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Monthly Overview

Tight Supply, Prices Record High

Due to the low temperature in North China and the promotion of coal to gas, China's natural gas is facing supply shortage. The annual gas consumption is expected to increase substantially compared with 2016. In the long run, China will still rely on pipeline gas import and LNG import contracts to meet increasing domestic demand.

From the SUPPLY side, gas import hit record high. China's November LNG import could hit 4 million mt surpassing the previous record of 3.7 million mt the country imported in December last year.

The increase in imports is a response to rising demand boosted by a government-led switch from coal to natural gas (Coal to Gas or CTG) for heating of millions of households in the northeast regions of Tianjin and Hebei, as well as a colder start of the winter.

Despite that both PetroChina and Sinopec were increasing their gas output from gas field, storage facility, LNG import and shale gas production to meet the rapidly increasing demand for gas, the supply shortage forced PetroChina to limit its gas supply for LNG factories and led to a sharp drop in operating rates of LNG factories.

From DEMAND side, China consumed 186.5 bcm of gas in the first 10 months of 2017, up by 18.7% year on year, according to the National Development and Reform Commission.

Gas production reached 121.2 bcm, up by 11.2%, while imports came to 72.2 bcm, up by 27.5%. Gas consumption in October alone surged by 21.3%, to 18.8 bcm, while production increased by 15.9%, to 12.4 bcm and imports rose by 36.8%, to 7.8 bcm.

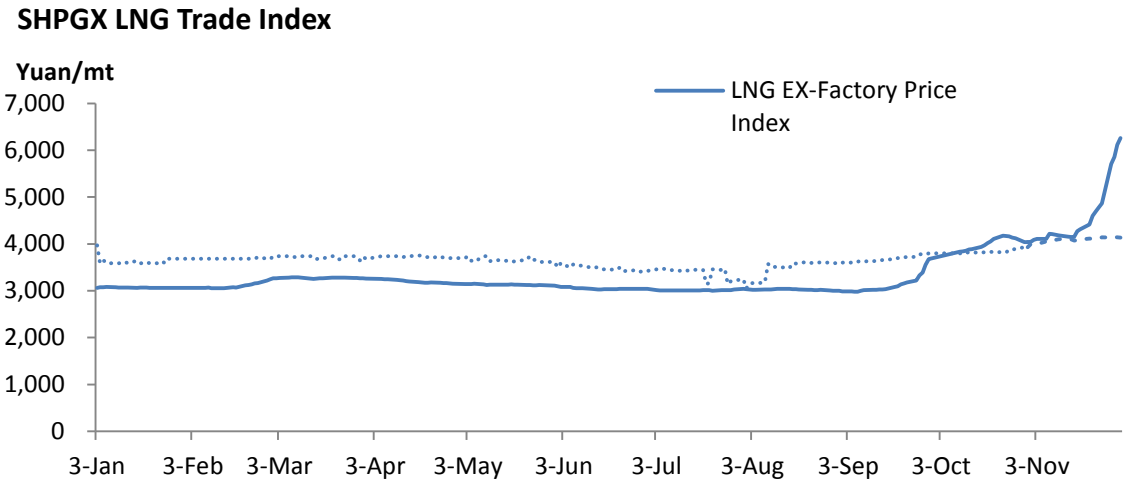
North China's gas consumption in winter peaked 10 times higher than in summer. As a result, gas supply in winter is very tight and the transaction price moved up. CNPC expects that the condition of winter gas shortage will continue in next five years.

The tense situation led to high gas prices. From imported LNG, spot gas and LNG factories, the gas prices went up sharply by more than 50% while the gas prices of some LNG factories soared by over 80%. Certain local government have already released policies to increase non-residential gas prices. It is expected that with winter temperatures continue to drop, there will be more areas to gradually raise the price of non-residential gas.

In November CNPC signed a long-term LNG contract of about 10 billion USD with Cheniere. Central-Asia Gas Pipeline Line-D was expected to be completed by 2020 and to provide 30 bcm/yr gas import capacity. Beijing Gas Group is considering the construction of new LNG terminals. In addition, more policies will be put in place to encourage the construction of gas storage facility and peak shaving capacity. In parallel with the reform of the pipe network, more private enterprises will join to increase natural gas supply capacity.

Price Index

China Domestic LNG Price Index (Yuan/mt)											
	Jan Avg.	Feb Avg.	Mar Avg.	Apr Avg.	May Avg.	Jun Avg.	Jul Avg.	Aug Avg.	Sep Avg.	Oct Avg.	Nov Avg.
LNG EX-Factory	3,068.6	3,102.7	3,272.6	3,195.6	3,130.0	3,047.8	3,011.7	3,024.0	3,138.1	4,013.1	4,612.5
South China LNG	3,624.6	3,686.6	3,712.9	3,724.8	3,660.5	3,479.4	3,374.7	3,474.6	3,680.5	3,841.6	4,090.6



* The LNG Index is released daily by Shanghai Petroleum and Natural Gas Exchange (SHPGX)

*LNG EX-Factory Price Index was calculated based on SHPGX trade data and institute quotas with focused monitoring on about 50 LNG factories and terminals, which mainly reflects China LNG market prices trend.

*S-China LNG Trade Index was calculated based on domestic LNG sale, pipeline gas, import LNG, import crude as well as substitutes including fuel oil, LPG, diesel and electricity, which mainly estimates S-China LNG market value.

Editorial

China's November LNG imports to hit new high

China's imports of LNG for the month of November could hit 4 million mt surpassing the previous record of 3.7 million mt the country imported in December last year.

PetroChina cuts industrial gas supply

PetroChina plans to reduce natural gas supplies to industrial users by a range of 3 percent to 10 percent as it expects shortages this winter after millions of residential households were switched to gas for heating.

CNPC, Cheniere ink LNG MoU

China National Petroleum Corporation (CNPC) and the Houston-based LNG player, Cheniere signed a memorandum of understanding for long-term LNG sales and purchase cooperation. The MOU involved up to 110 billion USD. If the long-term price was set around 8 USD/MMBtu with a general 20-year supply cycle, the annual supply of LNG was estimated to be about 3 million mt.

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News / Analysis

State Policy

China eyes more market-oriented pricing mechanism by 2020

NDRC, China's top economic planner, released a guideline on deepening pricing reforms on Nov 10, with the aim to establish a more market-oriented, fair and transparent mechanism by 2020.

A key breakthrough for the regulation of the monopolized sectors

For the monopolized sectors, the government will gradually loosen its grip and allow producers "reasonable" room for profit, according to the National Development and Reform Commission (NDRC).

Major monopolized industries include power transmission and distribution, natural gas pipelines and railway transport, in which the NDRC said it would conduct cost monitoring and supervision.

The guideline also specified pricing principles for public services such as medical treatment, green consumption, administrative fees and farm produce.

In recent years, the government has moved in gradual steps to advance pricing reforms in monopolized sectors to allow the market to play a bigger role.

According to a plan released in May, China encourages gas companies to split sales and pipeline businesses in a step by step manner to move towards market-based pricing.

A report to the 19th National Congress of the Communist Party of China has pledged to speed up the reform of market-based pricing of factors of production, relax control over market access in the service sector, and improve market oversight mechanisms.

China draws up draft law on resource tax

China has formulated a draft law on resource tax in a bid to conserve natural resources and protect the environment.

The draft law was released on Nov 20 by the Ministry of Finance and the State Administration of Taxation for public comment.

"In order to give better play to the role of taxation in supporting resource saving and environmental protection, we must speed up work on a resource tax law, improve the legal system and make it more methodical, stable and authoritative," said MOF in a statement.

Nearly 800 billion yuan (about $120 billion) of resource

tax was collected from 1994 to 2016, an annual average growth of 14.8 percent, with 95 billion yuan collected last year, according to MOF data.

The draft law basically maintains the current resource tax framework and rates formulated after a reform to levy such tax on most resources based on prices instead of quantities, the statement said.

China has experimented with price-based resource tax on such products as crude oil, natural gas and coal since Nov 2011 and expanded the reform to most products in July 2016.

Local governments will be authorized to set specific tax rates within certain ranges, according to the statement.

It said conditions are not ripe for legislation on a water resource tax, noting that further pilot reform is needed to improve the tax system.

The country is not yet prepared for levying resource taxes on forests and grassland, the statement said.

Under the draft law, Chinese and foreign companies jointly exploring crude oil and natural gas will pay resource tax instead of royalties.

China listed combustible ice as new mineral

China has listed natural gas hydrate, or combustible ice, as the country's 173rd mineral variety, to speed up exploitation of the clean energy source.

The Ministry of Land and Resources (MLR) filed an application with the State Council, China's cabinet, last month to include the resource in China's mineral list. The application was approved on Nov 3.

The application was made in response to a request in May from the central leadership to promote industrialization of natural gas hydrate after trial mining in the South China Sea.

WHAT IS COMBUSTIBLE ICE?

Natural gas hydrate usually exists in the seabed or permafrost areas. It is composed of natural gas and water under high pressure at low temperature. It resembles ice and can be ignited like solid ethanol, hence the name "combustible ice."

Natural gas from the combustible ice can be used for the same purposes as regular natural gas. With a high density of energy, it is a clean and efficient energy source.

Besides China, the United States, Japan and Canada are also mining the resource.

Preliminary estimates show China's reserves of combustible ice under the sea are about 80 billion mt of oil equivalent.

Combustible ice has different chemical and physical properties from regular natural gas, coalbed gas and shale gas, and requires different storage, exploration and mining technology.

LISTED, AND SO WHAT?

Combustible ice will reduce China's reliance on oil and gas imports and improve its energy and resource security

After legal recognition, capital will be encouraged into the exploitation of the resource to speed up industrialization.

Research will be stepped up, driving the development of related industries including equipment manufacture, pipeline construction and shipbuilding.

The MLR will work on long-term strategic planning and fundamental research, with improved management, tax breaks and subsidies to develop mining techniques and equipment that meet China's needs.

Trial mining is just the first step on a long journey. Industrialization faces challenges in terms of output, cost and protection of the environment, according to China Geological Survey.

Exploration should aim to find up to four large resource bases as a foundation for industrialization.

Environmental protection is crucial to the process and demands close monitoring of the marine environment and the right technology for green exploitation.

RELATED: RESEARCH AND TRIAL MINING

-- 1999. China started surveying natural gas hydrate and found the resource under the Xisha trough in the South China Sea.

-- 2002. Evaluation of combustible ice in key permafrost areas in western and northeastern China began.

-- 2007. Gas hydrate samples were collected under the Shenhu area of the South China Sea.

-- 2008. The first sample of combustible ice from the ground was collected from permafrost in the Qilian Mountains, Qinghai Province. The mineral was found several more times in the area between 2009 and 2015.

-- 2013. Samples of different types of combustible ice were collected in the northern part of the South China Sea.

-- 2014. Preparation for trial mining began with an underwater pilot project.

-- May 10, 2017. A 60-day mining trial began in Shenhu. And 309,000 m^3 of natural gas had been extracted in the trial mining.

Regional Policy

Local Governments Increases Non-Residential Prices

With the decreasing temperature and the promotion of Coal to Gas, domestic gas was facing supply shortage. As a result, a number of regional governments released notices to raise non-residential gas prices.

On Nov 24, Shaanxi Province raised non-residential city-gate gas prices supplied from provincial gas company by 0.06 yuan/m^3 from Nov 25, 2017 to Mar 31, 2018. The increasing volume for local cities should be no more than 0.05 yuan/m^3.

Guizhou Province also raised its ladder city-gate prices for non-residential users by a range of 10% - 20% from Nov 1, 2017 to Mar 31, 2018.

In addition, natural gas prices in Beijing, Qingdao, Qiqihar and Xianyang were also increased by around 10%.

Supply “OFF” with CTG promotion

It is the first year of CTG implementation. The tense contradiction of gas supply and demand was stimulated by increasing demand and insufficient upstream gas supply. At present, gas stations in several Northern cities went out of supply.

With the implementation of CTG reform, gas demand and consumption in North China increased sharply, leading to a shortage in supply. This problem was particularly evident in the areas where "CTG" is implemented. With China’s environmental supervision to maintain high pressure situation this year, as well as the expanding "Coal to Gas, Gas Replacing Coal" policy, gas shortage was not a surprise at all. Given this situation, there might be more regions where gas prices were expected to increase.

Market Overview

Import: China’s November LNG imports to hit new high

China’s imports of liquefied natural gas (LNG) for the month of November could hit 4 million mt surpassing the previous record of 3.7 million mt the country imported in December last year.

The increase in imports is a response to rising demand boosted by a government-led switch from coal to natural gas for heating of millions of households in the northeast regions of Tianjin and Hebei, as well as a colder start of the winter.

The major part of the demand will be covered by LNG imports which resulted in Asian spot LNG prices going up 80 percent, closing in on 10 USD/MMBtu mark. China’s domestic gas price hit 1,060 USD/mt during the last week of Nov.

China has been increasingly supplied from the spot LNG market, which bumped the liquidity of the market dominated by long-term deals.

This also resulted in the tightening of the Asian LNG market, usually oversupplied, but rising output from Australian LNG projects would ensure ample supply for the market despite Chinese imports rise.

China is also boosting its import capacity from 62 million mt per year to 70 million mt as four new terminals begin commissioning during 2018.

The natural gas demand in China is forecast to rise 10 percent this year, following a rise of 6.6 percent and 5.7 percent in 2016 and 2015, respectively.

The LNG imports rise was the result of a growing demand and due to spot LNG prices that were lower in comparison to the state-controlled city-gate gas prices during the summer. However, with spot prices reaching over 9 USD/MMBtu, Beijing Gas Group is likely cut on its spot LNG imports.

The positive margins encouraged state-owned operators CNOOC and PetroChina to buy more spot cargoes to meet demand and also build inventories ahead of the winter.

China's import capacity has been expanded and the utilization rate in the 12 months is estimated to be close to 55 percent.

A number of small-scale liquefied natural gas terminals are set for expansion in the coming period to extend the handling capacity available to gas distributors that either have contracts in place with LNG export projects, or are looking secure volumes through tenders.

Half of the receiving capacity is operated by CNOOC with two new terminals to add another 4.6 million mt. The company's imports in 2016 were at 16 million mt and it is expected that this year the figure will exceed 22 million mt in 2017.

The company's long-term sale and purchase deal will reach its peak in 2020 with 22 million mt per year, which urged the company to secure more supply under one to three-year deals to complement its existing supply.

CNOOC is also in discussions to allow third-party access to its terminals at the beginning of next year.

Supply: Increasing supply, but not for Industries

PetroChina

PetroChina's Tarim Oilfield unit will supply 67.9 million m^3 per day (MMcm/d) of gas to the first West-East Pipeline and south Xinjiang this winter, while its Qinghai Oilfield unit will supply up to 18.5 MMcm/d by the end of the year.

The Dagang and Bannan underground storage depots started to supply gas to Beijing, Tianjin and Hebei province on Nov 9, and provisions will reach 18.0 MMcm/d by the end of November.

PetroChina has also supplied 564 MMcm of gas to the southwestern Chinese province of Guizhou in the first 10 months of this year, an increase of 72.3% on an annual basis.

Meanwhile, CNPC plans to reduce natural gas supplies to industrial users as it expects shortages this winter after millions of residential households were switched to gas for heating. It will cut supplies to industrial clients by a range of 3 percent to 10 percent.

Sinopec

Sinopec vows to increase its natural gas supply to 15.1 bcm, a 13.1 percent year-on-year increase, to ensure the heating season supply.

The company is also pushing forward the Fuling shale gas field, China's first shale gas commercial production program, and making sure it reaches annual output of 10 bcm by end of year.

Beijing Gas Group

Beijing Gas Group would start piping gas to more than 328 rural villages no later than Nov 15, meeting a government deadline for millions of people across northern China to be ready to start using gas for heating by Nov 15. It has built more than 3,400 km of gas pipelines and provided new residential gas boilers for more than 137,000 households in Beijing over the past six months.

Consumption: Prices hiking with supply shortage

Increasing Demand

Natural gas sales are expected to rise by more than 20 percent to 13.9 billion yuan ($2.1 billion; 1.76 billion euros; £1.58 billion) this year, according to CNPC.

Consumption of natural gas, which emits 50 percent less carbon dioxide than coal, will rise as demand is set to surge. China's commitment to smog-free air and green power is good news for not just electricity consumers and green campaigners, but also for those who thrive on gas imports.

The efforts to ensure adequate supplies of natural gas will involve creation or expansion of infrastructure like pipelines, ports with suitable terminals, storage facilities and transportation networks.

Existing Chinese investments in overseas energy assets

like oil and gas fields will likely be augmented, and fresh targets identified.

LNG consumption reached 167.6 bcm during the January-September period, up by 16.6 percent year-on-year. Full-year growth in 2016 was 7 percent, according to CNPC.

By 2040, China is expected to import as much as Japan, about 311.5 MMcm of natural gas a day, according to the International Energy Agency.

LNG Prices

Average domestic trucked LNG prices in China jumped more than 47% since Nov 14, according to Shanghai Petroleum and Natural Gas Exchange which monitors trucked LNG transactions from 50 LNG terminals and factories.

The price spike followed PetroChina's announcements to cut gas flows to industrial end-users in Shaanxi, Shandong and Inner Mongolia.

Daily industrial gas supply was reduced by up to 20% in certain Northern provinces as a winter policy measure to guarantee supply to households. In major demand centers in northern regions such as Shandong prices broke above 7,000 Yuan/mt (1,060 USD/mt) on supply imbalances and colder-than-expected weather in early winter.

The soaring price had a serious impact on downstream gas demand. Taking natural gas vehicles (NGV) as an example, the sales volume of LNG heavy truck was reported to drop by 34% in October. The price advantage of LNG heavy truck gradually disappeared while end-users were under great pressure of increasing LNG prices.

Shortage will continue?

According to "China Natural Gas Development Report" 2017 White Paper, China has already built 18 underground gas storage facilities with 6.4 bcm capacity, accounting 3% of annual consumption by the end of 2016. There was the obvious capacity gap compared with 20% in US and 25% in EU.

According to CNPC, the main challenge was to increase gas supply in winter. And it was expected that the condition of winter gas shortage would continue in next five years.

Central vs Local: Pipeline Struggle

NDRC recently sent specialists to investigate pipeline gas issues in Guangdong and Guangxi Province.

Currently market players were questioning provincial pipeline operators about the procurement/sell monopoly, which was inconsistent with government policy.

Natural Gas Dilemma

“Now mentioning the independence of natural gas pipelines, most players are going to point their finger at PetroChina and Sinopec. In fact, local pipe network companies are even more against the reform,” according to sources from PetroChina.

According to the source, PetroChina charges an average of 0.79 yuan/m^3 transportation fee for its over 4,000 kilometers WEP-I. However, the provincial pipeline network charges over 0.6 yuan/m^3 for around 500 km. The gas transportation toll raises 0.2 yuan/m^3 for simply passing through one city gate station.

According to PetroChina’s data, gas pipeline companies in partial provinces were actually implementing “integrated procurement/sell” or “integrated transportation”, which led to a series of problems. First was the high rate of price gap. For example, the transportation fee was 0.26 yuan/m^3 for industrial users and 0.25 yuan/m^3 for gas-power plants in Guangdong Province. In Jiangxi Province it was 0.35 yuan/m^3. And it was 0.36 yuan/m^3 in Guangxi Province. Second was that the price gap did not match the service. For example, provincial pipeline company charges 0.26 yuan/m^3 transportation fee for only a few hundred meters length from WEP-II Dongguan distribution station to Dongguan City gas station.

Some regions were antagonistic and were not willing to rectify, according to sources close to NDRC.

PetroChina, which undertakes the important task of gas pipeline construction and selling, was also under pressure to promote the utilization of natural gas. According to PetroChina's 2016 annual report, the turnover of its gas and pipeline segment was 247.477 billion yuan, a decrease of 12.2% from 281.778 billion yuan in 2015. In 2016, the natural gas and pipeline segment posted a net loss on gas imports of RMB14.884 billion. Among all losses: sales of 34.473 bcm gas imported from Central Asia posted a loss of 4.06 billion yuan; sales of 6.657 bcm imported LNG posted a loss of 7.34 billion yuan; sales of 4.75 bcm Myanmar gas posted

a loss of 5.951 billion yuan.

As of 2017, as PetroChina's natural gas and pipeline segment had an increasing income, it still suffered serious losses in the sales of imported pipeline gas and LNG.

The net loss of imported gas and LNG sales in 1H 2017 reached 11.80 billion yuan, 3.79 billion more than 1H 2016. Among all losses: sales of 19.604 bcm gas imported from Central Asia posted a loss of 4.77 billion yuan; sales of 5.348 bcm imported LNG posted a loss of 5.71 billion yuan; sales of 1.883 bcm Myanmar gas posted a loss of 2.79 billion yuan.

Currently, PetroChina has 10 bcm/yr gas transportation capacity in Guangxi Province, with only 0.85 bcm used in 2017. Guangxi Province also raised ambitious target to increase gas utilization to consume 8.8 million of standard coal in 2020, with an annual increasing of 51.7%, and to stay 7% in total energy consumption from 1.1% in 2015.

Obviously, all parties need to work hard to achieve such a substantial increase. Local authorities in Guangxi also expected that PetroChina can further adjust the price.

The state may usher in a breakthrough in deepening the reform of natural gas prices and promoting the market-based reform of gas prices for non-residents after the NDRC reported to the State Council.

Major Events

CNPC, Cheniere ink LNG MoU

China National Petroleum Corporation (CNPC) and the Houston-based LNG player, Cheniere signed a memorandum of understanding for long-term LNG sales and purchase cooperation.

The deal between the two companies was signed during president Trump's first state visit to China. The MOU involved up to 110 billion USD. If the long-term price was set around 8 USD/MMBtu with a general 20-year supply cycle, the annual supply of LNG was estimated to be about 3 million mt.

According to CNPC, the agreement would strengthen its cooperation with Cheniere in regards to the latter's liquefaction and export project in the Gulf of Mexico.

CNPC noted in its statement that discussions towards binding LNG sales and purchase agreement with Cheniere will continue over the coming period.

About Cheniere

Cheniere Energy owns and operates the Sabine Pass liquefaction terminal in Louisiana, currently the only such facility to ship U.S. shale gas overseas.

The company is also building the Corpus Christi LNG export facility on the U.S. Gulf Coast that is planned to have a 23 million mt per year production capacity.

Industry News

Import & Supply

China's gas imports up 52% in October

China imported 5.81 million mt of LNG and pipeline gas in October, up by 52.1% year on year but down from 5.94 million mt in the previous month, according to preliminary data released by the General Administration of Customs.

October's imports bring the total for the first 10 months to 54.20 million mt, up by one-quarter from 2016.

First Canadian LNG shipment heads to China

FortisBC's Tilbury facility in Delta shipped the first volumes of liquefied natural gas (LNG) to China in a pilot project to determine long-term feasibility.

The equipment for the Canada LNG industry's milestone was provided by True North Energy Corporation and CIMC ENRIC Holdings, and the cargo was shipped from Vancouver.

"This pilot is a small, but significant step for B.C.'s LNG export industry," said Douglas Stout, vice-president of market development and external relations, FortisBC.

By next year, China is projected to become the world's second-largest LNG importer. The Chinese government is stepping up its efforts in combatting air pollution and LNG imports have more than tripled in the last six years.

China's Khorgos gas entry point supplies record amount
PetroChina said Khorgos, the entry point in China for Central Asian gas, supplied a record 130 MMcm on Nov 6.

The gas was fed into the second and third West-East pipelines.

PetroChina expects the two cross-country trunk lines to supply 140 MMcm/d this winter.

China has enough gas to meet CTG switching demand – ministry
China's gas supply is high enough to meet growing demand from coal-to-gas switching, the Ministry of Environmental Protection (MEP) has said.

The MEP called for residential gas supplies to be safeguarded to ensure enough gas is available to replace coal in heating.

Twelve major cities in northern China, including Tianjin, are piloting the complete replacement of coal with gas and electricity for heating this winter.

Beijing Gas Group to start rural supplies
Beijing Gas Group has said it will start piping gas to more than 328 rural villages no later than Nov 15, meeting a government deadline for millions of people across northern China to be ready to start using gas for heating by Nov 15.

The city gas operator said it has built more than 3,400 km of gas pipelines and provided new residential gas boilers for more than 137,000 households in Beijing over the past six months.

Pipeline, Storage & LNG

Building goes smoothly on China-Russia gas pipeline
Construction of two underwater tunnels on the China-Russia East-Route Natural Gas Pipeline is going smoothly, the Heihe city government said in a statement.

Gas pipelines will be installed in the two tunnels, each 1,139 meters long, connecting Heihe in Heilongjiang Province, and Blagoveshchensk in Russia, according to the government statement.

The underwater project passes through the Heilongjiang River along the Sino-Russian border. One of the two tunnels was completed recently, according to the local government.

The Chinese section of the 3,968-kilometer China-Russia east-route natural gas pipeline originates in Heihe and terminates in Shanghai.

Work on the Russian part of the east-route pipeline began in eastern Siberia in 2014.

The pipeline is expected to begin sending up to 38 bcm of gas to China each year from 2018.

CNPC completes fourth Shaanxi-Beijing gas pipeline
China National Petroleum Corp. has completed the fourth Shaanxi-Beijing gas pipeline, according to officials from the National Development and Reform Commission.

The 1,098 km pipeline has a capacity of 25 billion cubic metres per year and will increase gas supplies to Beijing by around 70 MMcm per day, the news agency said. The first three pipelines have combined capacity of 35 bcm/yr.

China's LNG plants maintain supply share in October
Domestic liquefaction plants met 55% of China's LNG needs in October, unchanged from September, as rising heating needs boosted demand. Their share is expected to grow in November and December as import terminals curb LNG sales to meet piped gas demand.

China Gas planning new LNG terminal
China Gas Holdings, one of China's largest domestic natural gas distributors, plans to expand its extensive pipeline network, and is in talks with potential partners on building its first receiving terminal for imported liquefied gas, said Liu Minghui, the company's founder and president.

Liu estimated his company makes up 8-9 percent of China's total gas consumption.

China, the world's third-biggest gas consumer, will burn 240 bcm of the cleaner-burning fuel this year, up 15 percent versus 2016 in the nation's fastest growth since 2011. The growth in use is fueled by Beijing's program to heat millions of homes with gas this winter in some 30 northern cities.

Liu, who set up China Gas in 2002 and holds the second-largest block of shares after state-run Beijing Enterprises Holdings, said the company plans to lay 20,000 to 30,000 km of pipeline every year over the next three to five years.

The company now operates some 140,000 km of natural gas pipeline, enough to go around the earth 3-1/2 times.

"As a leading firm in the gasification program this year … at one point we had 50,000 workers laying pipes in Hebei alone," said Liu, referring to the smoggy northern Chinese province that is the focal area for gasification.

Liu said this year's program is only a start, as the National Development and Reform Commission (NDRC), China's top economic planner, has started studying a more ambitious plan to use gas as the winter heating fuel in 14 northern provinces.

To meet surging demand for the fuel, China Gas, which has relied on state energy firms for gas supplies, recently agreed with Delfin Midstream to explore the possibility to import liquefied natural gas (LNG) from the United States.

With its pipeline grid reaching 400 cities, China Gas is planning to invest or build an LNG terminal in the country's south, joining the ranks like privately-run ENN Energy Holdings and Xinjiang Guanghui to operate import terminals, which so far have been dominated by state energy giants.

PetroChina making 8 MMcm/d of storage injections in Jintan

PetroChina has injected 8 MMcm of gas into the Jintan underground storage depot in Jiangsu province every day since the start of October.

Jintan supplied an average of 6.8 MMcm/d and a total of 342 MMcm to Jiangsu in the first quarter of 2017.

Engie renews FSRU deal with CNOOC

French energy giant and LNG player Engie renewed the regasification and storage services contract with Chinese energy group CNOOC to provide the FSRU GDF Suez Cape Ann in the port of Tianjin for the coming winter season.

The FSRU arrived in Tianjin fully loaded with LNG and started operations on Oct 28, Engie said adding that it will remain in the Chinese port until Spring 2018.

Cape Ann has previously provided similar services to CNOOC, from November 2013 to January 2017, as a contribution to both LNG and natural gas supply needs, mainly during winter period associated with peak demand.

In addition to the usual FSRU activities, Cape Ann will also transfer LNG into smaller on-shore tanks which are used by CNOOC for LNG trucking activity.

The vessels delivered in 2010 from Samsung Heavy Industries is owned by Höegh LNG Partners, MOL and Tokyo LNG Tanker is under a 20-year charter deal with Engie.

It has a storage capacity of 145,000 m3 of LNG and maximum send-out capacity of 21 MMcm/d.

Rudong LNG volumes hit 4.03 bcm for 2017 so far

PetroChina's Rudong LNG terminal had supplied 4.03 bcm of gas this year as of Nov 17, exceeding its 2017 target by 34%.

The terminal has supplied 11.35 bcm of regasified LNG since it came online in November 2011 - equal to half of Jiangsu's winter gas demand for the past six years.

Dalian LNG supplying record 23 MMcm/d to Liaoning grid

PetroChina's Dalian LNG terminal is supplying a record 23 MMcm of gas per day to the pipeline grid in China's Liaoning province.

The terminal is linked to the Dalian-Shenyang and the Qinhuangdao-Shenyang pipelines. It also injects gas into the Shuangliu underground storage depot in the Liaohe oilfield.

Guangxi terminal receives 15 LNG cargoes in 10M 2017

Sinopec's Guangxi LNG terminal in the Chinese port of Beihai received 15 shipments of LNG carrying a total of 1.03 million mt in the first 10 months of 2017, up by 75% year on year, according to the Guangxi Entry-Exit Inspection and Quarantine Bureau.

The volumes had a total value of 420 million USD, an increase of 121% on an annual basis. The terminal came online in April 2016 and sells LNG by tanker truck to Hunan, Guangdong, Yunnan and Guangxi.

Downstream Utilization

Wison, Shanghai Electric partner up on LNG power barge

Wison Offshore & Marine signed a memorandum of understanding on strategic cooperation with Shanghai Electric Power Generation Group on medium to large-scale floating LNG power generation barge.

The two companies aim to collaborate on product development, global marketing and technical services as well as the commercialization of this new electrification solution, Wison's statement reads.

Based on the floating LNG storage regasification and power generation solution developed by Wison, both parties will join forces to build up capabilities throughout FSRP project.

The parties will focus on developing medium large-scale FSRP, and study the application of Shanghai Electric's gas turbine technology and integrated generation set solution to the FSRPs, to enhance the product's economy and reliability can be further enhanced.

While Wison already received Approval in Principle for its 50MW FSRP from Bureau Veritas in July, the agreement with Shanghai Electric Power Generation is a step towards a medium-large scale FSRP development.

Wison eyes FSRP as a critical extension of its LNG product portfolio, while Shanghai Electric is looking to accelerate the development of its gas turbine business.

Challenges force Huadian to cut gas-fired distributed generation goals

State-owned power group China Huadian has scaled down its target for gas-fired distributed generation (DG) capacity as high gas prices and low power tariffs have stymied rollout.

Huadian - which is China's largest gas power generator - aims to have 6 GW of gas-fuelled DG capacity by the end of the decade, said Song Hongtao, deputy general manager of Huadian Distributed Energy Engineering Technology at a conference. The company's original target was 10 GW by the end of 2020, according to Sun Gongmin, former general manager of Huadian Group in 2012.

It is the high gas prices and lower power tariffs which have led China's biggest gas power producer to lower its capacity target for gas-fired distributed generation.

Unconventional Gas

China-built ultra-deep-water drilling rig to set sail for combustible ice

Blue Whale 2, China's home-made ultra-deep-water semisubmersible drilling rig, is expected to set sail in Yantai, East China's Shandong province.

The platform is as tall as a 37-story building with a deck as large as a soccer field. It is able to drill at a depth of 15,240 meters, nearly twice the height of Mount Everest and the deepest in the world.

The rig can also weather tough winds with a speed of up to 50 meters per second, allowing it to operate in rough seas.

The oil exploration platform is the latest version of the Blue Whale series developed by China Yantai CIMC Raffles Offshore. Sea trials were completed in August for the rig, which is expected to be delivered this year.

Its sister rig Blue Whale 1 has been used in China's first test exploration for gas hydrate, or combustible ice, in the South China Sea from May to July. The successful mining of the hydrate marked a leap forward in China's efforts to replace conventional energies with renewable ones.

Combustible ice is formed under low temperatures and high pressure in permafrost under the sea. One cubic meter of the hydrate can release about 160 cubic meters of gas, which would emit only half the amount of carbon dioxide produced by oil or coal.

Shanxi holds first CBM exploration licence tender

The coal-rich province of Shanxi in central China has held the country's first tender of CBM exploration licenses.

The Shanxi arm of the Ministry of Land and Resources tendered rights for 10 CBM blocks spanning 204,300 hectares and containing an estimated 430 bcm of CBM resources.

Shanxi Guoxin Energy Development Group, Shanxi Meijin Energy and five other companies won the rights to the blocks.

Company

Beijing Gas Blue Sky to buy stake in PetroChina Jingtang LNG

Beijing Gas Blue Sky signed a memorandum of understanding with Beijing Gas Group and its unit Beijing Gas Company to purchase 29 percent equity interest in PetroChina Jingtang LNG.

PetroChina Jingtang is engaged in the provision of port facilities for LNG vessels, provision of cargo handling services, warehousing and loading services of LNG within the port area as well as receiving, storage and re-gasification of liquefied natural gas.

Beijing Gas Blue Sky expects the consideration of the proposed transaction to be no more than 1 billion yuan ($152.2 million) and will be covered by the issuance of new shares to Beijing Gas Group.

Upon the completion of the transaction, Beijing Gas Group, that currently holds 26.91 percent interest in Beijing Gas Blue Sky, would increase its shareholding in the company to over 30 percent.

Beijing Gas Blue Sky added that it has completed the acquisition of two natural gas projects in Shanxi Province, including Shanxi Minsheng Natural Gas and Yongji Minsheng Natural Gas.

MOU signed between CNPC and ADNOC

Wang Yilin, chairman of CNPC, and Sultan Ahmed Al Jaber, minister of State in the United Arab Emirates and the Group CEO of Abu Dhabi National Oil Company (ADNOC), met in Abu Dhabi and signed a MOU on cooperation between CNPC and ADNOC on behalf of the two sides on Nov 12 in Abu Dhabi.

According to the MOU, CNPC and ADNOC will strengthen cooperation in oil and gas blocks, gas field development, oil storage facilities construction and other fields.

Novatek inks Arctic LNG 2 deals with Chinese partners

Russia's largest independent natural gas producer, Novatek signed a memorandum of understanding with China Development Bank for the implementation of Arctic LNG 2 project.

In addition to Novatek's second LNG project, the two companies agreed to cooperate on other projects, including financing and investment into the capital of these projects.

Speaking of the agreement, Novatek's chairman, Leonid Mikhelson said, "our strategy envisages a rapid growth of LNG production using international financing sources."

The company has already cooperated with the China Development Bank on the Yamal LNG project, Mikhelson said.

Novatek pens LNG deal with CNPC

In a separate statement, Novatek said it has also signed a strategic cooperation agreement with the China National Petroleum Company (CNPC).

The deal confirms the intentions of the two companies to cooperate on the implementation of the Arctic LNG 2 project, as well as collaborating in different segments of the LNG and natural gas markets, including LNG trading and gas infrastructure development.

China POLY-GCL Group signs MoU on Djibouti LNG project investment

POLY-GCL Petroleum Group, a joint venture between China POLY Group and GCL Group, signed a memorandum of understanding with Djibouti on investing $4 billion in an LNG export project.

The memorandum will be followed by negotiations over

concession agreements with the construction expected to start next year, according to the Djibouti's energy minister Yonis Ali Guedi.

The facility, to be located in Damerjog, near the border with Somalia, will have one liquefaction train in the first phase, allowing for the production of 3 million mt of LNG per year, with an option to be expanded to 10 million mt per year.

Feed gas would be delivered via an 803 km pipeline transporting gas from Ethiopia's Ogaden Basin to Djibouti, with a planned phase one throughput of 4 bcm per year.

Following the MoU signing, a POLY-GCL representative noted that the production from the first phase is expected to start in 2020.

Delfin LNG, China Gas Holding ink LNG supply MoU

Delfin LNG and China Gas Holding signed a memorandum of understanding for the purchase of 3 million mt of LNG per year from the proposed project to be located 40 miles offshore Louisiana in the Gulf of Mexico.

The MoU is a preliminary framework agreement, China Gas Holding said in a filing of the stock exchange, adding that a legally binding agreement for the sale and purchase of LNG is subject to further negotiation between the two companies.

Delfin LNG, owned by Fairwood Peninsula Energy Corp, is the first and only permitted floating LNG export project in the United States.

In June this year, Delfin LNG joined forces with LNG shipper Golar to jointly develop the FLNG project.

The project includes up to four floating liquefaction vessels capable of producing up to 13 million mt of LNG per year.

A final investment decision for the first FLNG is expected in 2018, with the first production from the project planned for 2021 or 2022.

However, Delfin founder and CEO Frederick Jones noted that 2018 is a challenging deadline and that the company is looking to bring in Chinese investors onboard the $8 billion project.

Key Projects & Contracts – Central-Asia Gas Pipeline

CAGP helps meet rising demand for gas

The China-Central Asia natural gas pipeline has transported a total of 200 bcm of natural gas by Nov 29 since it started operation in December 2009, and is made up of three routes with a combined annual capacity of 55 bcm. The pipelines pass through countries such as Uzbekistan and Kazakhstan, meeting demand in the world's second-largest liquefied natural gas importer.

The pipeline, running through China, Turkmenistan, Kazakhstan and Uzbekistan with an annual gas transportation capacity exceeding 55 bcm, is the first pipeline importing natural gas from abroad by land, said Sino-Pipeline International Company Ltd, a subsidiary under CNPC and the operator of the pipeline.

Line D is currently under construction and once completed is projected to deliver 30 bcm of natural gas each year.

The 200 bcm of natural gas is equivalent to the total annual natural gas consumption of China or 11 years of natural gas supply for Beijing, it said.

Qu Guangxue, a CNPC spokesman, said the gas supply from Central Asian countries has played a significant role in ensuring natural gas supplies during the heating season in northern China, when demand rises to nearly three times that of non-heating seasons.

CNPC plans to continue negotiating with Central Asian nations for additional stocks to ensure adequate domestic natural gas supplies.

The China-Central Asia natural gas pipeline plays a significant role in ensuring China's surging natural gas demand while diversifying its sources of natural gas imports.

Project Summary

-- On 3 April 2006, China and Turkmenistan signed a framework agreement on the pipeline construction and long-term gas supply. On 30 April 2007, Uzbekistan and China signed an agreement on the construction and exploitation of the pipeline's Uzbekistan section. In July 2007, it was formally announced that Turkmenistan will join original Kazakhstan-China pipeline project.

-- On 8 November 2007, Kazakhstan's oil company KazMunayGas signed an agreement with the China National Petroleum Corporation on principles of future work on the pipeline.

-- On 30 August 2007, the construction of the 188 kilometres long Turkmen section of the pipeline began. Construction of the Uzbek section started on 30 June 2008. Construction works of the Kazakh section started on 9 July 2008 and the first stage was finished in July 2009.

-- The Kazakh section of the pipeline was inaugurated on 12 December 2009 during China's president Hu Jintao's visit to Kazakhstan. On 13 June 2010 China and Kazakhstan signed an agreement on a branch line from Western Kazakhstan.

-- In November 2011, the two countries signed an agreement on Turkmenistan's annual supply of 25 bcm of natural gas to China. The Line C was scheduled to start construction in September 2012.

-- On May 31 2014, Line C was put into production.

-- On November 2014, gas imported through CAGP reached 100 bcm.

-- Line D was going to be fully completed by the end of 2020 with 30 bcm/yr capacity. By then, the overall capacity of CAGP will reach 85 bcm.

SHPGX Auctions

Sinopec will allocate not less than 300 MMcm of natural gas for listing and bidding. The resources are mainly Sinopec shale gas and imported incremental LNG source. Trading window are from December 1, 2017 to March 15, 2018.

The amount of natural gas traded openly through SHPGX in 2017 is expected to exceed 25 bcm, accounting for about 11% of annual consumption. By November 26, SHPGX was officially in operation for a year, with trading volume from 15 bcm in 1st year to 25 bcm in 2017. The scale of natural gas deployment through market-oriented mechanisms has been growing. At present, SHPGC launches the listing and bidding transactions of pipeline natural gas (PNG) and liquefied natural gas (LNG), and conducts a pilot auction for pipeline gas.

Competing Energy

China's crude oil output falls 3.4%

China's crude oil output fell 3.4 percent year-on-year in the first ten months as refineries cut production and imported more due to high exploitation costs, data from the National Development and Reform Commission showed.

Crude oil output came in at 160 million mt during the period, which saw 466 million mt of crude refined, up 7.9 percent year-on-year.

For the January-October period, consumption of refined oil stood at 256 million mt, rising 6.8 percent year-on-year.

China is one of the world's largest oil buyers, with over 60 percent of its oil consumption coming from imports. China imported 349 million mt of crude oil in the first ten months, up 11.8 percent year-on-year.

Meanwhile, natural gas output totaled 121 bcm, gaining 11.2 percent year-on-year.

China aims to increase domestic crude oil output to 200 million mt by 2020, while supply capacity for natural gas should exceed 360 bcm.

Major tasks for the oil industry include accelerating exploration to ensure domestic oil supply, speeding up construction of pipeline networks and developing clean alternatives.

Electricity: China creates energy conglomerate by SOE merger

Two Chinese state-owned enterprises (SOEs) have merged into an energy conglomerate with total assets worth 1.8 trillion yuan (272.96 billion USD).

The new company, China Energy Corporation, has become the world's largest in coal mining, thermal power, renewable energy and coal-to-liquid conversion, according to the founding ceremony held Tuesday.

It was formed by the reorganization of power generator China Guodian Corporation and coal miner Shenhua Group.

"It is the biggest consolidation among central SOEs in recent years," said Xiao Yaqing, chairman of the State-owned Assets Supervision and Administration Commission.

Xiao expects the deal to improve corporate profitability and help coordinate coal and electricity markets.

The merger is in line with the country's effort to push restructuring in state-owned companies. During the past five years, 34 central SOEs were reorganized to improve competitiveness, according to Xiao.

The total number of central SOEs has halved from 196 in 2003.

Qiao Baoping, chairman of China Energy, said the company would focus on coal mining and power generation, while making more effort to eliminate excess capacity, and speed up its drive to go global.

China Energy signed a memorandum of understanding with the government of West Virginia to cooperate on shale gas exploration at the beginning of the month. The deal, with total investment to reach 83.7 billion USD in 20 years, will be the largest ever energy cooperation deal between China and the United States.

China making smooth progress in cutting coal capacity

China is smoothly pushing forward the reduction of outdated coal capacity.

China's goal to cut coal capacity by 500 million mt within three to five years starting 2016 will likely be met in advance, Lian Weiliang, deputy head of the National Development and Reform Commission, said at a trade fair.

By the end of 2017, the number of coal mines in China will drop to about 7,000 from 10,800 in 2015, Lian said.

The National Bureau of Statistics said in mid Nov that China had completed its 2017 tasks for steel and coal capacity cuts.

In 2016, China cut coal capacity by more than 290 million mt. This year's target was 150 million mt.

There is still a large amount of outdated capacity in the coal sector, and the task of cutting capacity remains arduous, Lian said.

First marine nuclear reactor will be ready by 2020

Hubei province has completed the technical design of its offshore nuclear power station and will soon start its construction, with the first marine reactor to be delivered in 2020.

The offshore nuclear power stations, including floating and submarine ones, can sail to where they are needed and be used for many different needs, including operating drilling machinery for offshore oil and gas fields, providing power supply to islands, as well as heating and desalination.

Batch construction of offshore nuclear power stations will result in a market that could be worth tens of billions of dollars in a marine nuclear energy industry chain, according to the 719 Research Institute of China Shipbuilding Industry Corp, the general contractor of the project.

Analysts said demand for offshore nuclear power plants is expected to grow in China and will become one of the most significant infrastructures for China's marine area.

Han Xiaoping, chief information officer of China Energy Net Consulting Co, said small nuclear reactors can provide cheap and sustainable electricity and can be

moved to isolated areas when they reach the end of their service life.

One kilowatt-hour (KWH) of electricity generated by an offshore nuclear plant costs about 0.9 yuan (13 cents), compared with 2 yuan for the same quantity generated by diesel for use by drilling platforms in the Bohai Sea, he said.

"Large nuclear reactors have high hydrological and geological requirements and safety has always been a major concern for local residents living nearby."

Wu Zhong, general manager of CSIC Asset Management Co Ltd, said earlier that offshore oil drilling demand will keep growing in the next few years with a market value of 100 billion yuan, while the industry of nuclear-powered equipment is expected to reach 50 billion yuan per year in the Bohai Bay.

Floating nuclear reactors can also be exported to economies with large populations but scarce land resources, including economies participating in the Belt and Road Initiative, such as Pakistan, Bangladesh and Myanmar, said Han.

Zhang Jinlin, an engineer of the 719 Research Institute of CSIC, said the design of the offshore nuclear power station, a typical military and civilian integration project, had taken full consideration of civilian use.

"It has also overcome multiple technological difficulties such as safety, radiation protection and waste disposal," he said.

Many companies have been working on developing offshore nuclear power stations in recent years. China General Nuclear Power Group signed a strategic cooperation agreement with CSIC in 2016 to develop a reactor design, the 200-megawatt ACPR50S for the offshore nuclear power platform.

China National Nuclear Power Co has also set up a joint venture that would have one billion yuan in registered capital to develop and produce small, floating nuclear power plants.

Exploitation of marine resources is vital to China's efforts to build itself into a maritime power, said Wang Yiren, deputy director of the State Administration of Science, Technology and Industry for National Defense.

Major Shale Gas Fields and Producing Regions in China

China Gas Data

China Gas Import & Export Volume and Prices Nov'16-Oct'17

UNIT: IMPORT VOLUME – KMT; PRICE AVG. – USD/MT

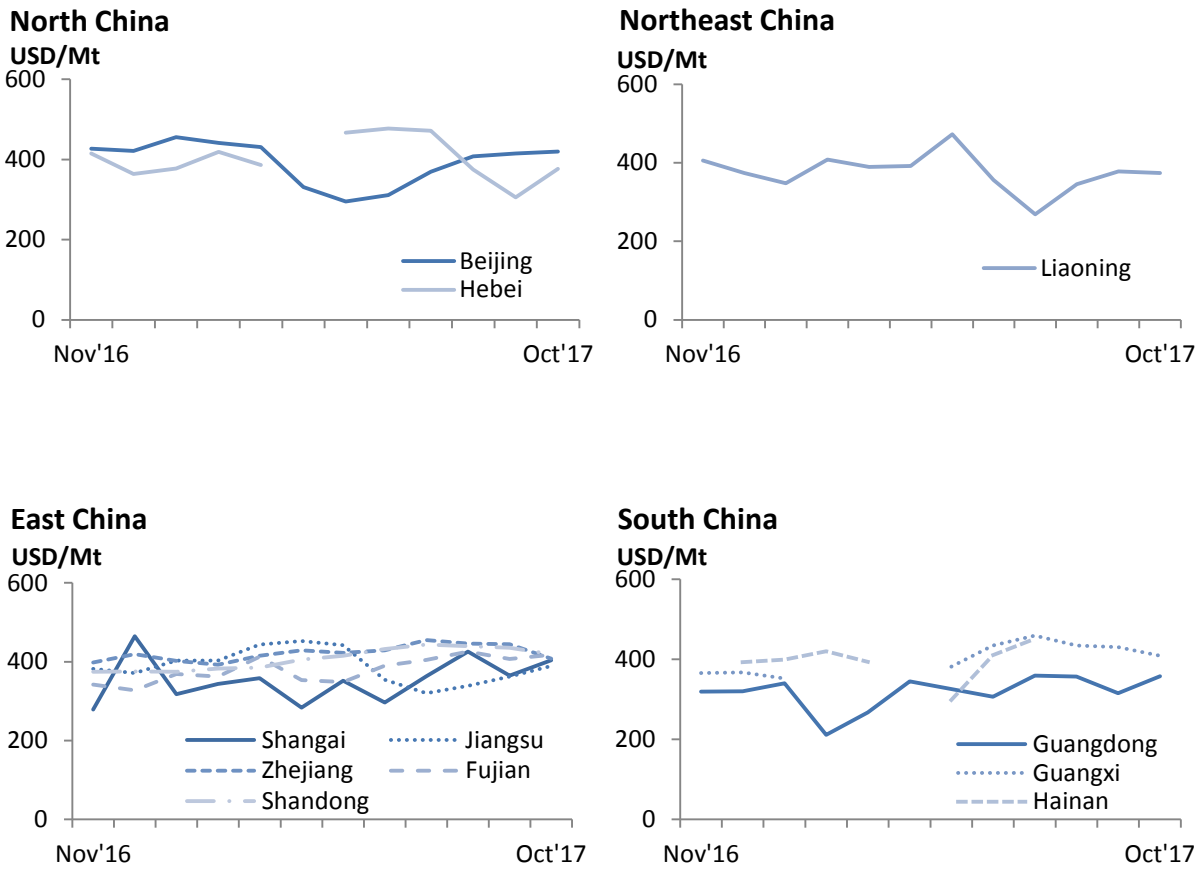
	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17	Apr'17	May'17	Jun'17	Jul'17	Aug'17	Sep'17	Oct'17
LNG Import Volume	2,659.2	3,732.5	3,436.3	2,372.3	1,990.7	2,170.6	2,911.3	3,038.2	3,120.7	3,140.1	3,453.9	3,566.9
Price Avg.			365.2	364.8	360.0	367.9	380.6	372.2	384.6	388.7	374.3	388.0
Pipe Gas Import Volume	1,959.5	2,333.0	2,390.6	2,546.3	2,298.9	2,913.9	2,504.6	2,539.7	2,625.3	2,521.1	2,490.6	2,241.7
Price Avg.			265.3	275.6	278.4	264.0	274.5	273.3	286.8	275.5	282.3	286.7
Pipe Gas Export Volume	265.9	259.1	151.3	132.9	118.8	169.4	192.7	228.4	280.5	253.9	319.6	279.1
Price Avg.			414.9	412.9	372.8	330.2	403.8	439.0	462.6	444.2	408.9	449.1

China Domestic LNG Import by Regions Nov'16-Oct'17

UNIT: KMT

	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17	Apr'17	May'17	Jun'17	Jul'17	Aug'17	Sep'17	Oct'17
North China												
Beijing	70.7	201.1	64.6	67.4	68.7	65.1	122.2	131.6	196.7	174.1	195.8	249.7
Tianjin					0.0							
Hebei	227.0	667.2	682.6	356.2	138.1		272.7	187.0	248.8	267.8	246.2	444.0
Shanxi												
Inner Mongolia												
Northeast China												
Liaoning	136.2	256.8	204.6	136.1	73.2	46.2	149.9	132.9	203.7	167.3	214.6	251.4
East China												
Shangai	191.4	90.9	516.4	245.1	217.7	188.5	252.7	187.9	284.9	123.1	317.2	150.5
Jiangsu	354.8	688.4	471.8	287.2	114.1	212.4	312.7	377.7	404.8	460.5	409.4	440.1
Zhejiang	252.4	364.0	208.0	58.1	268.2	199.5	256.2	339.1	279.0	406.7	336.3	295.3
Fujian	312.3	187.5	257.7	438.8	63.4	315.4	316.8	248.2	249.8	252.2	246.2	249.8
Shandong	292.7	435.1	363.0	370.3	288.3	303.4	292.1	432.7	365.5	358.8	437.7	369.5
South China												
Guangdong	757.1	690.3	597.1	314.0	539.1	840.1	810.1	780.0	744.3	862.4	831.1	978.2
Guangxi	64.5	138.1	66.1		211.0		66.2	204.3	72.3	67.0	136.5	138.4
Hainan		13.3	4.4	99.1	8.8		59.8	16.8	70.7		83.0	

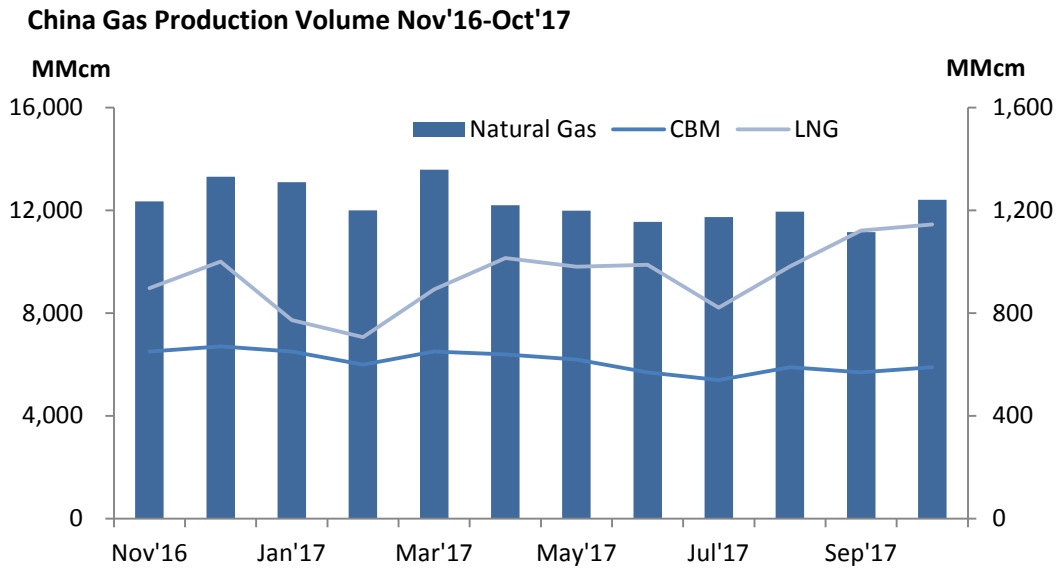
China Domestic LNG Import Prices by Regions Nov'16-Oct'17



China Gas Production Volume Nov'16-Oct'17

*UNIT: MMCM

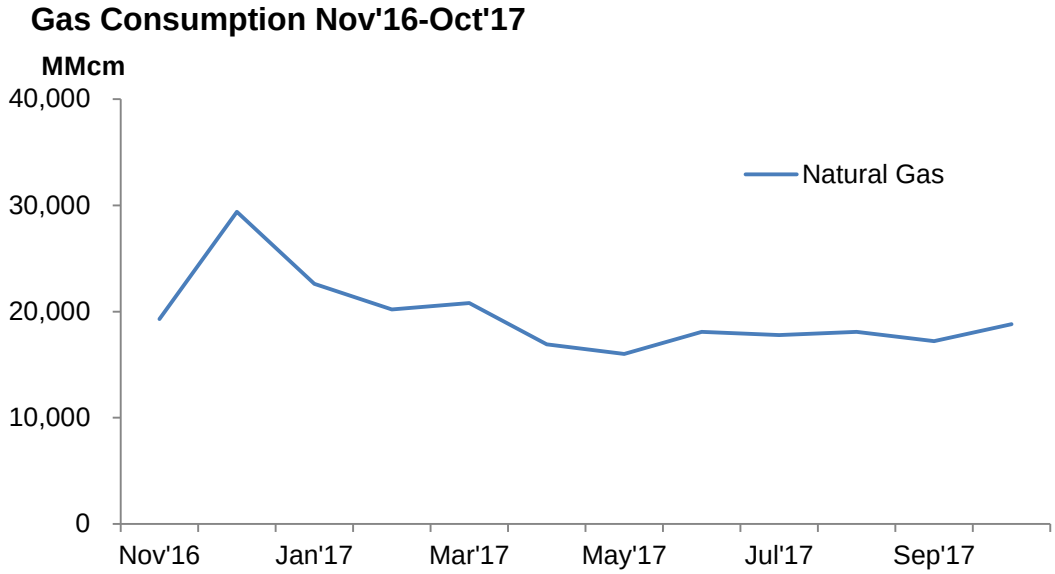
	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17	Apr'17	May'17	Jun'17	Jul'17	Aug'17	Sep'17	Oct'17
Natural Gas	12,350	13,310	13,100	12,000	13,580	12,200	11,990	11,550	11,740	11,950	11,150	12,410
CBM	650	670	650	600	650	640	620	570	540	590	570	590
LNG	898	1,001	772	707	892	1,015	981	989	821	982	1,122	1,145



China Gas Apprant Consumption Nov'16-Oct'17

*UNIT: MMCM

	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17	Apr'17	May'17	Jun'17	Jul'17	Aug'17	Sep'17	Oct'17
Natural Gas	19,300	29,400	22,600	20,200	20,800	16,900	16,000	18,100	17,800	18,100	17,200	18,800



China LNG Market Prices by LNG Factories Oct'17

*Unit: Price - Yuan/Mt; Capacity – 10,000M^3/D; T – Turnaround; H - Halt

	Capacity	1st Week	2nd Week	3rd Week	4th Week	Note
Northeast China						
Jilin Qianyuan	50	4,975	4,975	5,295	7,085	
Changchun Huarun	30	4,975	4,975	5,175	7,095	
Jianlong Steel	30	H	H	H	H	
CNOOC Yingkou	18	3,350	3,350	3,350	3,350	
East China						
Huasheng Gunzhou	50	4,575	4,575	4,975	5,075	
Zaozhuang Xueneng	68	4,715	4,615	5,295	7,675	COG
Suzhou Huafeng	10	T	T	T	T	
North China						
Huaqi Bazhou	100	4,475	4,361	5,155	7,255	
Huagang Renqiu	30	H	H	H	H	
Zhangjiakou CERCG	100	H	H	H	H	
Tanggang Gas	50	H	H	4,175	4,175	
Qian'an Chiji	90	4,425	4,565	5,135	7,535	COG
Qian'an Yihuida	35	4,425	4,545	5,235	7,675	COG
Inner Mongolia						
Erdos Xingxing	100	4,165	4,169	5,159	7,225	
Baotou Shiyi	10	H	H	H	H	
Baotou Hengtong	30	H	H	H	H	
Baotou Chuangmei	30					Self-use
Baotou Huanda	30	3,075	3,075	3,075	3,075	
Baotou Xinxingsheng	10	2,925	2,925	2,925	2,925	
Baotou Xinyuan	30					
Hohhot Wante	10	T	T	T	T	
Erdos Xinsheng	275	4,175	4,235	5,075	7,055	
Bayanzhuoer Huayou	30	H	H	H	H	
Bayanzhuoer Desheng	30	3,600	3,600	3,600	3,600	
Bayanzhuoer Hengtai	30	2,600	2,600	2,600	2,600	Self-use
Erdos Huida	30	2,930	2,930	2,930	2,930	
Erdos Juchang	20	T	T	T	T	
Erdos Shitai	30	3,980	4,075	4,890	7,450	
Erdos Jianyuan	10	T	T	T	T	COG
Inner Mongolia Lvneng	7	4,125	4,015	4,875	6,975	
Erdos Hongji	200	4,227	4,223	5,155	7,135	
Erdos ChinaCoal	100	4,155	4,087	5,105	7,375	
Inner Mongolia Hengkun	30	T	T	T	T	
Inner Mongolia Huineng	130	4,185	4,175	5,115	7,275	

	Capacity	1st Week	2nd Week	3rd Week	4th Week	Note
Inner Mongolia Sentai	120	4,125	4,175	5,155	6,695	
Sanju Jiajing	55	3,075	3,075	3,075		COG
Inner Mongolia Jingpeng	30	4,115	4,095	5,111	7,305	
Inner Mongolia Tianyuyuan	30	2,975	2,975			
Northwest China						
Ningxia Hanas	300	4,155	3,975	5,095		
Ningxia Clean Energy	60		3,895	4,785	4,633	Self-use
Yanchi Zhongyuan	100	4,195	4,107	5,055	7,215	
Ningxia Tianlifeng	100	4,185	4,048	5,175	7,271	
Ningxia Hongxing	100	4,075	4,075	4,895	7,195	
Xinjiang Borui	30					
Xinjiang Guanghui	150	3,345	3,605	4,050	5,300	
Xinjiang Hongtong	50	3,975	4,055	4,235	4,475	
Lanzhou Kunlun	30	3,220	4,064	4,975	7,475	
Gansu Xinlianhai	40	H	H	H	H	
Gansu Yongjing Saipu	20	3,050	3,050	3,050	6,135	
Huayou Ansai	200	4,217	4,131	4,825	4,825	
Dingbian Lvneng	100	4,195	4,123	5,055	7,215	
Yanchang Group	150	4,325	4,239	5,220	7,425	
Yulin Yuanheng	50	4,295	4,221	5,055	7,155	
Lvyuan Zizhou	100	4,187	4,155	5,195	6,975	
Jingbian Xingyuan	150	H	4,252	5,039	6,695	
Jingbian Xilan	50	4,265	4,193	5,145	7,035	
Hancheng Baosteel	50	4,341	4,195	5,121	6,355	COG
Shaanxi Hongcheng	50	H	H	H	H	
Yulin Huachen	50	4,155	4,165	5,025	7,215	
Lvyuan Mizhi	100	4,325	4,155	5,195	6,975	
Hancheng Longmen	100	4,347	4,225			CTG
Zhongyou Zhongtai	45	4,275	4,275	4,955	5,475	
Southwest China						
Huayou Guangyuan	100	3,700	3,700	3,700	3,700	
Huayou Guang'an	100	4,275	4,125	4,125	4,125	
Dazhou Huixin	100	4,025	4,075	4,075	5,995	
Sichuan Zhongjing	60	4,175	4,175	4,335	5,425	
Bazhong Tongkai	150	4,025	4,025	4,385	5,375	
Chongqing Minsheng	15					Self-use
Central China						
Kunlun Huanggang	500	4,275	4,275	4,455	5,575	
Henan Ancai	10	4,675	4,575	H	H	
Green Energy Hi-Tech	30	H	H	H	H	

	Capacity	1st Week	2nd Week	3rd Week	4th Week	Note
Green Energy Rongchuang	50	4,825	4,670	5,485	7,575	
Jingbao ENN	30	H	H	5,775	7,335	

China LNG Market Prices by LNG Terminals Oct'17

*Unit: Price - Yuan/Mt; Capacity – Million Mt/Yr

	Capacity	1st Week	2nd Week	3rd Week	4th Week
North China					
Tianjin FLNG	22	4,375	4,429	4,557	4,767
Caofeidian	3	4,325	4,325	4,385	6,145
Shandong Qingdao	3	5,225	5,245	5,565	7,505
East China					
Jiangsu Rudong	6.5	4,475	4,475	4,645	6,312
Zhejiang Ningbo	3	4,255	4,255	4,287	4,683
South China					
Guangdong Dapeng	2.6	3,925	3,925	3,925	4,205
Zhuhai Jinwan	3.5	3,875	3,875	3,875	4,085
Dongguan Jiufeng	1.5	3,925	3,925	3,925	4,275
Fujian Putian	3	3,855	3,855	3,855	3,979
Southwest China					
Guangxi Beihai	3	3,610	3,610	3,610	3,896
Northeast China					
Liaoning Dalian	3	4,325	4,325	4,325	4,425

China LNG Market Prices by CBM Factories Oct'17

*Unit: Price - Yuan/Mt; Capacity – 10,000M^3/D

	Capacity	1st Week	2nd Week	3rd Week	4th Week
North China					
Shanxi Yigao CBM	90	4,475	4,335	5,195	7,395
Shanxi Jincheng Tianyu CBM	30	4,525	4,355	5,275	7,435
Yangcheng Shuntianda	30	4,475	4,335	5,195	7,395
Shanxi Haokun	50	4,475	4,335	5,115	7,395
Jincheng Huagang	150	4,475	4,335	5,155	7,395
Shanxi CBM	100	4,475	4,335	5,115	7,395
Qinshui Xinneng		4,475	4,335	5,195	7,395

China LNG Prices by Region Oct'17

*Unit: Yuan/Mt

	City	1st Week	2nd Week	3rd Week	4th Week
Northeast China					
Jilin	Changchun	4,998	5,154	5,747	8,027
Liaoning	Shenyang	5,138	5,213	5,665	7,645
Heilongjiang	Harbin	5,193	5,275	5,737	7,717
East China					
Anhui	Hefei	5,135	5,222	5,824	7,014
Hubei	Wuhan	5,619	5,658	6,341	7,731
Hunan	Changsha	3,561	3,571	3,585	3,573
Jiangsu	Nanjing	4,960	4,999	5,490	6,719
Jiangxi	Ganzhou	5,358	5,426	5,905	6,857
Jiangxi	Nanchang	4,947	5,017	5,499	6,451
Zhejiang	Hangzhou	5,468	5,552	6,152	7,342
Zhejiang	Jinhua	5,242	5,298	5,703	6,563
Zhejiang	Zhoushan	5,189	5,245	5,650	6,509
South China					
Fujian	Putian	3,855	3,855	3,855	3,979
Guangdong	Guangzhou	5,235	5,334	5,877	7,253
Guangdong	Chaozhou	5,486	5,599	6,220	7,752
Guangdong	Foshan	5,207	5,306	5,849	7,222
Guangdong	Zhanjiang	5,611	5,724	6,344	7,873
Southwest China					
Guangxi	Nanning	4,655	4,755	4,875	5,794
Guizhou	Guiyang	4,459	4,499	4,504	5,367
Sichuan	Chengdu	4,675	4,969	5,258	6,682
Yunnan	Qujing	4,693	5,000	5,234	6,716
Yunnan	Yuxi	4,862	5,156	5,444	6,868
North China					
Shandong	Yantai	5,418	5,248	5,786	7,756
Shandong	Jinan	5,319	5,376	5,617	7,545

China Spot Prices: Gas vs LPG vs Coal Nov'16-Oct'17

*Unit: Yuan/Mt

	Nov'16	Dec'16	Jan'17	Feb'17	Mar'17	Apr'17	May'17	Jun'17	Jul'17	Aug'17	Sep'17	Oct'17
LNG	3,040	3,130	3,080	3,110	3,150	2,990	2,930	2,950	2,970	3,120	3,150	3,950
LPG	3,600	3,850	4,100	4,270	4,040	4,190	3,860	3,580	3,130	3,570	4,050	4,630
Steam Coal	624	597	592	588	595	602	595	573	580	582	580	583

China LNG Transportation Fee Oct'17

*Unit: Yuan/Km • Mt

	1st Week	2nd Week	3rd Week	4th Week
Northwest China (>2,000km)	0.55-0.6	0.55-0.6	0.54-0.65	0.54-0.65
North China (1,000-1,500km)	0.62-0.68	0.62-0.68	0.69-0.75	0.69-0.75
North China (<1,000km)	0.65-0.75	0.65-0.75	0.7-0.85	0.7-0.85
Central China (500-1,000km)	0.9-1.0	0.9-1.0	0.73-0.92	0.73-0.92
Central China (1,000-1,500km)	0.75-0.85	0.75-0.85	0.65-0.73	0.65-0.73
Central China (>1,500km)	0.8	0.8	0.56-0.65	0.56-0.65
South China (500-800km)	0.65-0.85	0.65-0.85	0.75-0.8	0.75-0.8
East China (500-1,000km)	0.68-0.7	0.68-0.7	0.68-0.7	0.68-0.7

China Natural Gas Wellhead & Pipeline Prices Oct'17

*Unit: Yuan/1,000M^3

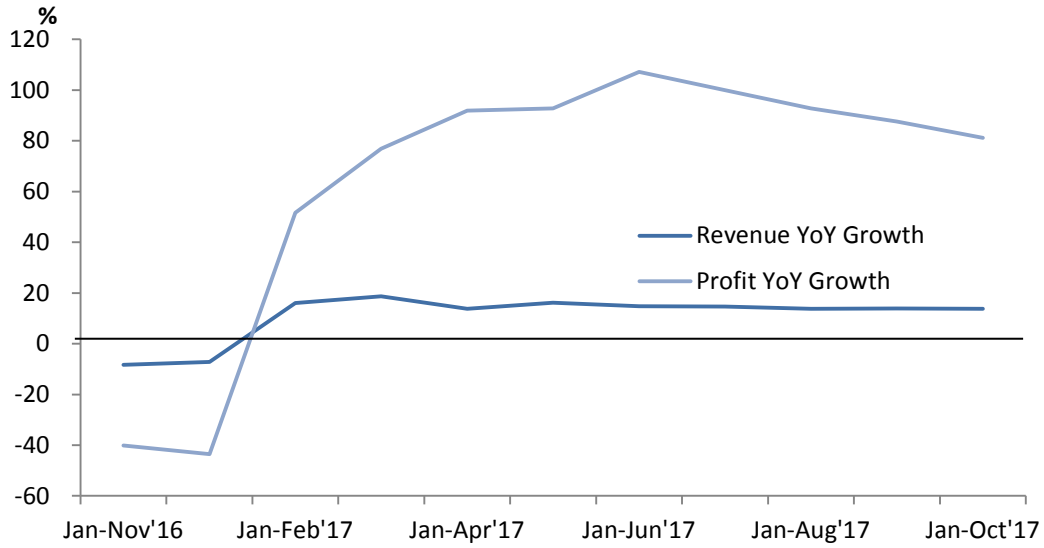
Pipeline Name	Use	Price
West-East Gas Pipeline	Fertilizer Gas Price	790
	Industrial Price	1,190
	City Gas Price(Industry)	1,190
	City Gas Price(Exc.Industry)	790
Zhongxian-Wuhan Gas Pipeline	Fertilizer Gas Price	1,141
	Industrial Price	1,541
	City Gas Price(Industry)	1,541
	City Gas Price(Exc.Industry)	1,141
Shaan-Jing Gas Pipeline	Fertilizer Gas Price	1,060
	Industrial Price	1,460
	City Gas Price(Industry)	1,460
	City Gas Price(Exc.Industry)	1,060
Sichuan West-East Pipeline(From Sichuan to Shanghai)	Fertilizer Gas Price	1,510
	Industrial Price	1,510
	City Gas Price(Industry)	1,510
	City Gas Price(Exc.Industry)	1,510

Gas Field	Use	Price
Sichuan-Chongqing Gas Field	Fertilizer Gas Price	920
	Industrial Price	1,505
	City Gas Price(Industry)	1,550
	City Gas Price(Exc.Industry)	1,150
Changqing Oil Field	Fertilizer Gas Price	940
	Industrial Price	1,355
	City Gas Price(Industry)	1,400
	City Gas Price(Exc.Industry)	1,000
Qinghai Oil Field	Fertilizer Gas Price	890
	Industrial Price	1,290
	City Gas Price(Industry)	1,290
	City Gas Price(Exc.Industry)	890
Oil Fields in Xinjiang	Fertilizer Gas Price	790
	Industrial Price	1,215
	City Gas Price(Industry)	1,190
	City Gas Price(Exc.Industry)	790
Oil Fields in Dagang, Liaohe & Zhongyuan	Fertilizer Gas Price	940
	Industrial Price	1,570
	City Gas Price(Industry)	1,570
	City Gas Price(Exc.Industry)	1,170
Other Oil fields	Fertilizer Gas Price	1,210
	Industrial Price	1,610
	City Gas Price(Industry)	1,610
	City Gas Price(Exc.Industry)	1,210

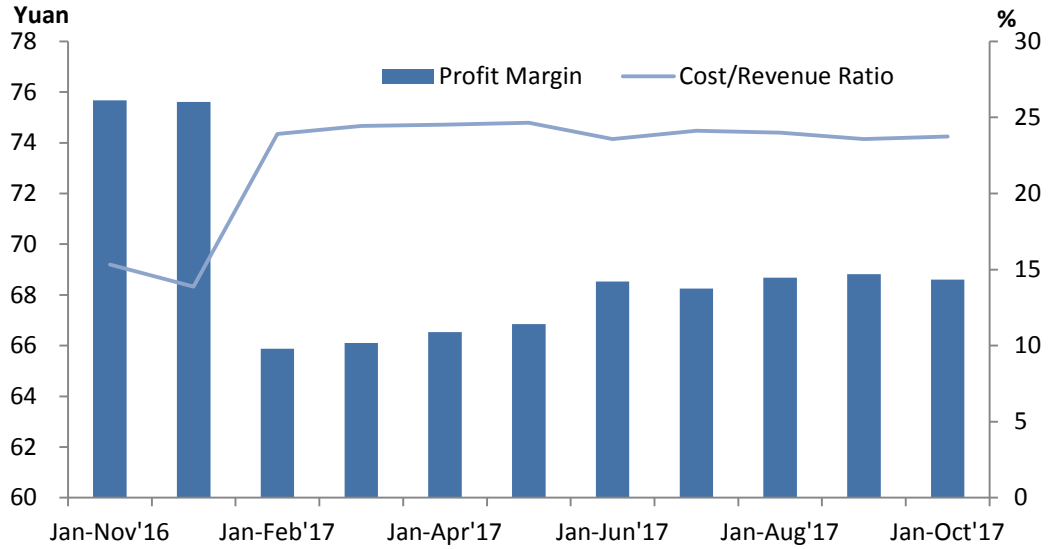
Macro Economy Index

Profit Data - China Natural Gas Production Industry Nov'16-Oct'17

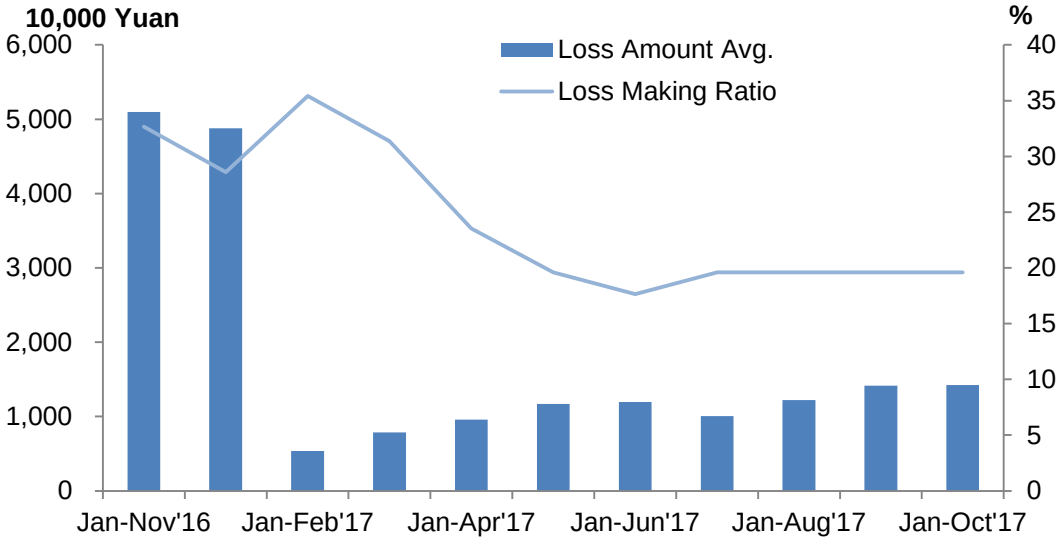
Revenue & Profit Growth



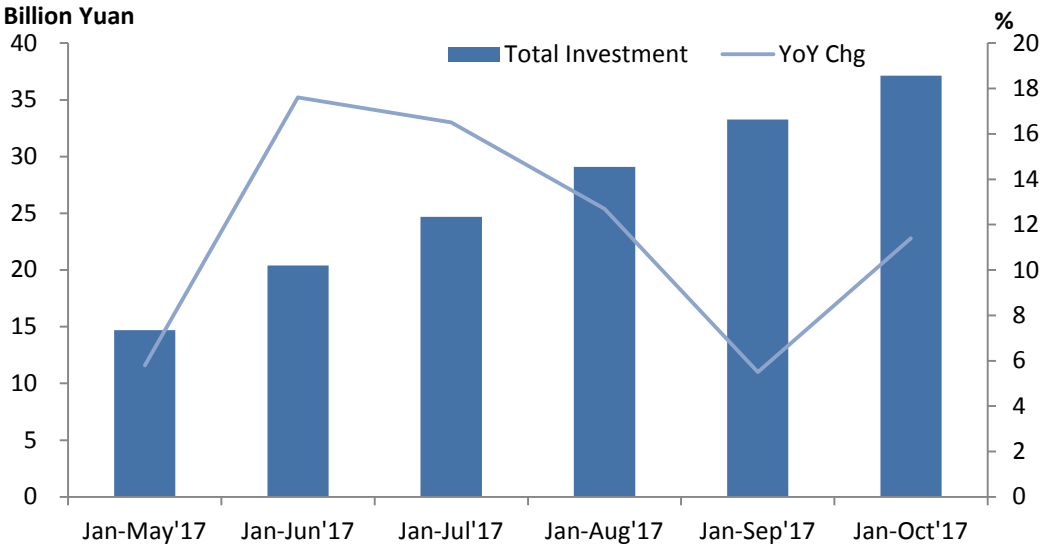
Profit Margin & Cost/Revenue Ratio



Loss Making Ratio & Loss Amount Ratio



Total Investment



China Power Generation Amount by sources Nov'16-Oct'17

*Unit: 100 Million KWH

	Nov'16	Dec'16	Jan-Feb'17	Mar'17	Apr'17	May'17	Jun'17	Jul'17	Aug'17	Sep'17	Oct'17
Thermal	3,797.0	4,235.8	7,279.9	3,960.8	3,521.8	3,552.7	3,709.7	4,334.3	4,310.0	3,622.7	3,475.0
Hydro	803.6	650.5	1,228.7	725.2	743.4	885.9	1,044.3	1,246.4	1,167.9	1,121.8	1,078.6
Nuclear	194.8	213.6	333.5	213.9	202.6	204.8	199.1	230.8	230.2	219.4	201.2
Wind	208.4	199.5	398.0	220.4	249.0	248.9	196.6	180.2	182.7	200.0	229.6
Solar	30.2	29.4	74.8	48.5	50.2	54.7	53.2	55.7	54.7	55.6	53.6

Note: The approximate conversion coefficient of the related units for Natural gas

	MMBtu	mt	m^3
MMBtu	1.0	0.0	0.0
mt	52.0	1.0	1.4
m^3	36.0	0.7	1.0

Note: Because the gas quality of different gas fields is different, the unit conversion coefficient is also different, but in order to maintain the unity, the data in the table adopts the"The yearbook of BP world energy statistics"

Other relevant unit conversion:

1 Mt=2205 lb=1.102 sh.ton=0.984 long ton

1 m^3=1000 liter=35.315 ft^3=6.29 bbl

1 cal=4.1868 J 1 kcal =4186.75 J

1 Btu＝1055.06 J

1 kW•h=3.6×10^6 J

The Thermal equivalent:

1 barrels of crude oil=5800 M^3 of natural gas (according to the calculation of average calorific value)

1 M^3 of natural gas= 1.3300 kilograms of standard coal

1 kilograms of crude oil= 1.4286 kilograms of standard coal

1 BCM= 100 MMcm

1 tcf=1,000 MMcf

1 bpd=1 barrels per day

Abbreviated From: (By alphabetically)

BTU - British Thermal Units

CBM - Coal-bed Methane

CTL - COAL TO LIQUIDS

CTG – Coal to Gas

UCG - UNDERGROUND COAL GASIFICATIO

CUCBM - China United Coal Bed Methane

CNPC - China National Petroleum Corp

CNOOC - China National Offshore Oil Corp

IOCs - International Oil Companies

IEA - The International Energy Agency

NDRC - National Reform and Development Commission

NOCs - National Oil Companies

NEA - The Nation Energy Administration

SIPC - Sinopec International Petroleum Corporation

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sz Energy Intelligence Co., Ltd

Energy Department	**Jeffrey Jiang**
Tel: 86-21-54383583	**Fax: 86-21-31159335**
Email: szintelligence@gmail.com	**editor@energychinaforum.com**