





Energize · Harmonize · Realize

Natural Gas

Meeting increasing demand for clean energy

CNPC is an integrated international energy company, with businesses covering oil and gas operations, oilfield services, engineering and construction, equipment manufacturing, financial services and new energy development.

- » China's largest oil and gas producer as well as a major provider of refined products
- » World's third largest oil company 
- » Ranking fourth on 2017 Fortune Global 500 
- » Operating 14 oil and gas production bases and 26 refining and petrochemical complexes in China
- » Oil and gas operations in 38 countries
- » Producing 171.34 million tons of crude and 128.73 billion cubic meters of natural gas, and processing 198.22 million tons of crude in 2017

Financial Highlights

Billion RMB yuan

	2016	2017
Total assets	4,069.76	4,098.72
Operating income	1,871.90	2,340.32
Total profits	50.73	53.34

CNPC's Natural Gas Business

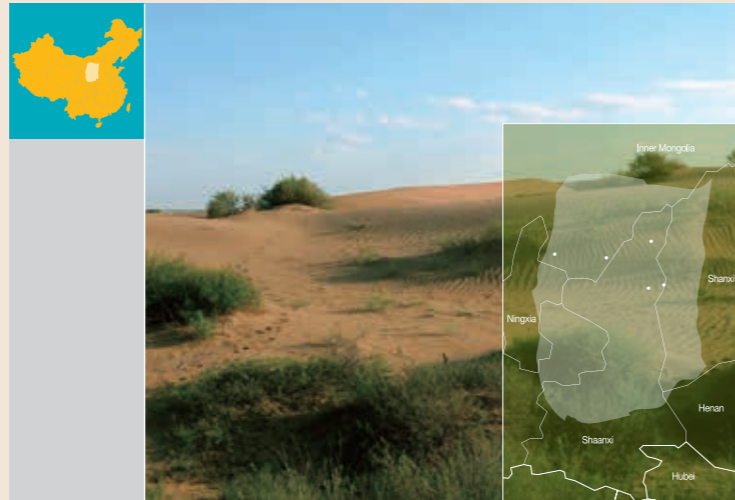
- » China's largest natural gas producer and supplier
- » Providing more than 71.1% of China's total natural gas supply
- » Operating 76.2% of China's total gas pipelines
- » Natural gas production accounting for 44.5% of the company's total production in toe

CNPC has built four gas production bases in China's Changqing, Tarim, Sichuan and Qinghai gas provinces with annual production capacity of nearly 100 bcm. In 2017, we newly proved 570 bcm of natural gas in place, and produced 128.7 bcm.



Changqing

Located in the Ordos Basin, Changqing gas province has nine proven gas fields, including Sulige, Jingbian, Yulin, Wushenqi and Zizhou, with an annual production capacity of more than 38 bcm. Changqing, by far China's largest gas production base, mainly ensures gas supply to the Shaanxi-Beijing Gas Pipeline network.



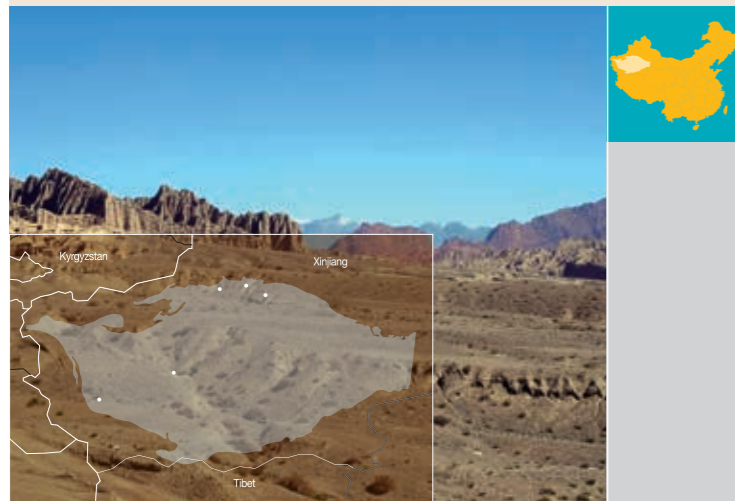
Sichuan

Located in the Sichuan Basin, Sichuan gas province has 112 proven gas fields, including Anyue, Guang'an, Hechuan, Datianchi, Luoziashai, Moxi, Wolonghe, Weiyuan, Tieshanpo and Dukouhe. With an annual production capacity of more than 21 bcm, Sichuan gas province is the gas source for the Southwest Gas Pipeline Network and the Zhongxian-Wuhan Gas Pipeline.



Tarim

Located in the Tarim Basin, the Tarim gas province mainly consists of the Kuche-Tabei, Bachu-Taxinan and Tadong natural gas enrichment zones, where 15 gas fields were proven including Kela-2, Dina-2, Keshen, Yaha and Hetianhe. Being capable of producing more than 25 bcm of natural gas annually, Tarim is one of the major sources for the West-East Gas Pipelines.



Qinghai

Located in the Qaidam Basin, Qinghai gas province has the highest-altitude of its kind in the world. It consists of six proven gas fields, including Sebei-1, Sebei-2 and Tainan. With an annual production capacity of 9 bcm, it ensures gas supply to the Sebei-Xining-Lanzhou Gas Pipeline network.



CNPC Operated Gas Pipelines in China

We have built and now operate a 53,834-km gas pipeline network, including trunk lines such as the West-East, Shaanxi-Beijing, Zhongxian-Wuhan, Sebei-Xining-Lanzhou and Zhongwei-Guiyang, supplying natural gas to 30 provinces, municipalities and autonomous regions, as well as Hong Kong SAR.

These natural gas pipelines are under the control of our Oil & Gas Pipeline Control Center in Beijing for integrated dispatch and monitoring, with an annual delivery capacity of 120 bcm. The center is one of such in the world that manages the operation of most long-distance oil and gas pipelines with the most complete transportation media.



53,834 Kilometers
76.2% of China's total

West-East Gas Pipeline

Runs from: Lunnan, Xinjiang
 To: Baihe, Shanghai
 Total length: 5,800 km (one trunk and three branches)
 Pipe diameter: 1,016 mm
 Design pressure: 10 MPa
 Major gas source: Tarim gas province
 Annual delivery capacity: 17 bcm
 Became operational in 2004



Second West-East Gas Pipeline

Runs from: Horgos, Xinjiang
 To: Guangzhou (South)/Shanghai (East)
 Total length: 9,102 km (one trunk and eight branches)
 Pipe diameter: 1,219 mm
 Design pressure: 10-12 MPa
 Major gas source: Central Asian countries & Tarim gas province
 Annual delivery capacity: 30 bcm
 Became operational in 2011



Third West-East Gas Pipeline

Runs from: Horgos, Xinjiang
 To: Fuzhou, Fujian
 Total length: 7,378 km (1 trunk and 8 branches)
 Pipe diameter: 1,016mm/1,219 mm
 Design pressure: 10-12Mpa
 Major gas source: Central Asian countries & Tarim gas province
 Annual delivery capacity: 30 bcm
 Became operational in 2015



First Shaanxi-Beijing Gas Pipeline

Runs from: Jingbian, Shaanxi
 To: Beijing
 Total length: 1,105 km
 Pipe diameter: 660 mm
 Design pressure: 10 MPa
 Major gas source: Changqing gas province
 Annual delivery capacity: 8 bcm
 Became operational in 1997

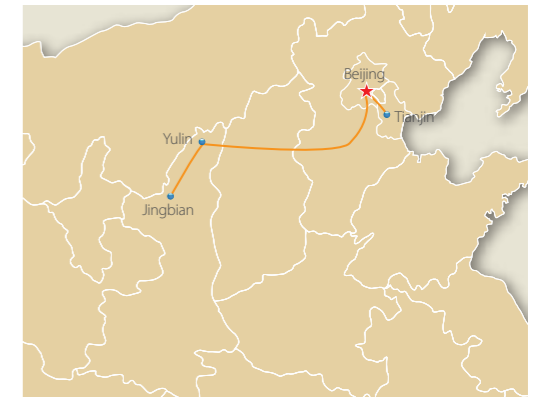
Second Shaanxi-Beijing Gas Pipeline

Runs from: Jingbian, Shaanxi
 To: Beijing
 Total length: 935 km
 Pipe diameter: 1,016 mm
 Design pressure: 10 MPa
 Major gas source: Changqing gas province
 Annual delivery capacity: 12 bcm
 Became operational in 2005



Third Shaanxi-Beijing Gas Pipeline

Runs from: Yulin, Shaanxi
 To: Beijing
 Total Length: 896 km
 Pipe diameter: 1,016 mm
 Design pressure: 10 MPa
 Major gas source: Changqing gas province
 Annual delivery capacity: 15 bcm
 Became operational in 2011





Zhongxian-Wuhan Gas Pipeline

Runs from: Zhongxian, Sichuan
To: Wuhan, Hubei
Total length: 1,375 km (one trunk and three branches)
Pipe diameter: 711 mm
Design pressure: 6.3-7.0 MPa
Major gas source: Sichuan gas province
Annual delivery capacity: 3 bcm
Became operational in 2004



Sebei-Xining-Lanzhou Gas Pipeline

Runs from: Sebei Gas Field, Qinghai
To: Lanzhou, Gansu
Total length: 931 km
Pipe diameter: 660 mm
Major gas source: Qinghai gas province
Annual delivery capacity: 3.4 bcm
Became operational in 2001



Cross-border Gas Supply Channels

- ▶ Central Asia-China Gas Pipeline
- ▶ Myanmar-China Gas Pipeline
- ▶ Offshore LNG



Central Asia-China Gas Pipeline

(Line A, Line B and Line C in parallel)

Runs from: Gedaim, Turkmen-Uzbek border

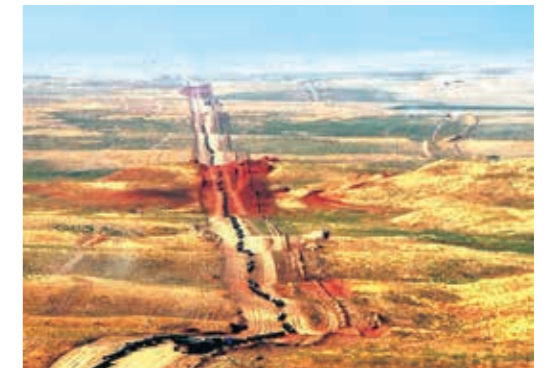
To: Horgos, Xinjiang

Total length: 1,830 km (single line)

Pipe diameter: 1,067 mm (Line A and Line B)/1,279 mm (Line C)

Annual delivery capacity: 55 bcm

Became operational in 2009 (Line A), 2010 (Line B), and 2014 (Line C) respectively



Myanmar-China Gas Pipeline

Runs from: Ramree Island in Kyaukphyu, Rakhine State

To: Ruili, Yunnan

Total length: 793 km

Pipe diameter: 1,016 mm

Annual delivery capacity: 12 bcm

Became operational in 2013

Yamal LNG

Three LNG trains each with a capacity of 5.50 Mt/a

Annual production: 16.5Mt LNG and 1Mt gas condensate

153 modules and 370 prefabricated members

80% of the modules were fabricated by Chinese companies

3 LNG carriers manufactured in China

14 LNG carriers operated by Chinese shipping companies

CNPC's share in the project: 20%



We have built three LNG terminals in Jiangsu, Dalian and Tangshan, which have done a good job in peak shaving since they became operational.

Dalian LNG Terminal

Max. cargo unloading capacity of 350,000 cubic meters

Phase-I: 3 Mt/a, annual gas deliverability of 4.2 bcm (being operational in Dec. 2011)

Phase-II: 6 Mt/a, annual gas deliverability of 8.4 bcm (being operational at the end of 2013)

Total capacity: 10 Mt/a, annual gas deliverability of 13.5 bcm

Storage capacity: 480,000 cubic meters

LNG sources are mainly from Qatar, Australia, Iran and Yamal. After gasification at the terminal, natural gas supply can be connected to China's northeastern and northern gas pipeline networks through the pipeline from Dalian to Shenyang, to cover Northeast China and part of North China.



Jiangsu LNG Terminal

Max. cargo unloading capacity of 267,000 cubic meters

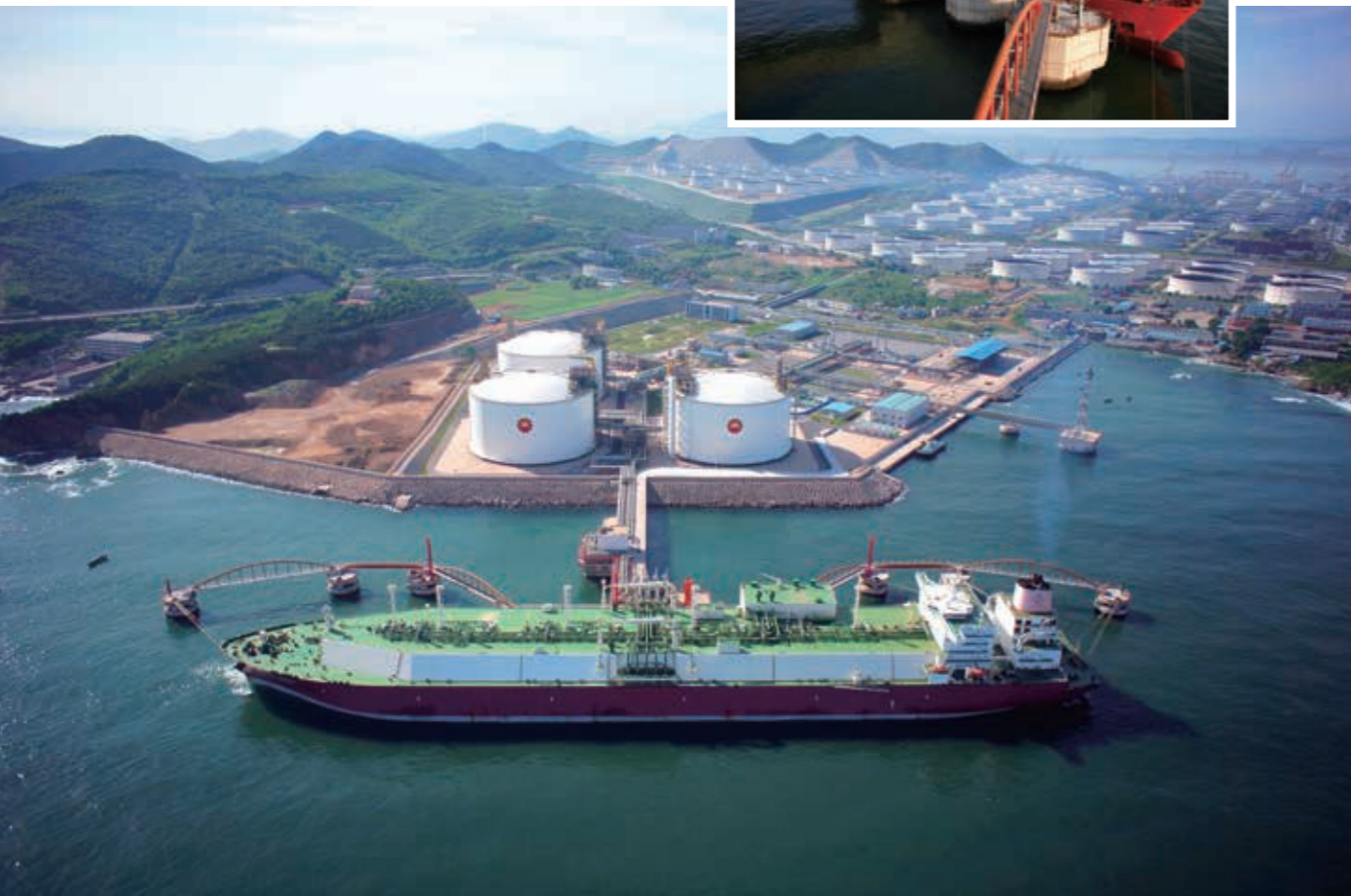
Phase-I: 3.5 Mt/a, annual gas deliverability of 4.8 bcm (being operational in Nov. 2011)

Phase-II: 6.5 Mt/a, annual gas deliverability of 8.7 bcm (being operational at the end of 2013)

Total capacity: 10 Mt/a, annual gas deliverability of 13.5 bcm

Storage capacity: 480,000 cubic meters

The project mainly receives, stores, and gasifies overseas LNG. It is connected to the West-East Gas Pipeline and the Ji-Ning branch through export pipelines. It delivers gas supply to Yangtze Delta and surrounding regions.



Tangshan LNG Terminal

Max. cargo unloading capacity of 270,000 cubic meters

Phase-I: 3.5 Mt/a, annual gas deliverability of 8.7 bcm (being operational in Dec. 2013)

Phase-II: 6.5 Mt/a (under construction)

Expected capacity: 10 Mt/a

Storage capacity: 640,000 cubic meters

LNG sources are mainly from Qatar and Australia. After gasification at the terminal, the natural gas is supplied to Beijing and Northeast China via the Yongqing-Tangshan-Qinhuangdao gas pipeline network.



Unconventional Natural Gas

Unconventional natural gases, such as tight gas, shale gas and CBM, are important supplement to conventional hydrocarbon resources in meeting ever increasing demand for clean energy. We are making progress in tapping and delivering more unconventional gases.

Tight gas

CNPC has identified 12.7 tcm of recoverable tight gas resources, mainly in the Ordos and Sichuan basins. We produce about 30 bcm of tight gas annually, accounting for 30% of the company's total gas production. Sulige contributed 23 bcm, making it the largest gas field in China.



Technologies for developing low pressure, low abundance, low permeability gas reservoirs:

- » Gas enrichment area screening & well site optimization
- » Fast drilling with low cost
- » Vertical well multilayer remodeling / horizontal well multi-stage fracturing
- » Downhole choking and low pressure gas gathering
- » Digital production management



Shale gas

CNPC has identified approximately 7 tcm of shale gas resources, mainly in the Sichuan Basin. We have built two national shale gas demonstration bases and are accelerating shale gas development through cooperation with both domestic and international partners, risk operation, and independent operation. In 2017, we produced 3 billion cubic meters of shale gas.



Shale gas development technologies:

- » Comprehensive geological evaluation
- » Horizontal well drilling & completion
- » Fracturing seismic monitoring
- » Development optimization
- » Horizontal well hydraulic fracturing
- » Ground gathering

CBM

CNPC has identified 2.9 tcm of CBM resources and 390.4 bcm proven OGIP in the Qinshui and Ordos basins. We delivered 1.8 bcm of commercial CBM in 2017.



CBM development technologies:

- » High rank coal favorable area screening
- » Flow pressure control for drainage
- » Variable displacement active water fracturing
- » Optimization & simplification of ground gathering

Natural Gas Business Outlook

- » Seek for national policy support and meet new HSE requirements.
- » Strengthen exploration for high quality and scalable reserves.
- » Develop applicable technologies to enhance single-well output and economic return.
- » More international cooperation with win-win partnership.

