

# COUNTRY ANALYSIS BRIEFS

## Turkmenistan

Last Updated: January 2012

### Background

***Lack of sufficient foreign investment, geographical challenges, inadequate export pipeline infrastructure, and a rigid economic structure are factors that have deterred the country from becoming a major hydrocarbon exporter.***

Turkmenistan has some of the largest natural gas reserves in the world, yet the country faces a myriad of challenges in bringing those reserves to world markets. It is geographically far from end-use markets and lacks sufficient pipeline infrastructure to export more hydrocarbons. Also, other hydrocarbon-rich Central Asian and Caspian states with more favorable investment climates and greater access to markets pose competition for Turkmenistan. The country is eager to diversify export routes for its oil and gas resources outside of the pipelines going to Russia, but must obtain capital, technical assistance, and political support for alternative pipelines.

After about 15 years of isolation and a political regime change, Turkmenistan began the process of renewing diplomatic relations with several countries including Russia, China, Europe, the US, and other Central Asian neighbors in 2007. Foreign energy firms experienced extreme political challenges and investment impasses prior to 2007, and several exited the country leaving a dearth of investment. Since then, Turkmenistan created a more business-friendly environment, attempting to attract foreign investment to increase both oil and gas production and expand its export portfolio.



### Oil

***Oil production from Turkmenistan has increased gradually since 2007 and is highly dependent on new investment and technological capacity to bring new fields online as well as resolving Caspian Sea maritime boundary disputes. The country remains a small net oil exporter.***

Turkmenistan had proven oil reserves of roughly 600 million barrels in January 2012 based on estimates by *Oil and Gas Journal (OGJ)*. Most of the country's oilfields are situated in the South Caspian Basin and the Garashyzyk onshore area in the west of the country. In addition, Turkmenistan claims its section of the Caspian Sea contains 80.6 billion barrels of oil, though much is unexplored.



Source: IEA

### Oil and Gas Sector Organization

In 1998, Turkmenistan restructured the Oil and Gas Ministry to include five state-run companies, which control the country's hydrocarbon activities. These companies include the following: Turkmenneftegaz (controls purchases, distribution, and exports of both fuels and oil refining); Turkmenneft (produces oil in the western region of the country); Turkmengaz (produces gas); Turkmenneftegazstroi (construction company for hydrocarbon industry); and Turkmengeologia (conducts hydrocarbon exploration).

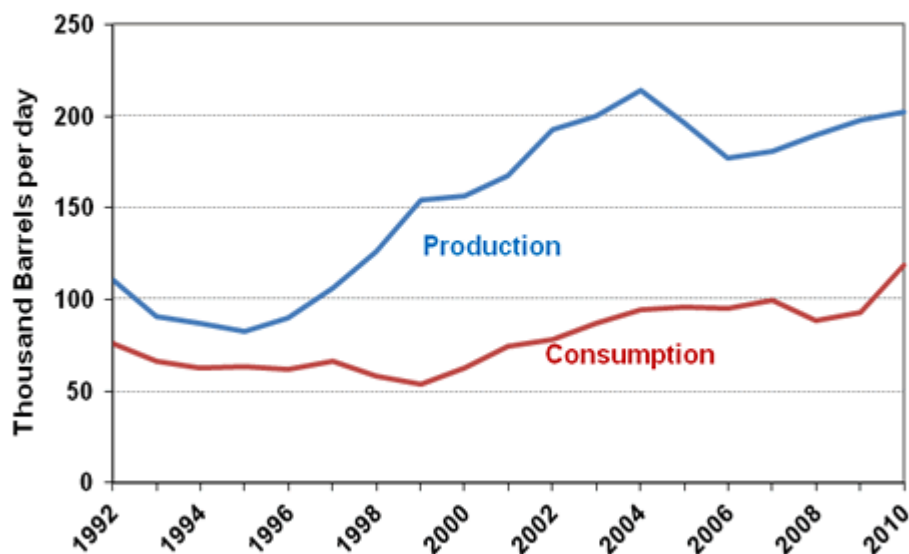
Seeking to attract more foreign investment and diversify export routes, the Turkmen government began reforming the country's energy sector and regulatory environment. In March 2007, the government established a hydrocarbon regulatory authority, State Agency on Management and Use of Hydrocarbon Resources, to issue licenses and contracts for oil and gas field development and provide greater revenue transparency. In 2008, Turkmenistan also passed a Hydrocarbon Law to provide greater legal transparency in ownership of oil and gas projects. According to the World Bank, foreign direct investment in Turkmenistan was \$1.4 billion in 2009, up 65 percent from 2008, and country officials anticipate higher investment in the future.

International companies can participate in joint ventures (JVs) or production sharing agreements (PSAs) with Turkmenneft for offshore oil and gas blocks in the Caspian Sea. Turkmenistan currently limits investment opportunities for international companies to offshore oil and gas developments, with exception for the PSA with China vis-à-vis the Bagtyarlyk onshore natural gas project in the country's southeastern region. In 2009, the Turkmen government signed several PSAs with foreign companies, including Russia's Itera and Germany's RWE, for offshore field development in the Caspian Sea.

### Exploration and Production

Turkmenistan's oil production has increased from 110,000 bbl/d in 1992 to approximately 202,000 barrels per day (bbl/d) in 2010. Production peaked at 213,000 bbl/d in 2004 before declining slightly. Short-term forecasts keep production relatively flat through 2013. About half of production is slated for the domestic market that consumed slightly more than 100,000 bbl/d.

### Turkmenistan's Total Oil Production and Consumption, 1992-2010



Sources: EIA International Energy Statistics

Oil deposits are located in disputed areas of the Caspian Sea, and without an agreement between Iran, Azerbaijan, and Turkmenistan on maritime boundaries, these fields likely will remain undeveloped. The disputed Kyapaz-Serdar oil and gas field linking the Turkmen and Azeri maritime border in the Caspian Sea holds between 367 and 700 million barrels of recoverable reserves, according to various sources. Turkmenistan sought international arbitration to settle the boundary dispute with Azerbaijan in 2009, though this issue alongside Turkmenistan's claims to portions of the Azeri and Chirag fields being developed by Azerbaijan, are still unresolved.

Since 2007, the Turkmen government began engaging with several foreign oil companies to develop Turkmenistan's part of the Caspian shelf. The table below is a snapshot of current oil agreements signed with foreign investors.

Turkmenistan's Oil Projects and Investments			
Company	Development / Field	Production	Contract Details
Burren Energy (Purchased by Eni in 2008)	Onshore - Nebit Dag	12,000 bbl/d in 2010	PSA until 2022 with 10-year extension
Petronas	Offshore - Diyarbekir	6,000 bbl/d in 2010	
Dragon Oil	Offshore - Cheleken block	47,211 bbl/d in 2010 (3 times level in 2002)	\$454 million invested by Dragon Oil in 2010
Itera and Zarubezhneft	Offshore - Block 21	Phase 1 of exploration complete	License signed in 2009
RWE Dea	Offshore - Block 23		License issued in 2009

Sources: Global Insight, IEA, and trade press

The government is working towards increasing oil production, but the sector struggles to meet its growth goals due to a shifting interest to natural gas production, lagging foreign investment, and heavy competition for investment within the Caspian region. According to Turkmen officials, the country aims to produce over 1.3 million bbl/d in offshore and onshore oil by 2030; however other industry sources forecast that production will be less than 300,000 bbl/d in this period. Most of the production growth in recent years is from Dragon Oil's offshore block (from United Arab Emirates), offshore Cheleken block and Eni's Nebit Dag field in the onshore western area. Dragon Oil realized a production increase of 25 percent in the Cheleken block in the first half of 2011 and anticipates doubling its oil production in

Turkmenistan to 100,000 bbl/d by 2015.

### Refining

Turkmenistan has two major refineries, the Seidi (Chardzhou) and Turkmenbashi, with a combined total capacity of 237,000 bbl/d. According to IHS Global Insight, Turkmenistan's refinery system has a low utilization rate of about 50 percent of capacity. Foreign oil companies generally export their share as crude oil while Turkmen companies usually refine its crude oil production for domestic use or for petroleum product exports. The government announced plans to construct three more refineries, expand capacity at the current refineries, and raise the total capacity to 600,000 bbl/d by 2030 based on the country's goal of increasing production during this timeframe.

### Oil Exports

Turkmenistan is a small net exporter of crude and refined oil. Oil export options for Turkmenistan are limited. Turkmenistan has almost no international oil pipelines apart from a cross-border pipeline in the east running from Kazakhstan and Uzbekistan where Turkmenistan can import Uzbek crude oil to feed the Chardzhou refinery. A small amount of crude oil is exported from Turkmenistan across the Caspian Sea to Azerbaijan and the Russian port of Makhachkala. Securing pipeline access in Russia has been a problem due to the poor quality of some Turkmen crude.

A portion of Turkmenistan's total petroleum exports is in the form of refined products. EIA reports exports of crude and total refined products were 48 bbl/d and 74 bbl/d, respectively, in 2008.

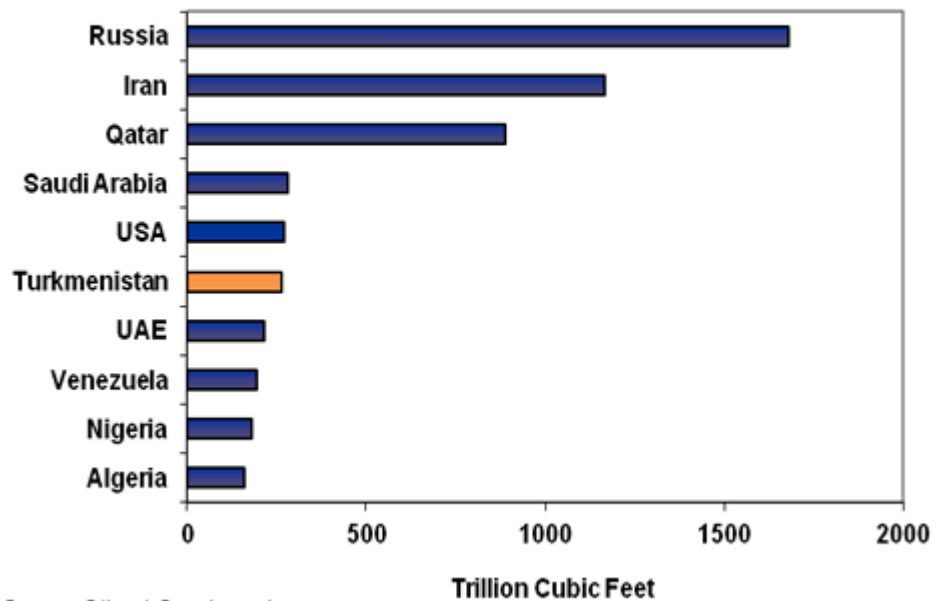
Dragon Oil held an oil swap deal with Iran from 1998 until 2010. Under this agreement, Dragon Oil transferred over half of its crude oil production in Turkmenistan to northern Iranian refineries in exchange for equal volumes exported from the Persian Gulf. In 2010, Dragon Oil stopped sending oil to Iran due to tighter international sanctions on Iran and diverted the volumes to Azerbaijan and the Baku-Tbilisi-Ceyhan pipeline.

## Natural Gas

***Turkmenistan has large amounts of natural gas reserves, but is currently constrained by the lack of available natural gas transportation infrastructure.***

Turkmenistan currently ranks in the top six countries for natural gas reserves and the top 20 in terms of gas production. According to *OGJ*, Turkmenistan has proven natural gas reserves of approximately 265 Trillion cubic feet (Tcf) in 2012, a significant increase from 94 Tcf estimated in 2009. Turkmenistan has several of the world's largest gas fields, including 10 with over 3.5 Tcf of reserves located primarily in the Amu Darya basin in the southeast, the Murgab Basin, and the South Caspian basin in the west. Recent major discoveries at South Yolotan in the prolific eastern part of the country are expected to offset most declines in other large, mature gas fields and will likely add to the current proven reserve amounts.

### Top Global Natural Gas Reserves by Country, January 1, 2012



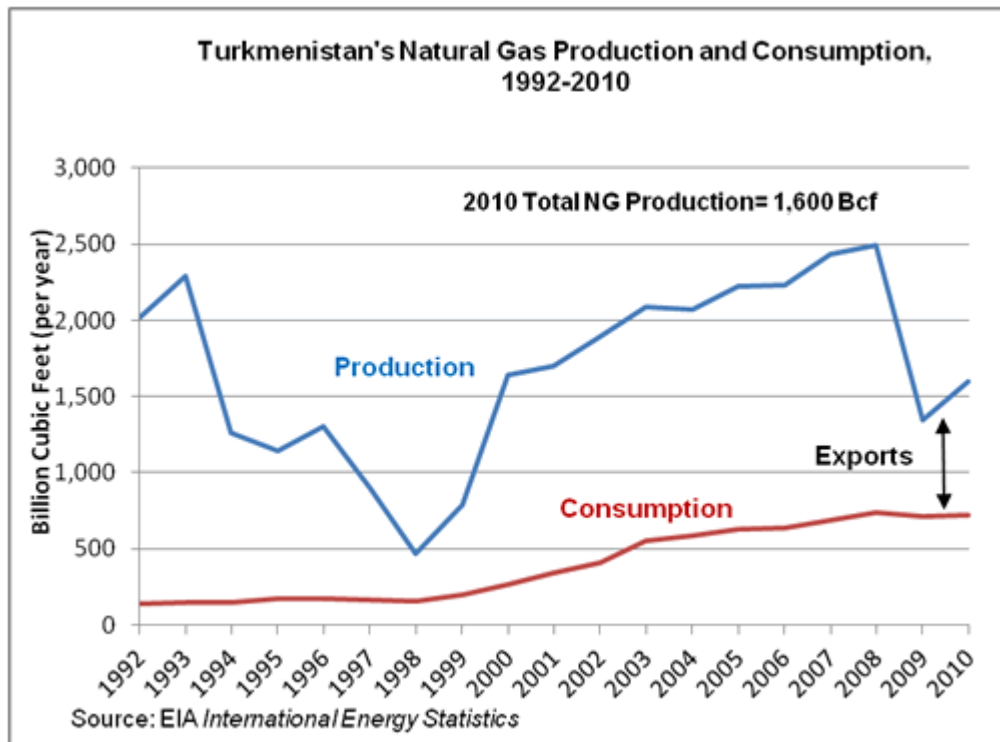
Natural gas plays a significant role in Turkmenistan's overall energy consumption. The country's consumption of total primary energy for Turkmenistan reached 1 quadrillion Btu in 2008. Of this amount, approximately 78 percent (0.78 quadrillion Btu) was from natural gas, while 22 percent of the market share (0.22 quadrillion Btu) was from petroleum products. According to the International Energy Agency, roughly one-third of the country's gas fuels power generation while another third helps to operate the gas industry's upstream and processing sector. All of Turkmenistan's power generation facilities are gas-fired.

### Exploration and Production

Despite vast gas reserves, limited export and investment options pose challenges to monetizing and producing gas resources. A majority of Turkmen gas travels to Russia where it is consumed or transits through Russia to end markets in Europe. Since 1992, Russia, the key export market for Turkmenistan, has exerted significant influence over export prices of gas resources charged by the Central Asian state. As a result of a pipeline explosion on the Central Asian Center export pipeline to Russia in April 2009, Turkmen gas production was shut in and suffered serious declines. Gas production fell almost 50 percent from a high of 2.5 Tcf/y in 2008 to 1.3 Tcf/y in 2009. Following the pipeline repair and a new pricing agreement signed with Russia in January 2010, Turkmenistan raised production to 1.6 Tcf/y in 2010 from 1.3 Tcf/y in 2009. However, Russia agreed to accept about 400 Bcf/y or only one-third of the volumes it imported prior to the explosion and at a lower import price, resulting from its declining exports to Europe.

Turkmenistan is seeking ways to boost gas production as well as release the current shut-in gas volume by diversifying its portfolio of export markets. The country anticipates increasing production as exports via new pipelines to China and Iran ramp up.

In November 2010, Turkmenistan's Ministry of Oil, Gas, and Mineral Resources said the country's energy strategy is to more than triple gas production to over 8.1 Tcf/y by 2030. Most of the gas available for future development is high in hydrogen sulfide and carbon dioxide and has a greater pressure and temperature, and these factors pose technical challenges, requiring greater capital costs for exploration and development.



The Dauletabad field, located in the Amu Darya basin in the southeast, is one of Turkmenistan's largest and oldest gas-producing fields with estimated reserves of 60 Tcf. The field produced approximately 1.2 Tcf/y in 2010 or most of Turkmenistan's gas supply, however, production is declining.

CNPC is the only foreign company with direct access to an onshore development, the Bagtyiarlyk project near the Amu Darya River, through a 35-year production sharing agreement. The project came online at the end of 2009 with a capacity of 182 Billion cubic feet (Bcf) per year and began feeding gas to the Central Asia China pipeline. By 2012, the field is expected to ramp up production capacity to 460 Bcf/y to supply gas to China.

In 2006, Turkmenistan announced the discovery of the South Yolotan deposit, located in the southeastern Murgab Basin north of the Dauletabad field. An independent audit estimated in October 2011 that the field's potential reserves are at least 460 Tcf and possibly as high as 740 Tcf, which would make South Yolotan the second largest field in the world. In order to aid in financing the field development, the China Development Bank provided a \$4 billion loan in 2009 for the project's first phase of development, and, in 2011, pledged another \$4.1 billion for the second phase. Industry analysts expect the field to be online by 2013 and to export gas via the Central Asia-China Pipeline.

The Turkmen government is open to foreign investment and ownership in oil and gas fields in the country's offshore section of the Caspian Sea. Most gas from the Caspian Sea is associated with oil production and is currently flared until companies can monetize the supply. Petronas and Dragon Oil produce gas through their respective PSAs in the Diyarbekir (Block 1) and Cheleken fields. Petronas currently flares gas from Block 1 while the company seeks ways to commercialize production. Turkmengaz signed a gas purchase agreement in July 2011 with Petronas, and Malaysia and Turkmenistan signed a cooperation agreement enabling Petronas to build a 360 Bcf/y-capacity gas processing plant on the Caspian coast to receive the gas from Block 1.

### Exports

Turkmenistan has become a leading gas exporter in the Caspian and Central Asian region. The country exports a majority of its gas because production rates are more than double domestic demand estimated at 720 Bcf/y in 2010. The International Energy Agency forecasts exports will rebound and rise to about 3,180 Bcf/y by 2035.

Turkmenistan signed several agreements between 2007 and 2009 with international parties interested in tapping its gas reserves and developing pipeline infrastructure. Turkmenistan has historically relied on Russia as the primary export market and transit country for its gas, though recently constructed pipeline routes to China and Iran have opened new opportunities. In 2009, Turkmenistan exported 636



Bcf/y, dropping from over 1,700 Bcf/y in 2007 and 2008, as a result of the supply disruption to Russia discussed in the Exploration and Production section.

At the beginning of 2008, Turkmenistan ceased sending supplies to Iran due to a gas dispute; however, the countries signed a new agreement in February 2009. Iran agreed to import 350 Bcf/y, though imported only 177 Bcf/y that year. This amount is expected to increase as Turkmenistan tries to offset the fall in exports to Russia and fill capacity on a second pipeline to Iran commissioned in 2010. Total capacity for both pipelines is 700 Bcf/y.

China began importing Turkmen gas at the end of 2009 and expects to increase supplies as the pipeline capacity and production levels increase. In July 2007, China signed a 30-year gas purchase agreement with Turkmenistan to take 1,100 Bcf/y. CNPC's fields in the Amu Darya/Bagtyarlyk contract area should supply about 460 Bcf/y of the gas with the remaining 600 Bcf/y of contract exports to come from existing fields and the South Yolotan. China and Turkmenistan signed another agreement in late 2011 that could add another 1,200 Bcf/y, bringing the total potential volume of gas exports to China to nearly 2,300 Bcf/y.



Source: IEA

### Pipelines

In an effort to open up more export routes in addition to the main pipeline to Russia, Turkmenistan has partnered with other countries to build gas infrastructure and pipelines. Two pipelines to Iran and China began operations recently, and other routes are under consideration. Maximum existing gas export capacity from Turkmenistan is now close to 3,500 Bcf/y.

#### *Central Asia Center Pipeline (CAC)*

The Central Asia-Center pipeline is the key route through which Turkmenistan exports its gas to Russia and Gazprom's natural gas system. The western branch delivers Turkmen natural gas from near the Caspian Sea region to the north, while the eastern branch pipes natural gas from eastern Turkmenistan and southern Uzbekistan to western Kazakhstan. Both branches have a combined design capacity of 3,530 Bcf/y; however, because of the poor technical conditions, actual capacity is about half of this amount.

#### *Korppezhe-Kurt Kui Pipeline (Turkmenistan to Iran)*

This 120-mile (200-kilometer) pipeline was built in 1997 and was the first Central Asian natural gas pipeline to bypass Russia. With a capacity of almost 477 Bcf/y, Turkmenistan has been able to supply Iran with roughly 212 Bcf of natural gas per year. The terms of the 25-year contract between the two countries stipulates that 35 percent of Turkmen supplies are allocated as payment for Iran's contribution to building the pipeline.

#### *[Dauletabad-Khangiran Pipeline \(Turkmenistan to Iran\)](#)*

A second pipeline with a capacity of 212 Bcf/y to Iran was initiated in January 2010, enabling Turkmenistan to expand its export options. The second phase of the \$550 million pipeline project was inaugurated in November 2010, which should raise capacity to 424 Bcf/y.

#### *[Central Asia-China Pipeline \(Turkmenistan to China\)](#)*

CNPC established the Sino-Turkmenistan Gas Pipe Corporation to construct a 1,140-mile (1,833-kilometer) gas export pipeline from Turkmenistan's eastern fields through Uzbekistan to western China and the interconnection with China's West-East pipeline. CNPC originally anticipated transporting up to 1,060 Bcf/y of gas on the Central Asia-China Pipeline which began operations in December 2009. However, in mid-2011, CNPC announced the pipeline's capacity could rise to over 2,100 Bcf/y by 2015. The inter-governmental gas supply deal between China and Turkmenistan includes the 35-year Bagtyyarlyk PSA, providing 460 Bcf/y from the Chinese production share and 600 Bcf/y from Turkmenistan's other southeastern gas fields such as South Yolotan.

#### *[Bukhara-Urals Pipeline](#)*

Lack of maintenance on the CAC caused Uzbekistan to re-open the moth-balled Bukhara-Urals Pipeline in 2001 to transit increasing volumes of Turkmen gas. This pipeline runs from the Dauletabad field in Turkmenistan through Uzbekistan and Kazakhstan to Orsk, Russia. The pipeline capacity is currently 706 Bcf/y; however, it operates at only a quarter of the capacity at around 177 Bcf/y, and is in need of modernization.

#### *[East-West Pipeline](#)*

Turkmenistan initiated the construction of the East-West Pipeline in May 2010 to connect Turkmenistan's southeastern gas fields to the Caspian Sea and serve as a potential transit link to Europe via routes along the Caspian. The pipeline capacity is expected to be 1,060 Bcf/y, coming on stream in mid-2015.

#### *[Turkmenistan-Afghanistan-Pakistan-India Pipeline \(TAPI\)](#)*

An additional way for Caspian region exporters to supply Asian demand would be to pipe oil and natural gas through Iran to the Persian Gulf, or southwest to Afghanistan. The Afghanistan option, which Turkmenistan has been promoting, would entail building pipelines across Afghan territory to reach markets in Pakistan and possibly India. The Trans-Afghan pipeline, also called the Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline, would span over 1,000 miles from a point in Turkmenistan to Fazilka (India) on the Pakistan-India border and have a proposed capacity of over 1,200 Bcf/y. Major issues holding up construction are supply security concerns, uncertainty of pricing and fees, and lack of financial commitments. India and Pakistan suggested paying below market prices, and finalization of the sales and purchase agreements presents a challenge to the negotiations.

The four countries involved signed a Gas Pipeline Framework Agreement and Inter-Governmental Agreement in December 2010, and Turkmenistan and Pakistan signed a Heads of Agreement in November 2011 regarding import prices. However, the likelihood of such a pipeline coming online in the next few years is very slim due to the logistical and security challenges.

#### *[Trans-Caspian Pipeline \(TCGP\)](#)*

A proposal to build the Trans-Caspian Pipeline would bypass both Russia and Iran to carry Turkmen gas across the Caspian Sea to Azerbaijan and connect with pipelines en route to Europe. This proposed 1,060-Bcf pipeline could connect to the South Caucasus pipeline flowing gas to Turkey and then to the planned Nabucco pipeline to southeastern Europe. Disputes over Caspian seabed jurisdiction between Turkmenistan and Azerbaijan could complicate the project's viability.

## Links

### EIA Links

[EIA: Country Information on Azerbaijan](#)

[EIA: Country Information on Iran](#)

[EIA: Country Information on Kazakhstan](#)

[EIA: Country Information on Russia](#)

[Oil and Gas Resources of the Fergana Basin-EIA](#)

### U.S. Government

[CIA World Factbook](#)

[U.S. Department of Energy, Office of Fossil Energy: International Affairs](#)

[U.S. International Trade Administration, Energy Division](#)



[U.S. Agency for International Development](#)  
[U.S. Department of State – Turkmenistan](#)  
[U.S. National Oceanic and Atmospheric Administration](#)  
[Radio Free Europe/Radio Liberty \(RFE/RL\)](#)  
[U.S. Embassy in Turkmenistan](#)

### **General Information**

[Central Asia to China Gas](#)  
[EurasiaNet.org--News and Analysis from Central Asia and the Caucasus](#)  
[Asian Development Bank](#)  
[Eurasianet.org - Country Summaries and news articles](#)  
[International Crisis Group](#)  
[World Bank data](#)  
[UNDP](#)  
[News Central Asia](#)  
[Interfax News Agency](#)

### **Associations and Institutions**

[CNPC](#)  
[Government of Turkmenistan](#)  
[Government of Uzbekistan](#)

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PFC Energy  
Platt's Oilgram News  
Reuters  
Rigzone  
Russia Petroleum Investor  
U.S. Energy Information Administration  
The World Bank

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