2017

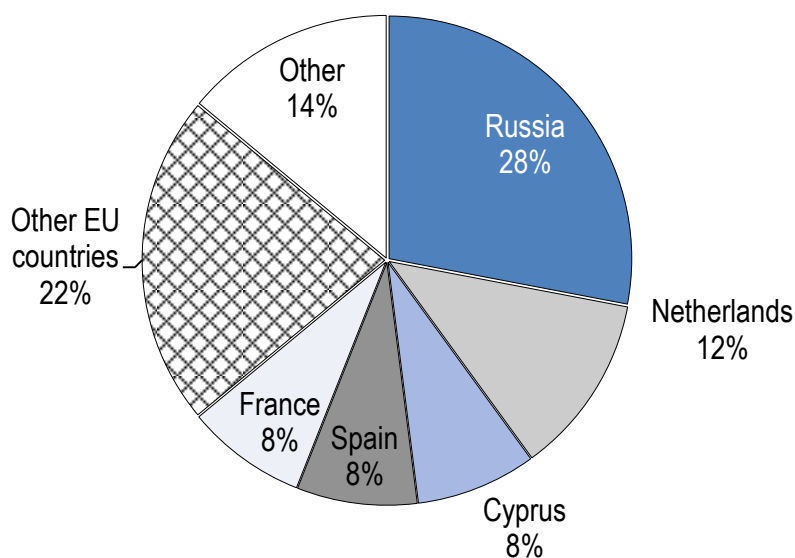
Cumulated greenfield FDI capital between January 2003 and September 2017 in USD million



Source: OECD based on fDi Markets (2019^[15]), fDi Markets: the in-depth crossborder investment monitor (database), fDi Markets, <https://www.fdimarkets.com/>

Russia is the most important single-country source of FDI to Moldova, accounting for 28% of inflows in 2015, but the European Union collectively accounts for almost twice Russia's volumes (58%) (Figure 5.3). Within the European Union, the Netherlands (12%), Cyprus (8%), Spain (8%), France (8%) and neighbouring Romania (6%) are the largest investors. The presence of offshore companies in Cyprus and the Netherlands likely inflate these countries' respective shares somewhat (Walter, Luecke and Lupusor, 2017^[16]). Beyond the EU and Russia, the United Kingdom (3%) and the United States (2%) provide the most FDI to Moldova.

Figure 5.3. FDI in Moldova by country of origin, 2015



Source: Walter, Luecke and Lupusor (2017^[16]), "The economic impact of FDI in Moldova: Results from empirical analysis", German Economic Team (GET) Moldova, https://www.get-moldau.de/wordpress/wp-content/uploads/2018/01/PS_01_2017_en.pdf

Public debt has been relatively low in Moldova. In 2016, the stock of public and publicly guaranteed debt was equivalent to 36.9% of GDP but has since dropped to 30.8%. Although debt levels are lower than in many EaP countries, Moldova will need to effectively mobilise the private sector and external development partners to deliver on its ambitious infrastructure- and development-related 2020 fiscal plans while maintaining debt sustainability (IMF, 2020^[17]).

Climate change

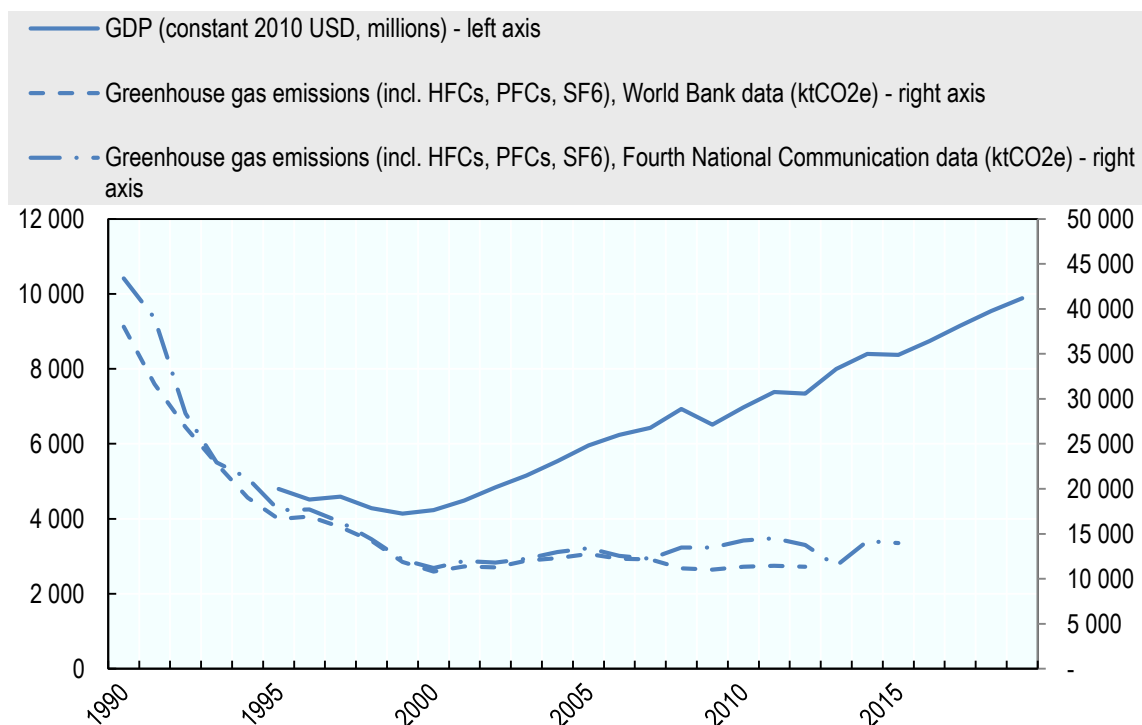
Given the country's small size, Moldova's emissions account for only 0.02% of global greenhouse gas (GHG) emissions. Following independence, Moldova's GHG emissions sharply declined throughout the 1990s (from 43 MtCO_{2e} in 1990 to 11 MtCO_{2e} in 2000) before plateauing and slightly increasing throughout the 2000s and 2010s to reach 14 MtCO_{2e} in 2014 and 2015 (Figure 5.4). Despite recent increases, Moldova's annual emissions are still only about a third of their pre-independence levels. Moldova's GDP, by contrast, has experienced two decades of near-constant, often rapid growth, with the notable exception of the 2014 bank fraud scandal and resulting crisis. In 2019 Moldova's economy reached USD 12.0 billion, more than nine times larger than in 2000 when GDP stood at USD 1.3 billion.³

As GHG emissions fell and GDP rose, the GHG intensity of Moldova's economy shrank to 1.8 kgCO_{2e} per USD (in constant 2010 dollars) by 2015 from 10.1 kgCO_{2e} per USD two decades earlier. However,

Moldova's economy remains significantly more emissions-intensive than the OECD average (0.35 kgCO₂e per USD in 2012). With a shrinking population and reduced GHG emissions, per capita emissions in Moldova have reduced from 10.0 (or 14.6) tCO₂e in 1990 to 4.9 tCO₂e in 2015 (World Bank, 2021^[1]; Climate Change Office of the Republic of Moldova, 2018^[18]).⁴

Moldova has submitted an updated version of its Nationally Determined Contribution (NDC) to the UN Framework Convention on Climate Change. The updated NDC increases the ambition of the country's mitigation targets, albeit marginally, from an unconditional commitment to reduce emissions by 2030 from 64-67% of 1990 levels (original NDC) to 70% of 1990 levels (updated NDC). Conditional on international support, Moldova aims to reduce emissions by 88% compared to 1990 levels by 2030 (compared to 78% in the original NDC).

Figure 5.4. GHG emissions and GDP of Moldova, 1990-2019



Note: GDP data unavailable prior to 1995

Source: World Bank (2021^[1]), World Development Indicators (database), World Bank, <https://data.worldbank.org/indicator/EN.ATM.GHGT.ZG>; Climate Change Office of the Republic of Moldova (2018^[18]), Fourth National Communication of the Republic of Moldova under the United Nations Framework Convention on Climate Change, Climate Change Office, Ministry of Agriculture, Regional Development and Environment, <http://www.clima.md/lib.php?l=en&idc=81&>

Energy (including fuel combustion from transport) accounts for the largest share of Moldova's GHG emissions (68% in 2015), but the share has declined compared to pre-independence levels (80% in 1990). Waste-related emissions have followed the opposite trajectory, rising from 5% in 1990 to 11% in 2015. The share of Moldova's agriculture-related emissions nearly doubled from 12% in 1990 to 22% in 2000 before falling once more to 15% in 2015. Emissions derived from industrial processes represent a small but rising share of emissions (4% in 1990, 6% in 2015). The absolute values of all categories of GHG emissions remain below their 1990 levels; energy-related emissions decreased the most (9.5 MtCO₂e in 2015 compared to 34.6 MtCO₂e in 1990) (Ministry of Environment of the Republic of Armenia, 2020^[19]).

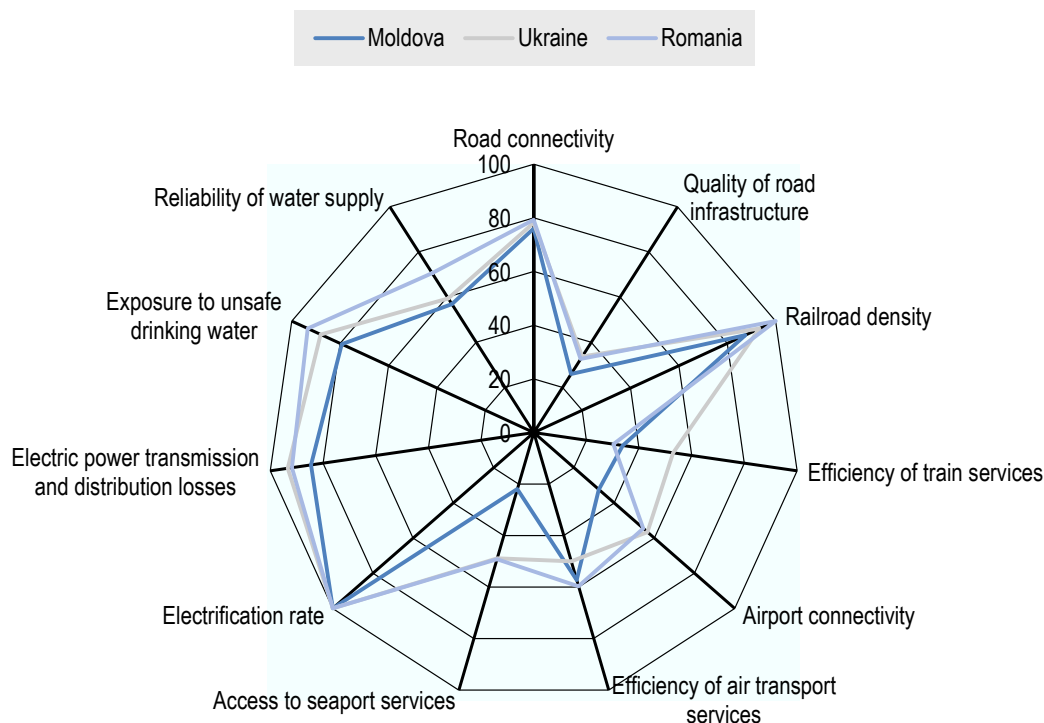
The effects of climate change have already become apparent in Moldova. The annual mean temperature rose by 1.0°C on average (1887-2014), with the upwards trend particularly evident following the early 1980s. Precipitation rates have not varied as significantly. Nationally, average precipitation increased slightly (54.7 mm more in 2014 compared to 1887) following trends in the north and centre of the country, while the south recorded a slight decrease in precipitation. According to Moldova's climate change scenarios, average temperature is expected to continue increasing, but precipitation levels could either increase or decrease slightly depending on how GHG concentrations. Despite a longer growing season and milder winter, without adaptation measures the yields of key crops are expected to decrease markedly by 2100. Depending on future GHG concentrations, corn productivity could decrease by 34-67% and winter wheat could decrease by 22-46%,⁵ while cultivation of both crops may become impossible in Moldova in the worst-case scenario. Rising temperatures could also exacerbate the risks of forest fires and negatively impact human health (Climate Change Office of the Republic of Moldova, 2018^[18]).

Moldova's infrastructure needs and current plans

According to the World Economic Forum's 2019 Competitiveness Index, Moldova's average infrastructure score (66) is below the average in Eurasian countries overall (67.7) but considerably higher than in other lower-middle income countries (60) (World Economic Forum, 2019^[20]). According to the World Bank's Logistics Performance Index, Moldova's infrastructure performance has deteriorated in recent years: Moldova fell from 85th in 2014's global ranking to 100th in 2016 and 141st in 2018 (World Bank, 2019^[21]). However, while the overall quality of Moldova's infrastructure is relatively low, its indicators are broadly in line with its two neighbouring countries, Romania and Ukraine (Figure 5.5). With the exception of its access to seaport services, where landlocked Moldova faces a distinct disadvantage, and airport connectivity, Moldova's transport infrastructure indicators closely follow Romania's and Ukraine's. On measures of the efficiency of its electricity grid and water supply systems, however, Moldova consistently underperforms compared to its neighbours.

A key infrastructure challenge in Moldova is the disparity between rural and urban areas. Access to adequate infrastructure services such as clean piped water, transportation services, electricity and district heating differs widely between cities and rural regions. For instance, only about 10% of rural residents in Moldova have access to modern heating⁶ compared to nearly 80% in urban areas. The disparity is a particularly acute problem in Moldova, the least urbanised country in the Eastern Partnership, since such a large share of its population (57% in 2019) lives in rural areas. Given the concentration of poorer households in rural areas, improving infrastructure service provision outside urban areas is an essential step in meeting Moldova's poverty reduction goals (World Bank, 2016^[22]). One of the Moldovan government's main priorities as laid out in the *National Development Strategy "Moldova 2030"* is extending access to physical infrastructure assets to underserved populations.

Figure 5.5. Quality of infrastructure in Moldova

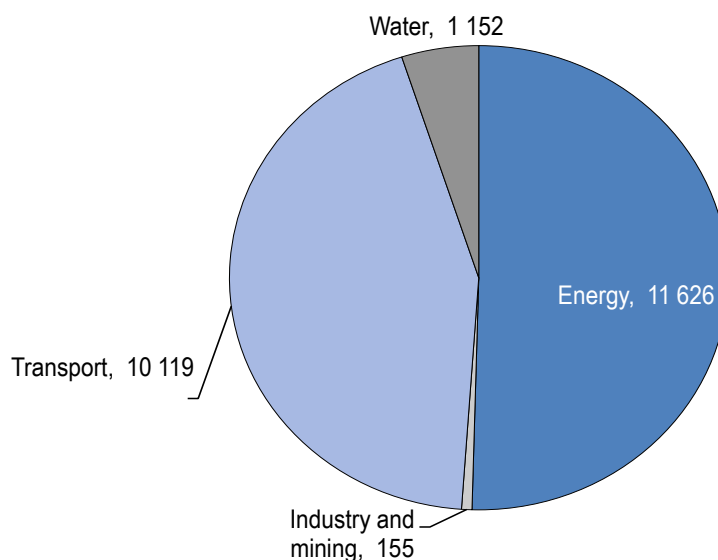


Source: World Economic Forum (2019_[20]), *The Global Competitiveness Report 2019*, World Economic Forum, http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

The OECD’s database tracks 20 major infrastructure projects planned or under construction in Moldova, with a cumulative value of USD 2.4 billion. By value, transport projects account for over half of the investments (53%, USD 1.3 billion), and energy projects, particularly in electricity transmission and distribution, make up the second largest share (41%, USD 1.0 billion) (Figure 5.6). By comparison, industry and mining projects (1.7%, USD 40 million) and water projects (4.2%, USD 102 million) represent much smaller shares of total investment in Moldova’s infrastructure.

Figure 5.6. Investment projects in Moldova, by sector

Planned and under construction, in USD million



Source: OECD analysis based on accessed databases as of June 2020.

Transport

For a country of its size, Moldova has a relatively extensive network of transport infrastructure, but the Soviet-era stock of assets has suffered from underinvestment and insufficient maintenance leading to suboptimal service delivery, particularly in rural areas. Firms in Moldova identify access to transport and logistics infrastructure services as an obstacle to growth and job creation. Increased investments have resulted in a marked improvement in the quality of Moldova's roads, less than 50% of which were classified as 'poor' or 'very poor' in 2015, compared to over 90% in 2006 (World Bank, 2016_[22]).

As with other infrastructure services in Moldova, the quality of transport services differs considerably between urban and rural areas. Poor transport connectivity, especially in rural localities removed from interurban transport corridors, constrains Moldova's continued development, reduces the economic opportunities of rural Moldovans and hinders trade. In response, Moldova's *Transport and Logistics Strategy 2013-2022* has set an objective of developing and rehabilitating the national road network, including secondary roads, to ensure year-round access for all settlements to the country's primary highways.

In terms of public transport, major cities like Chisinau and Balti enjoy public transport services, but only about half of small town have any kind of publicly funded transport services and such services are completely absent in rural areas (World Bank, 2016_[22]). Even in Moldova's larger population centres, recent OECD analysis demonstrates that several barriers exist in national and municipal policy frameworks that hinder the development and 'greening' of transport infrastructure and services (OECD, 2019_[23]).

Inadequate transport infrastructure quality combined with regulatory barriers increase the costs of trade in Moldova. According to the OECD's Trade Facilitation Indicators, poor border agency co-operation – both external and internal – and documentation are weak points in facilitating cross-border trade (OECD, 2020_[24]).

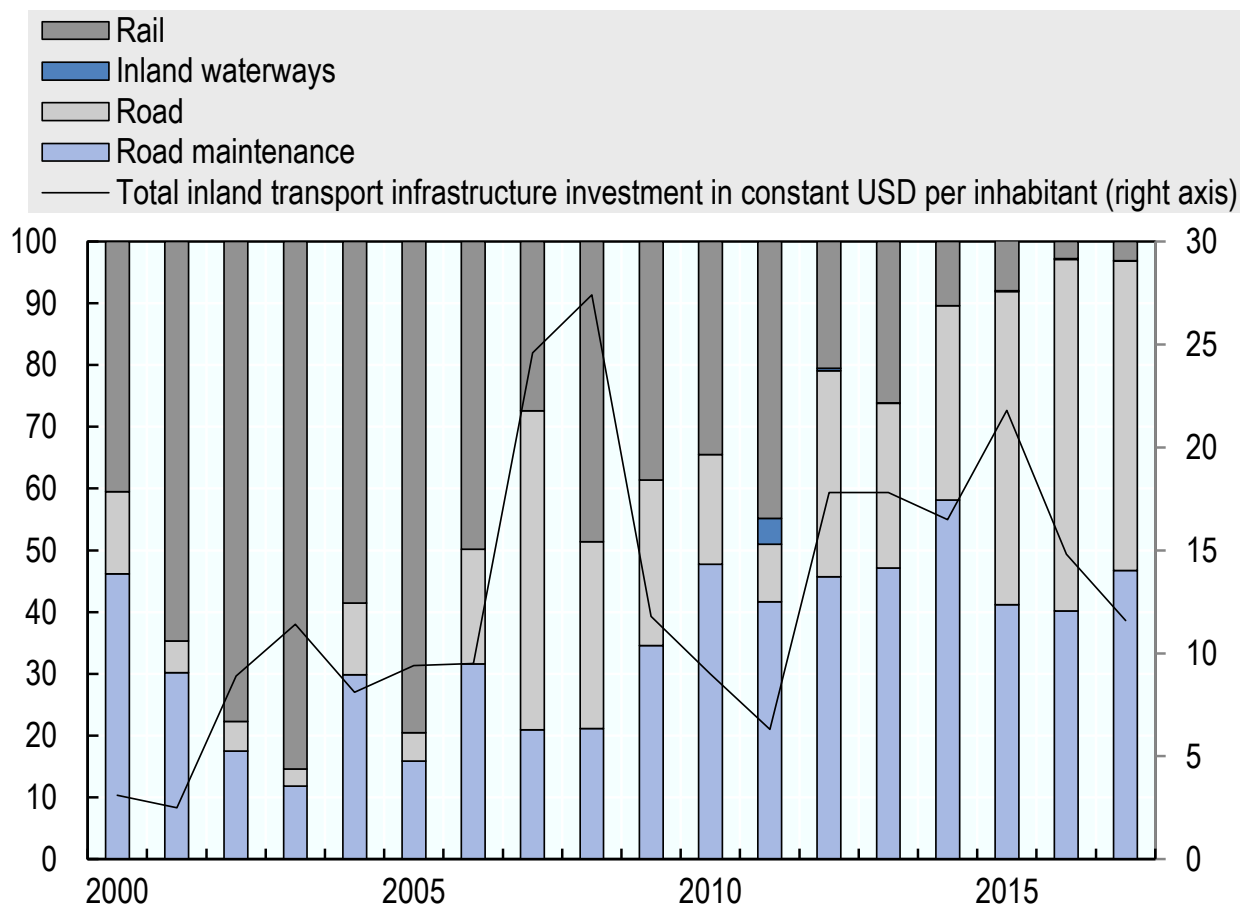
Underinvestment in transport infrastructure is a major factor in the deterioration of Moldova's transport network. Between 2000 and 2018, Moldova spent 0.57% of its GDP on total inland transport infrastructure

annually on average, considerably less than other countries in the Eastern Partnership: Armenia, 1.0% (2008-2016); Azerbaijan, 2.0% (2000-2018), Belarus, 2.8% (2005-2018) and Georgia, 2.7% (2002-2018) (ITF, 2019^[25]). In broad terms, investments in Moldova have shifted away from rail over the past decade, focusing mostly on road and road maintenance (Figure 5.7). While increased investment in road and road maintenance could improve connectivity, including in rural areas, continued underinvestment in Moldova's existing rail network risks hastening its fall into disrepair.

The modal shift away from rail towards road is evident in the transport of goods and passengers in Moldova. While rail assured 73% of the turnover of goods (measured in tonnes-kilometers, tkm) in 1995 compared to 27% for road, these proportions had reversed by 2019: 86% road vs 14% rail. In absolute terms, rail turnover reduced by 70% from 3.1 billion tkm to 0.9 billion tkm while road increased by 380% from 1.2 billion tkm to 5.6 billion tkm. Rail's modal share of passenger turnover (measured in passenger-kilometres, pkm) has also declined, from 15% in 2006 to 1% in 2020, but unlike for cargo, passenger turnover has shifted towards air travel (from 15% in 2006 to 40% in 2019) rather than road (70% in 2006, 59% in 2019). In absolute terms, rail is the only mode with decreased turnover (down 84% from 471 million pkm to 75 pkm) while all others increased (road by 59%, river by 34% and air by 397%) (National Bureau of Statistics of the Republic of Moldova, 2020^[26]). The government has taken steps to counter this shift, supporting regional rail connectivity through the acquisition of new locomotives and the rehabilitation of existing rail infrastructure, relying on part in support from EBRD and EIB (Codreanu, 2019^[27]; Ahlemeyer, 2020^[28]).

Figure 5.7. Inland transport infrastructure investment in Moldova (2000-2017)

Modal share (%) of total inland infrastructure investment (left axis) and total inland transport infrastructure investment in current USD per capita (right axis)



Source: ITF (2019^[25]), *Transport performance indicators*, International Transport Forum, <https://doi.org/10.1787/trsprt-data-en>

Compared to frozen conflicts elsewhere in the Eastern Partnership like Abkhazia and South Ossetia in Georgia and Nagorno-Karabakh/Artsakh in Azerbaijan, the breakaway region of Transnistria is less disruptive to Moldova's international transport connections with Ukraine, particularly following recent developments in border crossing facilitation. Between late 2018 and early 2019, the EU Border Assistance Mission to Moldova and Ukraine (EUBAM) ensured the opening of the Palanca-Maiaky-Udobne Joint Operated Border Crossing Point in southern Moldova for travellers and cargo, bypassing the Transnistrian-controlled portion of the Moldova-Ukraine border. Another EUBAM-supported project resulted in the relaunch of passenger and cargo rail services between Chisinau and Odessa (Ukraine) via Transnistrian territory (EUBAM, 2019^[29]).

Transport is the main source of air pollution in Moldova, especially in urban centres, accounting for upwards of 86% of pollutant emissions and, according to some estimates, could be as high as 96%. As road transport use has increased, Moldovan households and companies have relied on imports of foreign used vehicles, many of which enter Moldova with inadequate technical inspections (OECD, 2019^[23]). Moldova's government has made tackling this problem a priority in both its environment- and economic development-related strategic documents, such as the *National Development Strategy "Moldova 2030"* (increase share

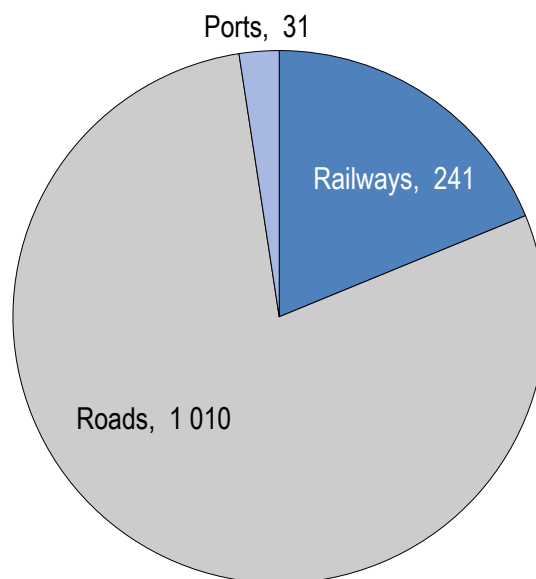
of renewables in transport's final energy use to 10% by 2022) and the *Environmental Strategy for 2014-2023* (approximate environment-related EU Directives, including on fuel standards). Moldova has made considerable progress on transposing transport- and air quality-related EU Directives into national legislation. In 2016, Moldova transposed Directive 1999/32/EC relating to a reduction in the sulphur content of certain liquid fuels. Moldova has also developed legislation that will transpose Directive 2008/50/EC on ambient air quality and cleaner air and Directive 1994/63/EC, which aims to prevent volatile organic compound (VOC) emissions during petrol storage.

Moldova's transport infrastructure projects planned and under construction account for around USD 1.3 billion, primarily in the road sector (79% or USD 1 billion) (Figure 5.8). Rail (19% or USD 241 million) and fluvial port projects (2% or USD 31 million) account for the remainder. All of Moldova's road and rail projects tracked in the OECD's database aim to rehabilitate existing infrastructure.

The hotspot projects identified in the OECD's database of infrastructure projects planned and under construction in Moldova reflect the emphasis placed on road network rehabilitation in the *Transport and Logistics Strategy 2013-2022* (Table 5.2). There is no evidence in the OECD database of projects designed to help Moldova meet some of its transport-related environment objectives, i.e. Moldova 2030's goal to increase the use of renewables in the transport sector.

Figure 5.8. Transport projects in Moldova, by sub-sector

Planned and under construction in USD million



Source: OECD analysis based on accessed databases as of June 2020.

Table 5.2. Hotspot projects in the transport sector in Moldova

(a) Under construction					
Name	Sub-sector	Description	Project value (USD million)	Funding source	Type of investment
Moldova Roads II, III and IV	Road	The project will rehabilitate key national roads with a focus on connections to cross-European corridors.	830	EIB, EBRD	Brownfield
Moldova Rail Infrastructure and Rolling Stock FL	Rail	The project aims to acquire more modern rolling stock for Moldova's rail system, namely diesel locomotives for cargo and passenger transport, and rehabilitate selected stretches of railways	130	EIB	Brownfield
(b) Planned					
Name	Sub-sector	Description	Project value (USD million)	Funding source	Type of investment
Moldova Rail Infrastructure (Bender-Basarabeasca-Etulia-Giurgiuilesti)	Rail	The project will rehabilitate 233 km of track along a key railway corridor for trade between Bender (Transnistria-controlled territory) and Giurgiuilesti (Moldova's only international fluvial port) via Basarabeasca and Etulia (on the border with Ukraine).	111	EIB	Brownfield
Local Roads Improvement Project	Road	The project aims to rehabilitate and upgrade 300 km of priority local roads to improve rural connectivity.	88	IDA; Government of Moldova	Brownfield

Note: Refer to the Reader's guide for the present report's definition of 'hotspot' and other information on how the projects above were selected and prioritised. EIB = European Investment Bank; EBRD = European Bank for Reconstruction and Development; IDA = International Development Association.

Source: OECD database as of June 2020.

Energy

According to Moldova's *Energy Strategy 2030*, 70-75% of Moldova's existing stock of energy infrastructure assets are in poor condition and need of refurbishment or replacement. The losses incurred by the country's ageing gas pipelines, for instance, stand at about 7% (World Bank, 2016^[22]). Moldova's power transmission and distribution systems are particularly inefficient, recording losses of 18.8% of electricity output, compared to 10.3% in Ukraine and 11.9% in Romania (World Economic Forum, 2019^[20]). Like other former Soviet Union countries, Moldova has achieved universal access to electricity, but, due to the country's outdated infrastructure, the reliability of electricity systems falls below the regional average in Europe and Central Asia, with 37% of surveyed firms reporting electrical outages in Moldova compared to 33% in the region as a whole (World Bank, EBRD and EIB, 2019^[30]).

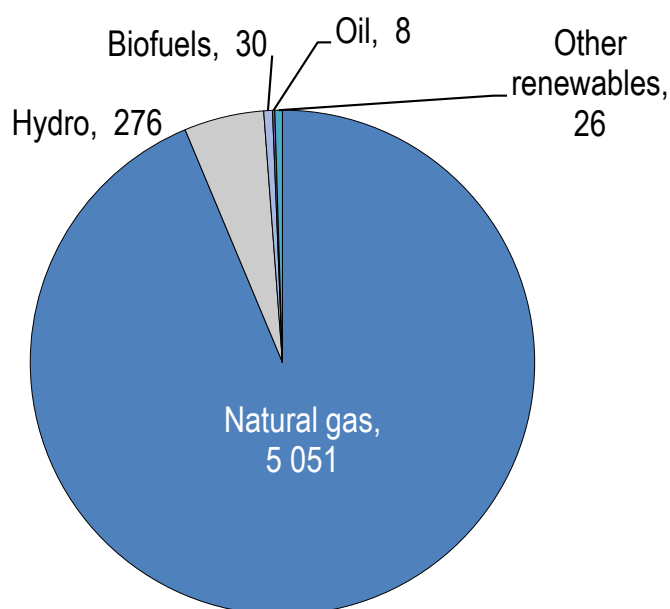
Moldova is extremely dependent on imports to meet its energy consumption needs. In 2018, Moldova covered only 20% (818 ktoe) of its total primary energy supply through domestic production while relying on net imports to cover the remainder (3 342 ktoe). Moldova exports no gas, coal or electricity, but does export limited quantities of oil products (27 ktoe in 2018) (IEA, 2019^[31]). Moldova covers about 90% of its domestic power needs with "imported" electricity from Transnistria (World Bank, 2016^[22]), although it has sought to diversify supply with cheaper imports from neighbouring Romania and Ukraine. As a result of the Moldovan government's *de facto* loss of sovereign control over Transnistria, Moldova lost Moldovaskaya GRES, its most important power plant, with an installed capacity of 2 520 MW. Given Transnistria's position between Moldova and, via Ukraine, its main gas supplier Russia, the breakaway state is able to siphon off gas supplies intended for Moldova for which it has neglected to offer any payments to MoldovaGaz, the main Moldovan gas company. Due to this, MoldovaGaz owes a massive

debt to Russian SOE Gazprom for gas that never reached territories under the effective control of the Moldovan government (OECD, 2019^[23]).

Moldova also relies entirely on imports to meet its domestic demand for coal, which is not used in power generation but an important heating fuel especially for the rural poor, and natural gas, which fuels 94% of domestic power generation (Figure 5.9). Moldova also has limited hydroelectric generation capacity (e.g. a 16-MW run-of-the-river power plant in Costesti), which nearly makes up the remainder of domestic generation (5%). Biofuels account for a further 1%, and other renewables (solar PV, 3 GWh; wind, 23 GWh) jointly account for slightly less than 0.5% of electricity generation in Moldova.

Figure 5.9. Electricity generation by source

GWh, 2018



Source: IEA (2021^[32]), *Electricity Information 2020*, International Energy Agency, <https://www.iea.org/data-and-statistics/>

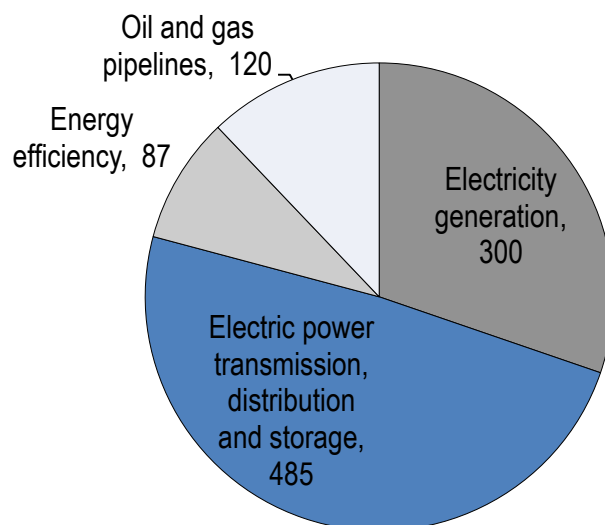
In response to its energy-related challenges, Moldova set out three overarching objectives in its *Energy Strategy 2030*. First, Moldova strives to bolster its energy security and achieve greater independence from imports, notably by building new power generation capacity (to reach 800 MW by 2020). Its second goal, related to the first, is integration into the European energy system, particularly gas supply lines and the European Network of Transmission System Operators for Electricity (ENTSO-E), which the country aims to join by the end of 2020. Lastly, to improve sustainability and diversify energy sources, Moldova aims to develop renewables in its power generation (10% by 2020 – a target repeated in *Moldova 2030*, to be achieved by 2022), total energy consumption (20% by 2020) and fuels (10% biofuels in total fuels by 2020). As a supporting measures for these objectives, Moldova also aims to reduce the energy intensity of its economy (by 10% by 2020) and improve the efficiency of its building stock and transmission and distribution systems.

Moldova adopted a law that transposes EU Directive 2009/28/CE on renewable energy use in 2016. The law establishes a legal framework for the promotion of energy from renewable sources. It sets mandatory national targets for the overall share of energy from renewable sources in gross final consumption of energy and for the share of energy from renewable sources in transport.

Unique among the EaP countries in the present study, Moldova's energy-related infrastructure projects are not concentrated in electricity generation, which only account for 30% of energy projects by value (Figure 5.10). Instead, electric transmission and distribution projects make up the largest share (49%), consisting predominantly of a single large-scale project that aims to connect Chisinau to the existing interchange between Moldova and Romania's electricity networks (Table 5.3) in addition to smaller-scale refurbishments of electricity distribution and transmission lines. These projects, combined with the 12% of energy investments dedicated to a project linking Chisinau to the natural gas interchange on the Moldova-Romania border, are consistent with the second overarching goal of *Moldova Energy Strategy 2030* to integrate Moldova's energy system with Europe's. However, the lack of renewable energy projects and the presence of only a single large-scale project to construct new electricity generation capacity cast doubt on the strategy's other goals by end of 2020 to increase domestic capacity and pivot towards renewable energy.

Figure 5.10. Energy projects in Moldova, by sub-sector

Planned and under construction in USD million



Source: OECD analysis based on accessed databases as of June 2020.

Table 5.3. Hotspot projects in the energy sector in Moldova

(a) Under construction						
Name	Sub-sector	Description	Project value (USD million)	New capacity (MW)	Funding source	Type of investment
Moldova-Romania Power Interconnector Project	Electricity transmission and distribution	The project will install new power lines and a converter station to connect Chisinau to Isaccea (Romania) via Vulcanesti (southern Moldova).	305	N/A	EBRD, EIB, World Bank, EU	Greenfield
Ungheni-Chisinau Natural Gas Pipeline	Natural gas pipeline	The project will extend the existing line between Iasi (Romania) and Ungheni (Moldova, on the Romanian border) to Chisinau with 120 km of new pipeline.	120	N/A	EBRD, EIB, EU, Romanian government	Greenfield
(b) Planned						
Name	Sub-sector	Description	Project value (USD million)	New capacity (MW)	Funding source	Type of investment
Burlaceni Combined Cycle Power Plant	Electricity generation (natural gas-fired power plant)	The project aims to construct a condensing power plant in the village of Burlaceni (southern Moldova).	300	500	RWE AG	Greenfield
Moldova Energy Efficiency Project	Energy efficiency	The project retrofits public and residential buildings in various Moldovan cities to improve energy efficiency.	87	N/A	EIB	Brownfield

Note: Refer to the Reader's guide for the present report's definition of 'hotspot' and other information on how the projects above were selected and prioritised. EBRD = European Bank for Reconstruction and Development; EIB = European Investment Bank.

Source: OECD database as of June 2020:

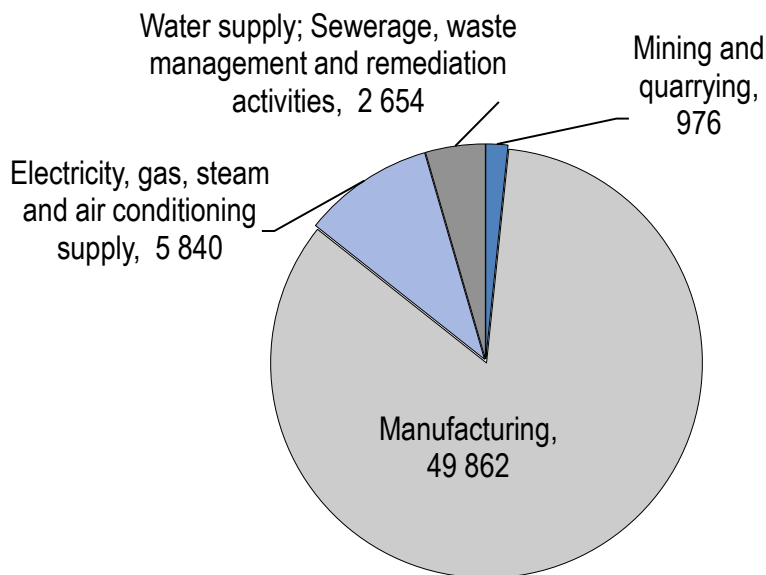
Industry, mining and water

The share of Moldova's GDP derived from industry (excluding the construction sector, which remained broadly stable) decreased from about 20% in 1995-1998 to below 15% by 2009-2014, reflecting a shift in labour and economic output from industry (and agriculture) towards the service sector (World Bank, 2016^[22]).

The vast majority (84%) of Moldova's industrial output consists of manufactured goods (Figure 5.11), primarily manufactured food and beverage products. Processed meat products and wine are the country's two most important industrial outputs by value. Unlike most EaP countries, Moldova has only modest mineral deposits and consequently does not have a sizeable mining and quarrying sector, as evidenced by the sector's small share (2%) of industrial output.

Figure 5.11. Industrial output by NACE* subsector

2019, in million MDL



Note: MDL =Moldovan leu; * NACE = Nomenclature statistique des activités économiques dans la Communauté européenne [Statistical Classification of Economic Activities in the European Community]

Source: National Bureau of Statistics of the Republic of Moldova (2020^[33]), "Value of manufactured industrial production, by types of activities, 2014-2019", <http://statbank.statistica.md/>

Moldova's water infrastructure quality is inadequate and underperforms compared to other EaP countries. 22.3% of the population is exposed to unsafe drinking water (compared to 13.7% in Ukraine, the second worst performer in the region on this metric), and its water supply is the least reliable in region, ranking 88th globally (several places below Ukraine, 80th, and the countries of the Caucasus, between 59th and 63rd) (World Economic Forum, 2019^[20]).

Moldova's urban-rural disparity of infrastructure service delivery is especially evident in the water supply and sanitation (WSS) sector. 95% of Chisinau's population enjoys access to improved water sources, compared to only 54% of rural residents (only 39% of whom have improved water piped directly to their homes). Only 10% of rural Moldovans have private flush toilets. Moldova's progress on improving service delivery to its population has been slow: It was the only country in Europe that did not achieve its WSS-related Millennium Development Goal of halving the share of its population without access to basic WSS services between 1990 and 2015. Rural water supply often relies on shallow groundwater wells that do not benefit from regular monitoring and fail to meet drinking water quality standards (World Bank, 2016^[22]).

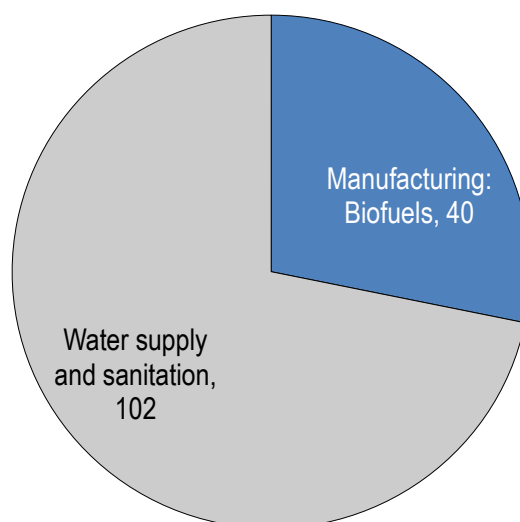
Recognising these shortcomings, the government of Moldova has set several water-related targets in its national development planning documents. As part of its overarching goals to widen access to physical infrastructure and communal services and to safeguard the fundamental right to physical health, *Moldova 2030* sets targets to provide 92-99%⁷ of the population with safe water supply services (compared to a baseline of 88%) and 81-89% with improved sanitation services (compared to a baseline of 77%). Another target is to construct or refurbish water purification facilities to working order in all settlements throughout the country with 15 thousand inhabitants or more.

The OECD's database contains only a single industrial project in Moldova, a planned USD 40 million bioethanol plant, contributing to *Energy Strategy 2030's* goal of reaching 10% biofuels by 2020. In the water sector, although the individual projects are smaller in value, the OECD database tracks

USD 102million worth of water supply and sanitation (WSS) projects (Figure 5.12). These projects focus on developing or refurbishing WSS systems, in line with the targets outlined above, but over half of the investments are focused on urban centres – large and small cities – with only a third explicitly targeting small towns.

Figure 5.12. Industry, mining and water infrastructure projects in Moldova, by sub-sector

Planned and under construction in USD million



Source: OECD analysis based on accessed databases as of June 2020.

Strengths and weaknesses of existing institutional set-up for sustainable infrastructure planning

Strategic planning and links between long-term goals, infrastructure plans and environmental considerations

Moldova's top-level strategic planning document, the *National Development Strategy "Moldova 2030"*, is the first national development strategy to emphasise the importance of environmental protection. One of its priorities relates directly to the safeguarding of the natural environment.

In "*Moldova 2030*" (approved by the government in June 2020, awaiting adoption by parliament), the government notes unmet objectives in previous strategies (Strategy for Economic Growth and Poverty Reduction 2004-2006, National Development Strategy 2008-2011, National Development Strategy 2012-2020), identifying a fragmented system of independently developed and inadequately coordinated policy documents as a primary cause. OECD analysis of Moldova's public administration system raised similar concerns about incoherent development planning system and the inefficiency caused by contradicting objectives expressed in across several sector- and institution-specific strategies. Both *Moldova 2030* and the OECD's analysis call for standardisation of planning documents and a clearly defined hierarchy of planning documents in which lower-level sectoral and subnational strategies would be subordinate to the overarching development strategy (i.e. *Moldova 2030*) in a cascading structure (OECD, 2015^[34]).

In this regard, Moldova could benefit from a clearly defined long-term vision (perhaps, like Kazakhstan's top-level development strategy, to 2050) transcending immediate politically contentious debates. Such

long-term planning documents enable countries to look beyond shorter-term political and business cycles to articulate priorities in terms of economic and social development as well as, crucially, the reconciliation of these goals with environmental concerns. *Moldova 2030's* overarching focus on improving citizens' wellbeing is a promising development in this regard. The government also plans to develop a long-term low-emission development strategy along with a Strategy on National Energy and Climate Plan.

Given *Moldova 2030's* recent approval, the proposed reforms to the country's strategic planning document system remain unimplemented at present, but traces a pathway to a more coherent system moving forward. Moldova's sectoral development strategies (e.g. *Transport and Logistics Strategy 2013-2022*, *National Renewable Energy Action Plan of the Republic of Moldova for 2013-2020*, *Energy Strategy 2030* – whose quantitative targets extend to 2020) predate *Moldova 2030*, and their successor documents could offer an opportunity to cement a multi-level system of internally consistent strategic documents. *Moldova 2030* links explicitly to the Sustainable Development Goals, including infrastructure-related goals in the energy, transport and water supply and sanitation (WSS) sectors, and incorporates numerous quantitative environment- and climate-related targets.

Three successive governments between 2018 and 2020 proposed, retracted and re-proposed *Moldova 2030* before it was finally approved by the government in June 2020. Major, unresolved disagreements over, for instance, closer co-operation with (and, in the long term, eventual integration into) the European Union or the Eurasian Economic Union have scuttled attempts to outline a clear, united vision for medium- to long-term development.

Moldova 2030 defines a system of 3-year 'National Development Plans' to map out nearer-term goals and measures. These plans will also be used in the mid-term budgeting processes. Once put into practice, this system should provide a structured way for the government to monitor progress towards longer-term goals.

Moldova has been a party to the UNECE Convention on Environmental Impact Assessment in a Transboundary Context since 1997 and the related Protocol on Strategic Environmental Assessment since 2019. Moldova adopted a law on Environmental Impact Assessment in 2015 and another on Strategy Environmental Assessment in 2017, and has developed and approved a set of guidelines for implementation. Since 2019, one of the main work areas of the EU-funded EU4Environment programme, the successor to the EaP GREEN programme, is supporting reforms and improvements to the environmental assessment processes in Moldova and other EaP countries. The programme is jointly implemented by the OECD, UNECE, UNEP, UNIDO and the World Bank.

Institutional set-up and decision making processes

Moldova's institutional set-up, like in many EaP countries, is characterised by considerable instability. Most notably, in 2017, several ministries were combined, leading to a major restructuring of country's cabinet. The Ministry of Construction and Regional Development absorbed the Ministry of Agriculture and Food Industry as well as the Ministry of Environment to become the Ministry of Agriculture, Regional Development and Environment. Similarly, the Ministry of Economy absorbed the Ministry of Transport and Roads Infrastructure and the Ministry of Informational Technologies and Communications to become the Ministry of Economy and Infrastructure. As a result of the restructuring, the number of cabinet-level ministries in Moldova was reduced from 15 to 9.

Moldova's public administration continues to face challenges, but has been making steady, if uneven, progress since 2009. However, its remaining shortcomings are considerable, and contribute to ineffective and costly service delivery. The country's administration is characterised by numerous fragmented local structures that exacerbate cost overruns, leaving limited fiscal space to invest in infrastructure and much-needed social programmes (World Bank, 2016^[22]).

The wide gap in economic opportunities between rural and urban Moldovans stems in part from flaws in the country's institutional set-up. In water supply and sanitation, for instance, the national government

retains responsibility for distributing investment funding while service delivery falls to local governments, but national-level institutions in the water sector lack an explicit mandate to extend existing networks to unconnected rural inhabitants. Stronger leadership informed by the realities of Moldova's rural populations is required to make progress on shrinking urban-rural disparities (World Bank, 2016^[22]). The leading role in co-ordination, budget alignment and monitoring assigned to the State Chancellery in *Moldova 2030* could present an opportunity to fill the existing institutional gap, especially given the strategy's focus on improving the delivery of and access to infrastructure services.

Co-ordination between state bodies remains a challenge in Moldova for developing coherent policy frameworks and strategic documents. Although co-ordination bodies have been formed (e.g. Inter-Ministerial Working Group on the Promotion of Sustainable Development and Green Economy, Sustainable Development Council under the Prime Minister) and their roles defined, they have not functioned effectively in practice, partially due to political instability (OECD, 2015^[34]).

List of relevant strategic documents

Table 5.4. Main strategic documents in force

	Status	Time Horizon	Sectoral Coverage	Main objectives
Updated First Nationally Determined Contribution (NDC)	Submitted in 2017, updated in 2020	2017-30	Economy-wide	<ul style="list-style-type: none"> • Unconditional target: Reduce net GHG emissions by 70% by 2030 compared to 1990 levels (revised from 2017 submission: 64-67%) • Conditional target: Reduce net GHG emissions by 88% (revised from 2017 submission: 78%) • Main sectors targeted for emission reduction: energy, transport, agriculture, water resources, forestry • Main adaptation tool: capacity building, improved information, integrated disaster risk management, community-level climate change adaptation, technology transfer and uptake
National Development Strategy "Moldova 2030"	Adopted in 2018, retracted in 2019, approved in June 2020 by the government, submitted to parliament	2018-30	Economy-wide	<ul style="list-style-type: none"> • Widen access to physical infrastructure • Energy: 10% of power generation from renewables by 2022 • Transport: increase use of biofuels (10% of total fuel) • Water: increase share of population with access to clean drinking water and improved sanitation services to 92-99% and 81-89% respectively by 2030
Transport and Logistics Strategy 2013-2022	2013	2013-22	Transport	<ul style="list-style-type: none"> • Road: integrate road network with European network, ensure year-round access for all settlements to the national road network, rehabilitate all national roads by 2022, attract EUR 120 million per year of external funding for road rehabilitation, improve road quality (45% good, 45% fair and 10% bad by 2022), reduce traffic accidents by 50% by 2020, reduce vehicle operation costs per km

	Status	Time Horizon	Sectoral Coverage	Main objectives
				<ul style="list-style-type: none"> • Rail: rehabilitate rail lines so cargo and passenger trains can reach a minimum speed of 50 km/h on main railway lines by 2020 • Air: privatise civil aviation sector and liberalise market
Energy Strategy of Moldova 2030	Adopted in 2013		Energy	<ul style="list-style-type: none"> • Improve energy security, integrate into the European energy system (electricity and gas), improve sustainability • Increase share of renewables in power generation to 10% by 2020 • Increase share of renewables in total energy consumption to 20% by 2020 • Increase share of biofuels in total fuels to 10% by 2020 • Improve energy efficiency and reduce transmission and distribution losses
Environmental Strategy for 2014-2023	Adopted in 2014	2014-23	Economy-wide	<ul style="list-style-type: none"> • Closer alignment with EU Directives • Reduce GHG emissions by 20% by 2020 compared to 1990 baseline • Reduce air pollution levels to 30% of 1990 levels by 2023

Table 5.5. Other relevant documents

	Status	Time Horizon	Sectoral Coverage
National Renewable Energy Action Plan 2013-2020	Adopted in 2013	2013-20	Energy
Climate Change Adaptation Strategy by 2020 and Action Plan	Adopted in 2014	2014-20	Economy-wide
Low-Emission Development Strategy	Adopted in 2016	2016-30	Economy-wide
Programme on Promotion of Green Economy in the Republic of Moldova for 2018-2020	Adopted in 2018	2018-20	Economy-wide
National Energy Efficiency Programme 2011-2020	Adopted in 2011	2011-20	Energy, construction
Biological Diversity Strategy for the years 2015-2020	Adopted in 2015	2015-20	Ecosystems
National Programme for the Greening of SMEs			
Strategy on Waste Management 2013-2027	Adopted in 2013	2013-27	Waste
Strategy on Water Supply and Sanitation 2014-2028	Adopted in 2014	2014-28	Water

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Notes

¹ The EU Eastern Partnership (EaP) is a joint initiative for strengthening the relationships between the European Union, its member states and six countries (hereafter the EaP countries): Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine.

² Confirmed case and death figures are underestimates of actual case and death numbers. Methodology and testing rates vary widely, and international comparisons are necessarily flawed.

³ Data on Moldova's pre-1995 GDP are unavailable

⁴ Population estimates in Moldova varying considerably due to the large non-resident population, which means per capita emissions statistics vary in turn. In 1990, World Bank data indicates that the population of Moldova was about 3 million, while the National Bureau of Statistics puts the figure at 4.4 million. The two sources report similar figures for 2015 population, but these numbers are widely perceived as overestimates (UNFPA Moldova, 2016^[4]).

⁵ The lower figures are based on RCP 2.6 and the upper figures on RCP 4.5.

⁶ Here defined as heating with modern fuels, i.e. electricity, gas or central heating.

⁷ Depending on the development scenario. *Moldova 2030* sets targets based on three development scenarios.



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