

**ENVIRONMENT DIRECTORATE
ENVIRONMENT POLICY COMMITTEE**

GREEN Action Task Force

**Sustainable Infrastructure Development for a Low-Carbon Transition in
Central Asia and the Caucasus: Mapping of Potentially High-impact
Infrastructure Projects and Needs Assessment**

Strategic Infrastructure Planning for Sustainable Development in Turkmenistan

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8. Strategic infrastructure planning for sustainable development in Turkmenistan

Overview

Turkmenistan is an upper-middle income country with the second highest GDP per capita in Central Asia. 91% of Turkmenistan's export are mineral products (primarily gas), and 83% of its exports go to the People's Republic of China. Turkmenistan has one of the most difficult business environments in the region due to pervasive state control, exchange rate restrictions, heavy regulations, absence of rule of law and high corruption levels. Such issues are further exacerbated by limited property rights, lack of private land and a weak judicial system. Despite this, Turkmenistan benefits from large FDI flows, mainly Chinese investments in the oil and gas sector. While its contribution to global GHG is limited, Turkmenistan has one of the most energy-intensive economy due to natural gas seepage from oil and gas exploration, and very high energy subsidies leading to free access to energy in the country.

Despite some large-scale transport projects constructed in the past few years - Turkmenbashi International Sea Port on the Caspian Sea and a railway between Kazakhstan and Iran, Turkmenistan's infrastructure remains weak and logistic costs very high. Energy projects account for 66% of current infrastructure investments, mainly pipelines and cross-border electricity transmission projects. There is no sign that the country is beginning to diversify its electricity generation mix, which relies entirely on natural gas, and investments in transmission and distribution systems have been insufficient to limit leakages. , More transport investments are also needed to reap the economic benefits of its position near major markets in Iran, South Asia and, across the Caspian Sea, the Russian Federation.

Turkmenistan has adopted several strategic documents, such as the *National Socioeconomic Development Programme for 2011-2030* and the *National Climate Change Strategy*. However, its strategic documents are not actionable, since they do not specify which state body takes ultimate responsibility for the delivery of goals, and there are no quantitative – or at least verifiable – goals against which to measure progress on implementation. National legislation has included provisions for environmental impact assessments (EIAs) since 2000 but, in practice, EIAs are regularly carried out without public participation and consultation. In early 2019, Turkmenistan adopted a new institutional set-up to improve the implementation of reforms on transport, communication and industry. This could improve the integrated planning of the country's transport infrastructure, even though the merger between the State Committee on Environmental Protection (formerly an independent ministry) with the Ministry of Agriculture and Water Economy could weaken government's ability to mainstream environment in decision-making.

8.1. State of play: economy, investment and climate change in Turkmenistan

Economy and trade

Table 8.1. Key indicators on Turkmenistan's economy

Population (2018)	5 850 908
Urbanisation rate (2018)	52%
Annual population growth (2018)	1.6%
Surface area	488 100 km ²
GDP (USD, current price, 2018)	40 761 million
GDP per capita (USD, current price, 2018)	6 967
Real GDP growth (year-on-year change, 2019)	6.3%
Inflation (average consumer price, y-o-y change, 2017)	N/A
Exports of goods and services (% of GDP, 2018)	22.7%
Imports of goods and services (% of GDP, 2018)	12.5%
FDI, net inflows (% of GDP, 2017)	6.1%
General government net lending/borrowing (% of GDP, 2019)	0%
Unemployment (% of total labour force, 2018)	3.8%
Remittances (% of GDP, 2018)	0.004%
Transparency, accountability and corruption in the public sector rating (1= most corrupt, 6 = least corrupt, 2017)	N/A

Source: World Bank (2019^[1]), *World Development Indicators (database)*, World Bank, <https://datacatalog.worldbank.org/dataset/world-development-indicators>; IMF (2018^[2]), *World Economic Outlook: October 2018*, International Monetary Fund, https://www.imf.org/external/datamapper/GGXCNL_NGDP@WEO/OEMDC/ADVEC/WEOWORLD

Economy and demographics

Turkmenistan is an upper-middle income country with the second highest GDP per capita in Central Asia. More than half of Turkmenistan's population live in urban areas, and a quarter of the population live in the capital, Ashgabat. Turkmenistan's GDP contracted from USD 3.2 billion in 1991 to USD 2.4 billion in 1996. Starting in 1999, Turkmenistan's economy rapidly expanded and, by 2018, it was more than 12 times as large as in 1991. Over the same period, the country's population steadily increased, from 3.8 million in 1991 to 5.85 million in 2018 (World Bank, 2019^[1]).

Industry, including construction, accounts for the largest portion of Turkmenistan's economy at 57%, the highest share in the region. The service sector makes up a further 28.1%, while agriculture accounts for 9.3% (World Bank, 2019^[1]).

Trade

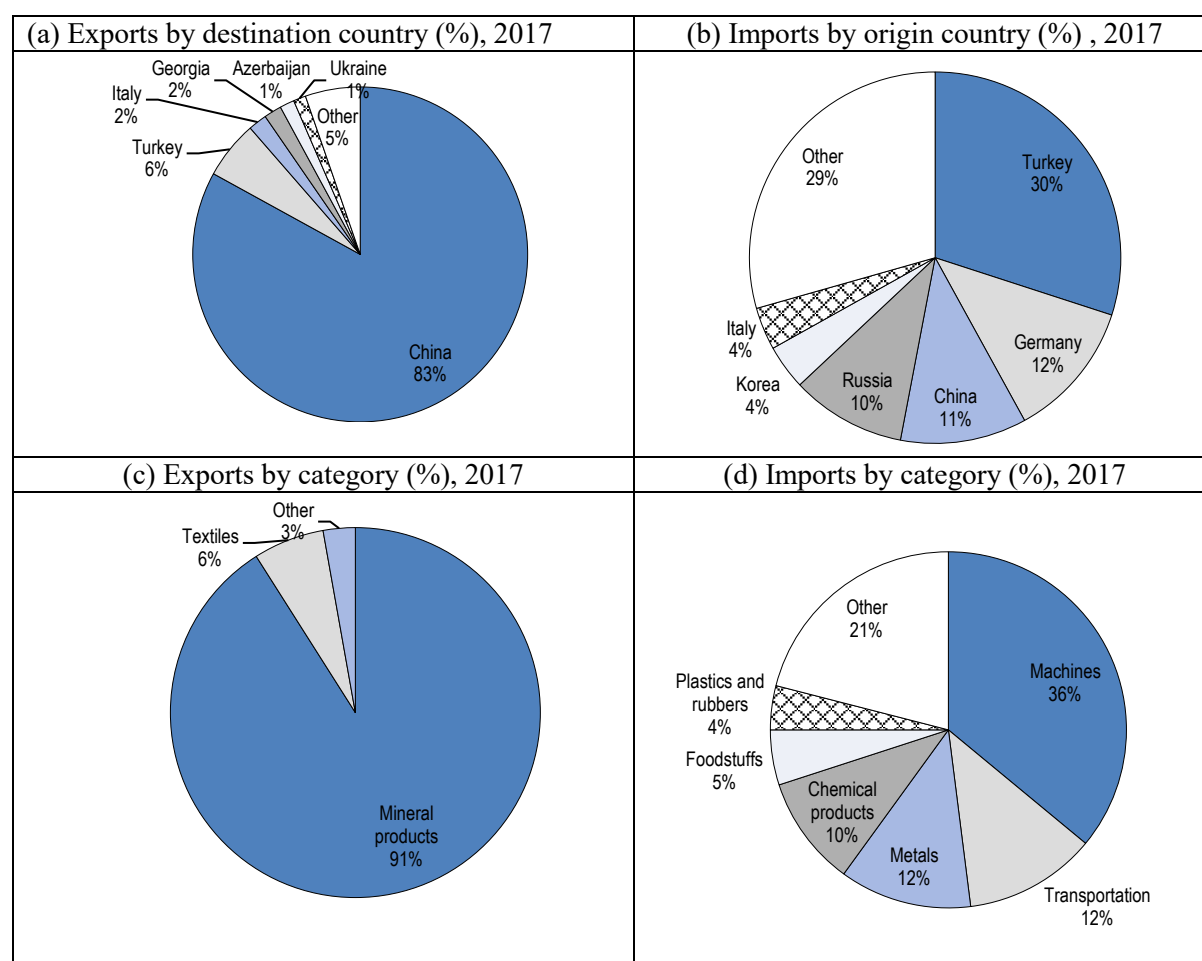
Turkmenistan is not a member of the World Trade Organisation and, unlike fellow regional non-members Azerbaijan and Uzbekistan, it is not an observer to the organisation. Turkmenistan is not a member of the Eurasian Economic Union either.

Petroleum gas alone accounts for 83% of Turkmenistan's exports, and its next largest export (refined petroleum, 5.6%) also falls into the mineral products category that dominates Turkmenistan's export mix (see Figure 8.1(c)). Textiles make up a further 6%, and the two main export products in this category are non-retail pure cotton yarn

(2.2%) and raw cotton (2.1%). All other categories of exports combined amount to just 3% of the country's total. Turkmenistan primarily imports manufactured goods, such as machines (36%), means of transportation (12%), metal products (12%, e.g. iron structures, iron pipes) and chemical products (10%, e.g. packaged medicaments, pesticides) (see Figure 8.1(d)).

The vast majority of Turkmenistan's exports go to the People's Republic of China (83%), and its second-largest export destination, Turkey, receives only 6% of exports (see Figure 8.1(a)). More than half of Turkmenistan's natural gas exports pass through the three existing pipes of the Turkmenistan-China pipeline to Xianjiang in China, and a planned additional pipe will increase capacity to 74-80 billion m³ (Vakulchuk and Overland, 2018^[3]). By contrast, only a fraction of Turkmenistan's exports go to its Central Asian and Caucasian neighbours (Georgia, 2%; Azerbaijan and Kazakhstan, about 1% each). Turkmenistan's imports come mainly from Turkey (30%), the European Union (Germany, 12%; Italy, 4%; France and the Netherlands, 2% each), China (11%) and the Russian Federation (10%) (see Figure 8.1(b)). The government plans to increase trade flows to USD 84 billion of exports and USD 51 billion of imports by 2025 (Big Asia, 2019^[4]).

Figure 8.1. Trade of Turkmenistan



Source: Observatory of Economic Complexity (2017^[5]), *Turkmenistan: Exports, Imports and Trade Partners*, Observatory of Economic Complexity, <https://atlas.media.mit.edu/en/profile/country/tkm/>

Investment climate

Turkmenistan has one of the most difficult business environments in the region due to a complex regulatory framework and unfavourable business practices. The country is not included in the World Bank Doing Business survey due to a lack of data, but the Heritage Foundation's *de jure* measure on the openness to foreign investment¹ reveals that FDI and other cross-border investment restrictions in Turkmenistan are among the highest in Central Asia. The country ranked 164th worldwide in terms of economic freedom in 2019 and received a score of 10 out of 100 on the investment freedom measure of the Index, similar to Uzbekistan (ranked 140th worldwide). The overall restrictions are driven by a number of factors, including heavy state control, restrictions on the exchange rates, heavily restrictive regulations, absence of rule of law and high corruption levels (Economist Intelligence Unit, 2019^[6]). Such issues are further exacerbated by limited property rights, lack of private land, and a weak judicial system which is subordinate to the President.

Investments in Turkmenistan are regulated by the Law on Foreign Investment (amended in 2008), the Law on Investments (amended in 1993), and the Law on Joint Stock Societies (1999). While such laws have been adopted to transform the economy, little has been achieved. Further reforms are needed to improve the investment climate, including the ease of restrictions on entry, exit and operations of enterprises (EBRD, 2014^[7]), as well as reforming the administrative measures, reducing non-tariff barriers and subsidies (World Bank, 2015^[8]). Currently, there exists no one-stop shop to facilitate the registration of businesses and the government has no investment promotion agency.

Turkmenistan benefits from large FDI inflows, especially for a country of its moderate size (US Department of State, 2018^[9]). In 2012, it ranked 9th worldwide in the UNCTAD FDI Attraction Index, which compares countries by the FDI, in absolute terms, that they receive compared relatively to the size of the economy (EBRD, 2014^[7]). Turkmenistan's national statistics committee has not published information on foreign direct investment, but international analysts estimate that the country's largest foreign investor is China (UNESCAP, 2016^[10]) and most investments benefit the oil and gas sector (US Department of State, 2019^[11]). In 2012, China was the largest source of FDI to Turkmenistan (39%), followed by Russia (16%), the Persian Gulf countries (12%), Turkey (9%) and Canada (8%) (see Figure 8.2).

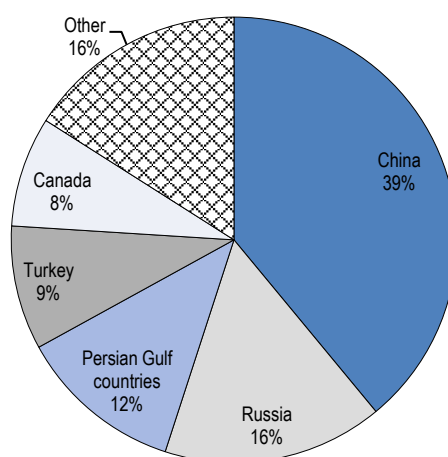
Turkmenistan's total gross external debt as a fraction of GDP has risen from 23.1% in 2016 to 25.9% in 2018 and is projected to reach 27.7% by 2020 (IMF, 2019^[12]). Compared to other regional hydrocarbon exporters, Turkmenistan's debt levels remain quite low.

The development of market conditions and the expansion of the private sector are key components of the second phase (2016-2020) of Turkmenistan's *National Programme of Socio-economic Development of Turkmenistan for 2011-2030* (for more information

¹ The Investment Freedom measure is a component of the Economic Freedom Index developed by the Heritage Foundation and it measures regulatory restrictions on a country's investment regime in the following areas: national treatment of foreign investment, foreign investment code, restrictions on land ownership, sectorial investment restrictions, expropriation of investment without fair compensation, foreign exchange controls and capital controls.

on Turkmenistan's strategic documents, see section 3). By the third phase (2021-2030), Turkmenistan aims to be among the world's highly developed countries and have achieved full integration into the global economy (Ovlyakulieva, 2012^[13]). In the transport sector, the government aims to transform many state-owned enterprises into private companies, while tariffs and policy measures will be set by the Ministry of Industry and Communications, which formed in early 2019 through the merger of four ministries (State News Agency of Turkmenistan, 2019^[14]).

Figure 8.2. FDI in Turkmenistan by source country, 2012

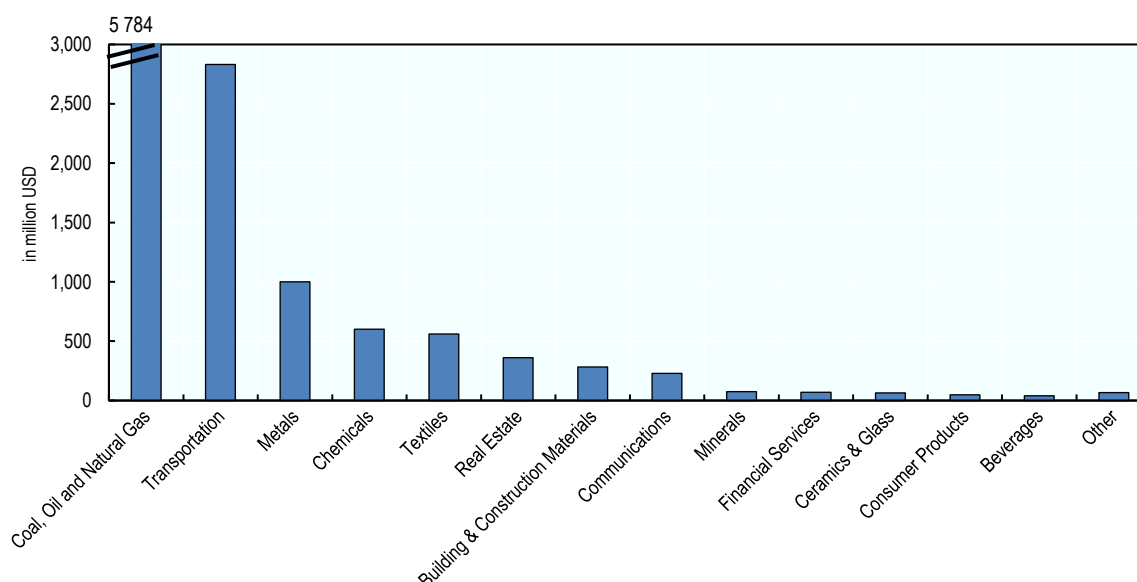


Source: Asian Development Bank Institute (2014^[15]), *Connecting Central Asia with Economic Centers*, Asian Development Bank Institute, <https://www.adb.org/sites/default/files/publication/159307/adbi-connecting-central-asia-economic-centers-final-report.pdf>

Between 2003 and 2017, Turkmenistan attracted over USD 12 billion of announced cross-border greenfield FDI projects, which is higher than some of its peers such as the Kyrgyz Republic (USD 6.2 billion) or Tajikistan (USD 6.9 billion), but lower than Uzbekistan's USD 26.8 billion. Almost half (or USD 5.7 billion) of foreign investments in Turkmenistan are in coal, oil and natural gas, followed by transportation (24%) and metals (10%) (Figure 8.3). In general, other sectors received much lower FDI during this period. For example, chemicals and textiles received a similar amount of around USD 600 million (or 5%), followed by real estate (USD 36.3 million) and building and construction materials (USD 282.2 million). Only around 1% of greenfield FDI projects were in sectors such as minerals, financial services, or ceramics.

Figure 8.3. Greenfield FDI in Turkmenistan by economic activity, 2003-2017

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



Note: Other includes: Industrial Machinery; Equipment & Tools; Food & Tobacco; Automotive OEM; Software & IT services; Non-Automotive Transport OEM; Electronic Components; and Business Services.
Source: OECD based on fDi Markets (2019^[16]), *fDi Markets: the in-depth crossborder investment monitor (database)*, fDi Markets, <https://www.fdimarkets.com/>

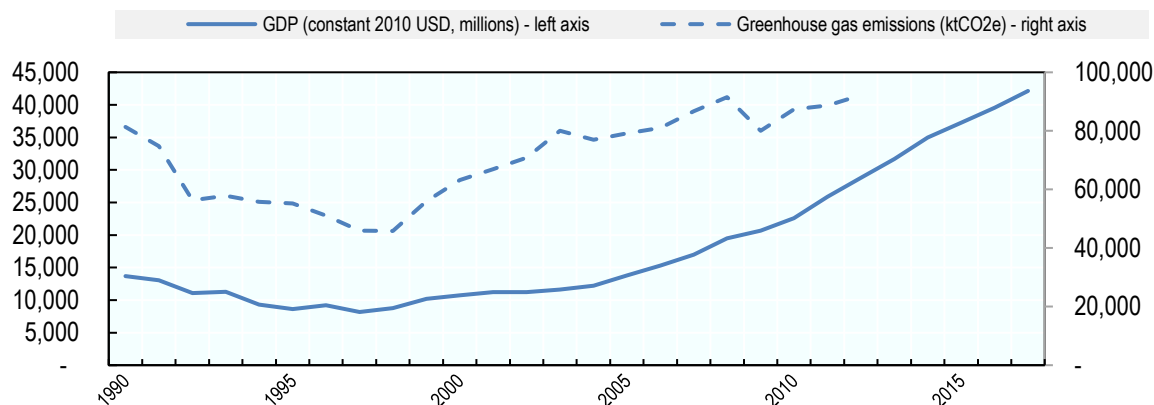
Climate change

Turkmenistan's total greenhouse gas emissions amount to only 0.0017% of global emissions, but its economy is one of the most energy intensive in the former Soviet Union and in the world. In 2012, Turkmenistan emitted 3.2 kgCO₂e per USD of GDP (World Bank, 2019^[11]), but its energy intensity has been gradually declining since then (IEA, 2015^[17]). Energy accounts for about 83% of Turkmenistan's greenhouse gas emissions (Climate Watch, 2019^[18]), 35% of which were emitted as unintended seepage of gases from oil and gas exploitation (OECD, 2016^[19]). Turkmenistan's *National Climate Change Strategy* identifies the reduction of natural gas seepage as a key part of the oil and gas sector's contribution to climate change mitigation (see section 8.3 on Turkmenistan's key strategic documents). After energy, agriculture emits the largest amount of GHG at 7%, while industrial processes emit only 2% and bunker fuels and waste account for the remainder (UNDP, 2012^[20]).

Like many former Soviet Union countries, Turkmenistan's emissions dropped dramatically following independence, but unlike many Central Asian countries Turkmenistan reached its pre-independence emissions as early as 2003 (see Figure 8.4). Between 1998 and 2012, Turkmenistan's GHG emissions doubled (from 45 829 ktCO₂e to 92 178 ktCO₂e), but over the same period the country's GDP more than tripled in size and has since grown to almost five times its 1998 levels. Turkmenistan's per capita

GHG emissions (17.5 tCO₂e) are the second highest in the region after Kazakhstan and are considerably higher than the OECD average (12.9 tCO₂e) (World Bank, 2019^[1]).

Figure 8.4. GHG emissions and GDP of Turkmenistan, 1990-2017



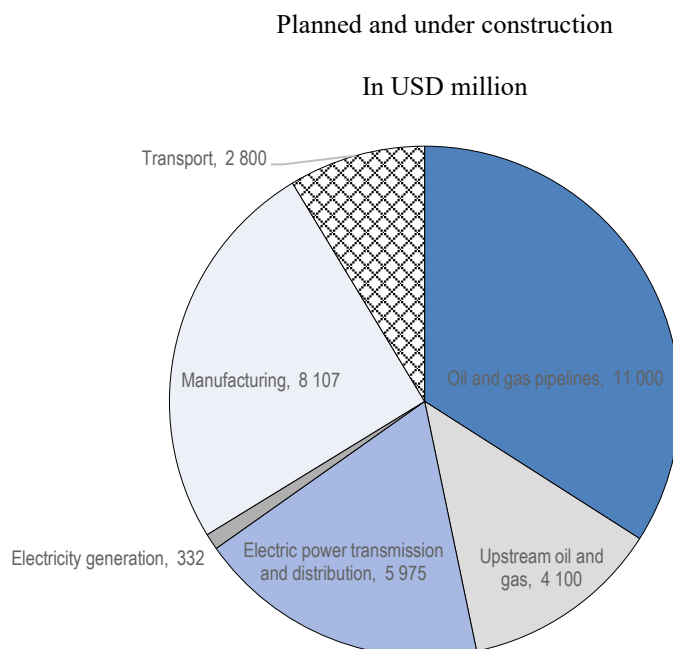
Source: World Bank (2019^[1]), *World Development Indicators (database)*, World Bank, <https://datacatalog.worldbank.org/dataset/world-development-indicators>

Without effective adaptation measures, Turkmenistan could face serious economic setbacks from the impacts of climate change. The agriculture sector is particularly at risk, with potential losses of USD 20.5 billion between 2016 and 2030 (OECD, 2016^[19]). Climate change could also lead to 10% annual increases in floods and mudflows, 5% annual increases in heavy rainfall and gradually increasing heatwaves (at a rate of 1.6% per year) (UNDP, 2012^[20]).

8.2. Turkmenistan's infrastructure needs and current plans

Turkmenistan needs to scale up investment in infrastructure, particularly in the transport sector, to reap the economic benefits of its position near major markets in Iran, South Asia and, across the Caspian Sea, the Russian Federation (ADB, 2017^[21]). Although the country's infrastructure network covers its entire territory, the services it provides are substandard and insufficient (Bertelsmann Stiftung, 2018^[22]). Turkmenistan scores poorly in the World Bank's Logistics Performance Index, with an overall score of 2.34 (out of 5) and a ranking of 142 (of 167 countries surveyed). Turkmenistan's infrastructure quality, according to the Index's infrastructure indicator, is particularly weak with a score of 2.23 (out of 5), on par with the Kyrgyz Republic and only slightly better than Tajikistan (World Bank, 2018^[23]).

The energy sector in particular dominates Turkmenistan's large-scale infrastructure plans. Out of the USD 32.3 billion of investments tracked in recent years, energy projects account for over 66% (USD 21.4 billion) while manufacturing and transport account for 25% and 9% respectively (see Figure 2.2). Nearly half of the total energy investments planned and under construction are large-scale oil and gas pipelines (over USD 11 billion), followed by electric power transmission and distribution (USD 6 billion), upstream oil and gas projects (USD 4.1 billion), and natural gas-fired electric power plants (USD 332 million) (Figure 8.5). Based on the data available, around 80% of these projects are greenfield, 13% brownfield, while for the remaining 7% of the projects the data is not available.

Figure 8.5. Infrastructure projects in Turkmenistan by sector

Note: Transport projects include roads and railways; oil and gas pipelines include large scale cross-border gas pipelines; upstream oil and gas include gas field projects and gas to gasoline projects; electric power, transmission and distribution projects include cross-border and national transmission lines; electricity generation projects includes natural gas-fired electric power plants; manufacturing projects include petrochemical and fertiliser plants.

Source: OECD based on IJGlobal (2019^[24]), ADB (2019^[25]), Dealogic (2019^[26]), and CSIS (2019^[27]) as of April 2019.

Transport

Geographical particularities of Turkmenistan complicate the development of transport infrastructure. It has the second lowest population density in Central Asia after Kazakhstan, at 12.451 people per square kilometre (World Bank, 2019^[1]), and deserts cover about 80% of its territory (EBRD, 2014^[7]). Road and rail construction, therefore, requires additional costs for sand dune fixation to avoid the encroachment of sand on the infrastructure (UNECE, 2012^[28]). The lack of private sector involvement in transport infrastructure construction and operation is another factor in its poor performance. Despite some improvements, domestic road quality impedes the transit of goods and people, and deficient governance and transparency in state-owned rail services contribute to poor service delivery (EBRD, 2014^[7]).

Recent developments in Turkmenistan's transport sector have markedly increased connectivity with its neighbours. In particular, the Turkmenbashi International Sea Port on the Caspian Sea, which was completed in 2018 (Turkmenbashi International Seaport, n.d.^[29]), and a rail link connecting Kazakhstan to Iran via Turkmenistan, which was completed in 2014 (Railway Gazette, 2014^[30]), facilitate regional trade flows. According to Turkmenistan's response to a recent OECD survey, the government has

plans to increase domestic connectivity by constructing high-speed road links between Turkmenbashi and Turkmenabad as well as between Turkmenbashi and Garabogaz.

In the transport sector, Turkmenistan currently does not have a large number of investment projects planned and under construction. According to information available from various datasets, there are three projects for a total of around USD 2.8 billion focusing on cross-border roads and railways (see Table 8.2). In particular, Afghanistan-Turkmenistan-Azerbaijan-Georgia-Turkey Transport Corridor is a multi-modal project focusing on both railways and roads between five countries, including Turkmenistan, which is among the largest planned investments in the country. The project is expected to boost regional integration and increase trade with other countries. Other cross-border projects include the Bereket-Etrek-Turkmenistan-Iran Border Railway and the CAREC Corridor 2, 3 and 6 (Turkmenabat-Mary) Railway Modernization Project both of which are expected to stimulate pro-poor economic growth. In general, transport infrastructure projects are of significant importance for Turkmenistan, to help ease the transportation of bulky goods such as oil and oil products, mineral resources, agricultural products and textiles.

Although multilateral development banks do not have a strong presence in the country, they have nevertheless been financing important cross-border transport projects. For example, the Asian Development Bank has been supporting Turkmenistan over the years to increase connectivity and develop an integrated and efficient railway system to improve connectivity with neighbouring Kazakhstan, the Persian Gulf countries, the Russian Federation and South Asia (ADB, 2018^[31]).

The Ministry of Transport is currently embarking on a railway modernisation program, which involves the construction of new railway lines and rehabilitation of the existing ones. Although there are no quantitative goals, Turkmenistan's *National Climate Change Strategy* lays out the following priorities by 2030: public transport and light rail development; renewal of car fleet with incentives for greater fuel efficiency; movement towards vehicles that run on natural gas; electrification of rail services (UNDP, 2012^[20]).

Table 8.2. Hotspot projects in the transport sector in Turkmenistan

Name	Sub-sector	Description	Project value (USD million)	Funding source	Type of investment
(a) Under construction					
Bereket-Etrek-Turkmenistan-Iran Border Railway (Construction)	Railway	The project is financed by the Islamic Development Bank and includes construction of the railway lines, nine stations as well as a locomotive transfer and maintenance depots in Etrek and Bereket.	700	Islamic Development Bank, others	Greenfield
(b) Planned					
Afghanistan-Turkmenistan-Azerbaijan-Georgia-Turkey Transport Corridor	Railway and roads	The project will connect several cities of the countries involved. For Turkmenistan, it will provide links between the Afghan province of Herat with Ashgabat, and with the Caspian port of Turkmenbashi. As a large cross-border project, it is expected to intensify the economic integration of the region and increase the volume of trade between Turkmenistan and other countries.	2 000	Government of Afghanistan (20%), Government of Turkmenistan (20%), Government of Azerbaijan (20%), Government of Georgia (20%), Government of Turkey (20%)	Greenfield
Central Asia Regional Economic Cooperation Corridors 2, 3 and 6 (Turkmenabat-Mary) Railway Modernization Project	Railway	The project entails a 1147km line from Turkmenabat to Turkmenbashi. In turn, travel costs and environmental costs are expected to be reduced for passenger and freight transport between Turkmenabat and Mary.	100	Asian Development Bank	Brownfield

Note: Refer to the Preamble for the present report's definition of 'hotspot' and other information on how the projects above were selected and prioritised.

Source: OECD analysis based on accessed data from ADB (2019^[25]), IJGlobal (2019^[24]), CSIS (2019^[27]) as of April 2019.

Energy

Turkmenistan's electricity transmission and distribution systems are inefficient, resulting in losses of 12.5% of the power they transport. However, like all other former Soviet Union countries, Turkmenistan has achieved universal access to electricity (World Bank, 2019^[1]).

Turkmenistan is a net exporter of energy, including oil (6.06 Mt in 2015, 4.08 Mt in 2016), electricity (0.28 Mtoe in both 2015 and 2016) and, most importantly, natural gas (43.62 Mtoe in 2015 and 45.06 Mtoe in 2016) (IEA, 2018^[32]). Turkmenistan does not face the same energy security concerns of some of its neighbours, but its economic reliance on natural gas exports exposes the country's economy to fluctuations in gas markets.

Reflecting the abundance of natural gas reserves in the country, Turkmenistan relies on natural gas for the entirety of its electricity generation (22 534 GWh in 2016). In the 1990s, Turkmenistan generated some of its electricity through hydroelectric dams, but

its share declined quickly (700 GWh of hydroelectricity in 1990 down to 4 GWh in 1995) before disappearing altogether.

A particularity of the energy sector in Turkmenistan is the pervasiveness of subsidies, with Turkmen citizens enjoying free access to a set amount of electricity, heat and gas. Although the government guaranteed the continuation of these subsidies until 2030, growing energy demand and government debt have led to increasing momentum within the government to reduce subsidies before 2030 (IEA, 2015^[33]).

Despite the outsized role that natural gas plays in Turkmenistan's economy, energy mix and exports, the government has not convincingly signalled that diversification is a priority. Although Turkmenistan's *National Climate Change Strategy* mentions economic diversification as a future policy direction (UNDP, 2012^[20]), its *Oil and Gas Development Plan to 2030* aims to boost gas production up to 250 billion m³ and oil production to 110 Mt by 2030 (IEA, 2015^[33]).

The *Concept of Electricity Sector Development of Turkmenistan for 2013-2020* envisions high-voltage electricity transmission connections uniting the Turkmen electricity grid and the construction of high-voltage connections with Iran (Mary-Sarakhs-Meshkhed, Balkanabat-Gonbad). The government plans to increase electricity exports to Iran (Turkmen Portal, 2017^[34]).

The *National Climate Change Strategy* highlights the modernisation of gas and oil pipelines as a priority, especially for reducing leakage. For renewables, it calls for small and medium-sized renewable energy generation in remote and sparsely populated regions "in the short-term" which the strategy defines as by 2020. In the medium term (which the strategy defines as 2030) and long term (undefined) it aims to have larger-scale generation and increase the share of renewables in electricity generation but does not set a quantitative target. Currently there are no renewable energy sources in Turkmenistan's energy mix.

Turkmenistan's energy infrastructure projects planned and under construction are large scale, costing over USD 20 billion (see Table 8.3). Given its small domestic market, its large gas reserves (eight trillion cubic meters of proven reserves, ranked 4th in the world) and its excess electricity generation capacity, Turkmenistan's energy projects are mainly in pipelines and cross-border electricity transmission projects, which will allow the country to better access export markets.

One of the flagship projects is the Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline. It stretches over of 1 814 km, reaching from Turkmenistan to India, and aims to supply Turkmen gas (about 33 billion m³ per year) to the large Indian market. Another high-impact project is the 500 km of electricity transmission lines linking Turkmenistan to the Afghani and Pakistani grids, connecting 4 000 MW of power to regional export markets.

Table 8.3. Hotspot projects in the energy sector in Turkmenistan

Name	Sub-sector	Description	Project value (USD million)	Funding source	Type of investment
Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline	Oil and gas pipelines	The gas pipeline will have a length of 1814 km to carry gas from Turkmenistan's Galkynysh field through Afghanistan, Pakistan and India. The pipeline will have an annual capacity of 22 billion cubic meters of gas.	7 000	Turkmengas (85%), Afghan Gas Enterprise (5%), Inter State Gas Systems (5%), GAIL (5%)	Greenfield
Turkmenistan-Afghanistan-Pakistan (TAP) Transmission Line (500 KM)	Electric power transmission and distribution	The project will develop a 500 km electricity grid connecting Turkmenistan-Afghanistan and Pakistan. Upon completion, the project is expected to transfer around 4000 MW of power from Turkmenistan to Afghanistan and Pakistan.	5 300	Government of Turkmenistan (33.33%), Government of Pakistan (33.33%), Government of Afghanistan (33.33%)	Greenfield
South Lolotan Gas Field Second Phase Development	Upstream oil and gas	The project is located in Mary province and is considered the second-largest gas field in the world.	4 100	N/A	Greenfield
East-West Gas Pipeline	Oil and gas pipelines	The project consists of a gas pipeline of over 1 000 kilometres in length from east to the west of Turkmenistan. The project is expected to enhance the country's export capacity.	2 000	Turkmengas (100%)	Greenfield
Trans-Caspian Gas Pipeline	Oil and gas pipelines	The project involves the construction of a 300 km shoreline pipeline along the Caspian with a capacity of 10 billion cubic metres a year. As part of the project, Turkmenistan will export gas to Russia via Kazakhstan.	2 000	Government of Azerbaijan (100%)	Greenfield

Note: Refer to the Preamble for the present report's definition of 'hotspot' and other information on how the projects above were selected and prioritised.

Source: OECD analysis based on accessed data from IJGlobal (2019^[24]) and Dealogic (2019^[26]) as of April 2019.

Industry and mining

Turkmenistan's *National Climate Change Strategy* focuses on energy efficiency measures in industry. Beyond supporting the oil and gas sector and related sectors (refineries, chemicals and petrochemicals), the Strategy calls for further development of non-hydrocarbon industries in Turkmenistan such as vehicle manufacturing, metal

processing, construction material production, light industry and foodstuffs. However, the Strategy does not provide clear qualitative or quantitative goals.

Currently, there are limited industry projects planned or under construction in Turkmenistan but they have a significant investment amount. Table 8.4 shows that the projects that are being currently promoted are in the chemicals and coke and refined petroleum sectors. All these projects are greenfield investments and are being funded either by Korean corporations such as LG Corporation and Hyundai Engineering & Construction, or by domestic companies such as Turkmenhimiya or Turkmengas.

The response from the country to the OECD survey carried out for this study corroborates the information in Table 8.4, and highlights the importance of the following projects: the Kiyanly Project (which will produce 5 billion m³ of natural gas in addition to polyethelene, carbamide and ammonia) and the Garabogaz Fertiliser Plant (which will produce 1 million tonnes of carbamide and 650 thousand tonnes of ammonia annually). Other large-scale projects include the Turkmenbashi oil refinery (which will produce 10 million tonnes of oil per year; production of motor fuel and oil, polypropylene, bitumen), several gas chemical processing plants (e.g. Mary, Ovadandepe) and chemical processing plants (Balkanabad iodine factory, Hazar chemical factory).

Table 8.4. Hotspot projects in the industry sector in Turkmenistan

Name	Sub-sector	Description	Project value (USD million)	Funding source	Type of investment
Turkmen Kiyanly Project	Coke and refined petroleum	The project involves the construction of a gas-to-liquids plant in Kiyanly with an annual capacity of 600 000 tonnes of synthetic fuel.	3 500	LG Corporation, Hyundai Engineering & Construction	Greenfield
Seidi Petrochemical Plant	Chemicals	The project will develop a petrochemical plant in Seidi that is expected to produce 290 000 tonnes of polyvinyl chloride and 190 000 tonnes of sodium hydrate a year.	2 000	LG Corporation, Hyundai Engineering & Construction	Greenfield
Garabogaz Fertiliser Plant	Chemicals	The project will develop a fertiliser plant in Garabogaz producing 2 000 metric tonnes per day of ammonia and 3 500 tonnes of urea using existing gas fields produced by Turkmengas.	1 365	Turkmenhimiya	Greenfield
Turkmenistan Gas to Gasoline Project	Coke and refined petroleum	The project will build a gas-to-liquids plant in Obadan, processing 1 785 billion cubic metres of natural gas per year. It is expected to produce 600 000 tonnes of gasoline per annum.	1 241	Turkmengas	Greenfield

Note: Refer to the Preamble for the present report's definition of 'hotspot' and other information on how the projects above were selected and prioritised.

Source: OECD analysis based on accessed data from IJGlobal (2019^[24]) accessed as of April 2019.

8.3. 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

Turkmenistan has adopted several strategic documents, one of the most notable being its *National Socioeconomic Development Programme for 2011-2030* in 2010 (see Table 8.5), which has since been supplemented with a shorter-term document for 2019-2025. While these documents present a vision of Turkmenistan's future development, notably to diversify its economy away from reliance on natural gas, they do not offer a concrete set of intermediate steps. In general, Turkmenistan's strategic documents are not actionable, since they do not specify which state body takes ultimate responsibility for the delivery of goals, and there are no quantitative – or at least verifiable – goals against which to measure progress on implementation.

Turkmenistan's *National Climate Change Strategy* suffers from similar deficiencies. Although it sets out a vision for Turkmenistan's future economic development in which renewables play a role in the country's energy mix and high-tech sectors ease economic dependence on fossil fuels, the plan for achieving these goals is largely absent. The government is currently updating the strategy (Dolgova, 2018^[35]), and it could consider setting more concrete, actionable goals and clearly identifying which government bodies are responsible for progress towards them.

In addition to the multitude of strategic documents, national legislation has included provisions for environmental impact assessments (EIAs) since 2000 but, in practice, EIAs are regularly carried out without public participation and consultation. Without the application of public participation procedures, stakeholder concerns risk being ignored in the development of infrastructure projects, which cuts planners off from valuable public feedback and criticism. The government has not yet adopted legislation on strategic environmental assessments (SEAs) and does not carry out such assessments (UNECE, 2012^[28]).

The public lacks access to key information relating to government policy, environmental regulations and the state of the environment. The government does not publish the texts of regulations or government decisions online, and the State Committee on Statistics does not make its data available to the public. Although the government publishes legislation on its website, it does not provide a search function or classification system to help the public find relevant laws (State News Agency of Turkmenistan, n.d.^[36]).

Although Turkmenistan is a party to the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (the Aarhus Convention), it does not comply with its obligations (UNECE, 2012^[28]). The government could make efforts to bring its practices in line with the Convention and establish accessible, user-friendly platforms where the public can access relevant information.

Institutional set-up and decision making processes

Turkmenistan has combined a number of independent ministries in order to streamline governance. In early 2019, several ministries (the industry-related divisions of the Ministry of Energy and Industry as well as the Ministry of Road Transport, the Ministry of Railway Transportation and the Ministry of Communications) were merged into a

new ministry, the Ministry of Industry and Communication. The government undertook this consolidation in part to improve implementation of reforms on policies related to transport, communications and industry (State News Agency of Turkmenistan, 2019^[14]). If the integration of the formerly independent ministries allows for more effective policy coordination, Turkmenistan's new institutional set-up could improve the integrated planning of the country's transport infrastructure.

It has also merged the State Committee on Environmental Protection (formerly an independent ministry) with the Ministry of Agriculture and Water Economy (which itself was formed from two separate ministries) to form the Ministry of Agriculture and Nature Protection in January 2019 (Turkmen Portal, 2019^[37]). There is a risk that environmental policy will not stand as high on the newly formed ministry's agenda, and the government should ensure that the new institutional set-up does not weaken the government's ability to take environmental policy into account in policy making.

Temporary inter-sectoral coordination bodies do exist in the form of State Commissions, which the President can establish on an ad hoc basis for crosscutting challenges, such as climate change. As a rule State Commissions meet only irregularly and bureaucratic complexity combined with a lack of resources hamper the implementation of their decisions (UNECE, 2012^[28]). The President has created State Commissions on climate change, for issues related to the Caspian Sea and for implementing the Turkmenistan's commitments under UN environmental conventions and programmes.

State Commissions consist of representatives from relevant ministries, other state bodies and state-owned enterprises, but information on the current composition of the environment-related state commissions is not publicly available. Depending on the State Commission on Climate Change's current structure, it could have the potential to serve as an effective tool in coordinating government action and integrating climate concerns across ministerial portfolios. However, UNECE identified irregular meetings and a lack of assigned resources as major barriers to the efficacy of State Commissions in pursuing policy objectives (UNECE, 2012^[28]).

List of relevant strategic documents

Table 8.5. Main strategic documents in force

	Status	Time Horizon	Sectoral Coverage	Main objectives
First Nationally Determined Contribution (NDC)	Submitted in 2016	2016-2030	Economy-wide	<ul style="list-style-type: none"> Unconditional Target: GHG will significantly lag behind GDP growth Conditional Target: achieve zero growth in GHG emissions and even reduce them by 2030 Main sectors for emission reduction: Energy (oil and gas is the main source of GHG emissions, therefore a move towards alternative energy sources is vital as well as increasing efficiency and energy conservation), Industry (ensuring industrial processes become more efficient with low emission production), Transport (move towards more modern, less emission intensive transport infrastructure) Adaptation priorities: <i>National Socioeconomic Development Programme</i>

				<i>for 2011-2030 and the National Climate Change Strategy as well as other strategic documents</i>
National Climate Change Strategy	Adopted in 2012	No defined timeframe	Governance, planning, transport, energy, water, industry	<ul style="list-style-type: none"> Promote economic diversification Increase the share of renewable energy, with a focus on developing small and medium sized renewable energy generation facilities in sparsely populated areas in the short-term (by 2020) Modernise gas and oil pipelines to decrease seepage of natural gas Promote development of non-hydrocarbon industries Develop and promote the use of modern irrigation systems Improve public transit and provide incentives for greater fuel efficiency Develop a light rail system and ensure electrification of current rail services
National Socioeconomic Development Programme for 2011-2030	Adopted in 2010	2011-2030	Governance, planning, energy, industry, transport	<ul style="list-style-type: none"> Aim to diversify the economy, in part reducing reliance on natural gas Improve the investment climate Promote the expansion of the private sector Modernise industrial production with the use of new technology Accelerate growth of the production potential of the chemical and light industry
Concept of Electricity Sector Development of Turkmenistan for 2013-2020	Adopted in 2013	2013-2020	Energy	<ul style="list-style-type: none"> Construction of new gas turbine power plants and rehabilitation of current plants Installation of high-voltage electricity transmission lines in order to unite Turkmenistan's electricity grid Construct high-voltage connections with Iran to increase electricity exports

Table 8.6. Other relevant documents

	Status	Time Horizon	Sectoral Coverage
National Environmental Action Plan for 2002-2010	Adopted in 2002	2002-2010	Multi-sector
Biodiversity Strategy and Action Plan of Turkmenistan for 2002-2010	Adopted in 2002	2002-2010	Multi-sector
National Caspian Action Plan for 2008-2011	Adopted in 2008	2008-2011	Multi-sector
Programme of Development of Economic, Financial and Banking Systems of Turkmenistan for 2012-2016	Adopted in 2012	2012-2016	Multi-sector
Programme of Development of an Intellectual Property System of Turkmenistan for 2015-2020	Adopted in 2015	2015-2020	Multi-sector
Concept of the Foreign Policy of Turkmenistan for 2017-2023	Adopted in 2017	2017-2023	Multi-sector
Concept of Development of the Digital Economy of Turkmenistan for 2019-2025	Adopted in 2018	2019-2025	Multi-sector

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