

## INDUSTRY OVERVIEW

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### OVERVIEW OF GLOBAL ENERGY INDUSTRY

#### Global primary energy consumption

The growth of world economy in recent years has fuelled the continuous growth in the consumption of primary energy. According to a research issued by EIA, world's primary energy consumption is forecasted to increase at an average annual rate of approximately 2.0% over the period from 2002 to 2025, higher than the corresponding rate of approximately 1.4% over the preceding 13-year period (1990 – 2002). The world's primary energy consumption in 2025 is expected to reach approximately 644.6 quadrillion Btu, representing an increase of approximately 56.6% from approximately 411.7 quadrillion Btu in 2002. The following table shows the amount of world's primary energy consumption by different types of energy sources in 1990 and 2002 and the forecasted amount in 2025 respectively:

Primary energy consumption (history and projections)	Quadrillion Btu			Share (%)			Average annual growth rate(%)	
	1990	2002	2025	1990	2002	2025	1990- 2002	2002- 2025
<b>Total</b>	<b>348.2</b>	<b>411.7</b>	<b>644.6</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>1.4</b>	<b>2.0</b>
Oil	136.0	159.4	243.4	39	39	38	1.3	1.9
Natural gas	75.0	95.2	162.1	22	23	25	2.0	2.3
Coal	90.5	98.1	156.1	26	24	24	0.7	2.0
Nuclear	20.3	26.9	34.1	6	6	5	2.4	1.0
Other	26.4	32.1	48.9	7	8	8	1.6	1.9

*Source: **History:** EIA, International Energy Annual 2002, (Washington, DC, March 2004); **Projections:** EIA, Annual Energy Outlook 2005, (Washington, DC, February 2005).*

#### Global natural gas market

Natural Gas is an important energy source in the world, representing approximately 23% of the world's primary energy consumption in 2002. It is one of the cleanest, safest, and most useful of all energy sources. The Directors consider that as the pollutants emitted by natural gas are only a fraction of those emitted by many other energy sources such as coal and crude oil, natural gas is often regarded as a preferred energy source in future and an environmentally friendly alternative to other fossil fuels. Natural gas can apply to power generation, residential, industrial and vehicular use.

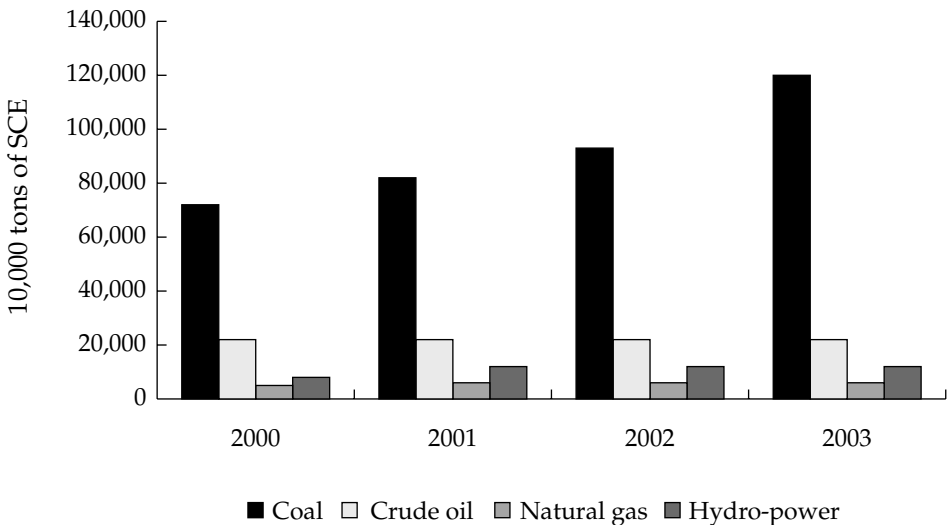
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Global warming and erratic weather patterns have attracted the world’s attention to the environmental problems caused by air pollution in recent years and discussions have taken place regarding the Group’s consumption of the different types of energy. According to International Energy Outlook 2005 issued by EIA, consumption of natural gas is expected to increase continuously and such growth in consumption is driven by the continuous demand from developing countries. As indicated in the table set out in the section headed “Industry overview – Global primary energy consumption” in this prospectus, the consumption of natural gas is projected to increase by approximately 70.3% between 2002 and 2025, from approximately 95.2 quadrillion Btu in 2002 to approximately 162.1 quadrillion Btu in 2025.

### OVERVIEW OF THE PRC ENERGY INDUSTRY

According to the International Energy Agency (IEA), the PRC is the world’s second largest energy producer and consumer after the United States. Coal is currently the most important source of energy in the PRC in terms of consumption. It is considered that future economic development of the PRC might be hindered by the reliance of coal and oil as the major energy source and related environmental problem caused by the consumption of fossil fuels. While coal remains the dominant fuel in power generation in the PRC, its combustion causes air pollution and other damages to the environment. The PRC ranks second and first in CO<sub>2</sub> and SO<sub>2</sub> emission respectively. Furthermore, one third of PRC’s current oil supply is dependent on import and this level is increasing. The following graph illustrates the composition of production supply of different energy source in the PRC from 2000 to 2003:

**Total production of energy and its composition**



Source: China Statistical Yearbook 2004, National Bureau of Statistics of the PRC, 2005.

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In light of the PRC's anticipated demand for energy so as to accompany its continuous economic growth, the PRC Government is stepping up its effort to ensure efficient energy usage and to identify alternative energy sources to tackle any possible energy shortage. According to the 10th Five-Year Plan (2001-2005) of the Ninth National People's Congress for the energy sector, it is a priority for the PRC to rationalise the nation's energy supply and consumption structure, by increasing the production supply of clean and more efficient energy sources including natural gas, hydropower and other clean fuels and reducing the share of coal in selected end-uses. The share of coal in the PRC's primary energy supply is expected to drop from approximately 70% in 2000 to approximately 60% in 2030.

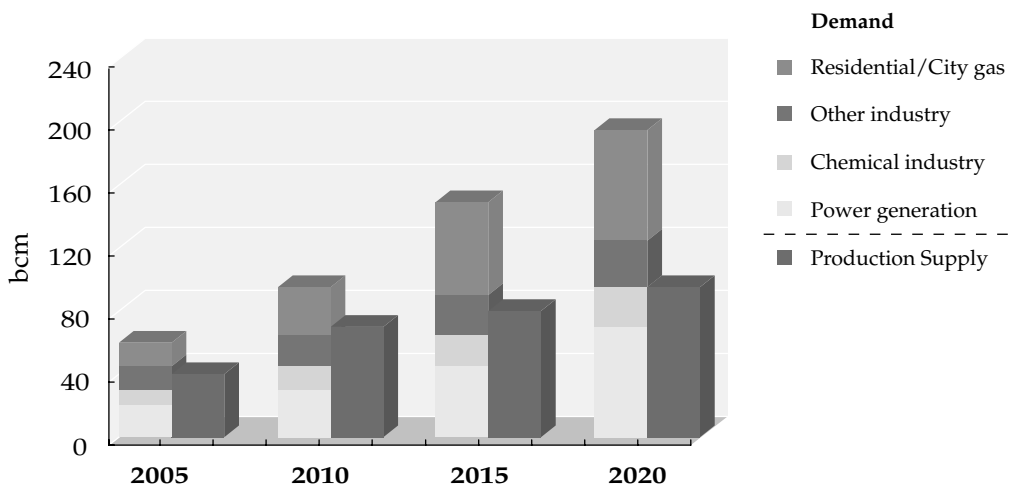
### The PRC natural gas market

The production supply of natural gas accounted for approximately 3.2% in the total energy supply, while the consumption of natural gas accounted for approximately 2.7% of the total PRC primary energy consumption in 2002. Such consumption level of natural gas is far below the world average of approximately 25% to 30%.

In order to rationalise the energy supply and consumption structure, pursuant to the 10th Five-Year Plan of the Ninth National People's Congress, it is a priority to increase the share of natural gas in the composition of the PRC's energy supply. The PRC Government is targeting to increase natural gas consumption to approximately 6% of the total PRC primary energy consumption by 2010. The PRC Government has decided to construct natural gas infrastructure including the country's first LNG import terminal in Guangdong and the 4,000km-long "West-to-East Pipeline".

The graph below indicates the demand and production supply of natural gas in the PRC by sector application in 2005, 2010, 2015 and 2020 respectively:

**Forecast of demand and production supply of natural gas  
by sector application of the PRC**



Source: *China's Energy Development Report 2003*, Beijing Academy of Economic Development Institution, 2004.

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It is expected that natural gas will continue to apply to the power, residential and industrial use (including chemical industry as feedstock and vehicular use).

By 2020, the demand of natural gas is forecasted to increase to approximately 200.0 bcm, representing an increase of approximately 785.0% when comparing to a demand of approximately 22.6 bcm in 2000. It is projected that approximately 37.5% of the total demand of natural gas in the PRC in 2020 will apply to the power generation sector and approximately 35.0% is forecasted to apply to the city gas sectors including natural gas vehicles.

The State Environmental Protection Administration of the PRC has taken a series of measures to reduce the extent of air pollution including the launch of National Clean Vehicle Campaign (國家清潔汽車行動) to advocate the use of natural gas vehicles since 1999.

Currently, there are more than 20 cities in the PRC that have launched the reinstallation of gas engines and conversion to natural gas vehicles. The PRC have reinstalled more than 50,000 vehicles, with more than 160 related gas fuelling stations to facilitate the convenient use of natural gas vehicles. In addition, a number of cities such as Beijing, Shanghai and Chongqing, have also promulgated preferential policy to encourage the development of natural gas vehicles.

In Beijing, as the 2008 Olympic host city, all buses commenced conversion to run on CNG from 2001, and taxis and other vehicles fleet will gradually convert to run on CNG. In Shanghai, all taxis will be converted to natural gas vehicles before 2005. The Directors expect that within the next decade, diesel-driven buses will be phased out and most taxis will run on CNG in all large cities in the PRC. It is expected that demand for the construction of natural gas refueling stations and other related natural gas equipment will increase. As part of the support to the utilisation of natural gas vehicles, construction of natural gas refueling stations is being expedited.

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### Supply of natural gas in the PRC

According to the International Energy Agency, the PRC has proven reserves of approximately 1.5 trillion m<sup>3</sup>.

The PRC Government has commenced the construction of a 4,000 km-long pipeline network since July 2002, known as the “West-to-East Pipeline” project, aiming to carry natural gas from deposits in the western Xinjiang province to Shanghai, and picking up additional gas in the Ordos Basin along the way.

Another supply source of natural gas will be from Kazakhstan. Construction of the Sino-Kazakh crude pipeline project has begun in 2004, aiming to transport gas from Kazakhstan to the PRC. It is a major land-based cross-border pipeline project with an investment of approximately US\$3 billion. It is currently expected to complete in 2006.

The PRC Government also intends to build LNG import terminals initially along the south-eastern coastal region of the PRC with an aim to import LNG for the supply of natural gas to the south-eastern area of the PRC. In March 2001, the plan to build the PRC’s first LNG import terminal in Guangdong was announced and a supply contract has already been signed for the import of LNG from Australia. Such terminal is expected to begin operation by late 2005 and is designed to serve Guangdong province and the surrounding regions. A second LNG terminal is planned to be built in Zhangzhou, Fujian province. A supply agreement has been concluded for the import of LNG from Indonesia.

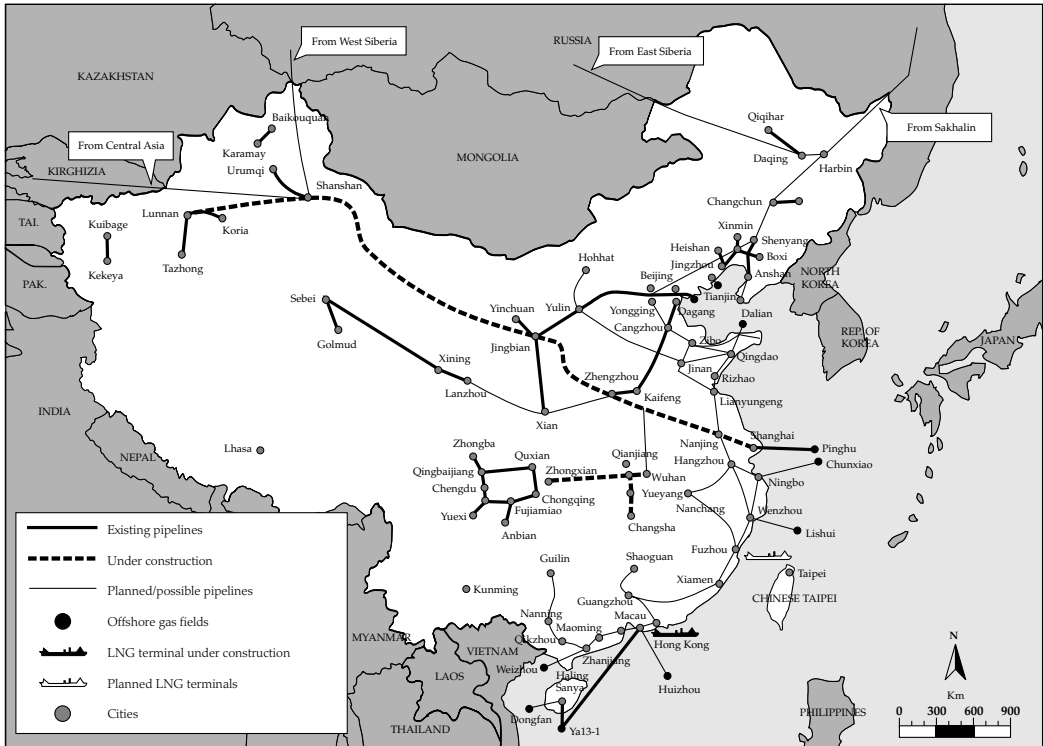
Apart from the above, other pipelines are being developed to link smaller natural gas deposits to consumers. A pipeline was completed in early 2002 linking the Sebei natural gas field in the Qaidam Basin to the city of Lanzhou in Gansu province, the PRC. Another project is planned to link gas deposits in Sichuan province in the southwest to Hubei and Hunan provinces in the PRC.

The Directors consider that the above projects contribute towards building the supply infrastructures which are necessary for the development of the natural gas market in the PRC.

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## Investments in natural gas infrastructure in the PRC

The PRC is aiming to lay down an effective natural gas supply system. The map below shows the current and expected gas distribution network and infrastructure:



Source: *Developing China's Natural Gas Market*, the International Energy Agency, 2002.

In terms of supply of natural gas, it generally refers to exploitation, storage, transportation and distribution and delivery. Natural gas can be stored in pressure vessels or gas tanks, while distribution and delivery will involve infrastructures such as gas-pressure regulating station, refueling station, compressors and pipelines. In terms of transportation, natural gas can be transported through pipelines, tank truck and trailers, and ocean tankers.

Regarding the LNG import terminals in the south-eastern area of the PRC, natural gas in the form of LNG is to be transported by large ocean tankers. Once the ocean tankers docked at the port/terminals, LNG is then collected and stored in large insulated tanks, awaiting for further processing and distribution in accordance with the customers need. Large storage and processing facilities are generally constructed at the terminals.

Regarding the “West-to-East Pipeline” project and the Sino-Kazakh crude pipeline project, natural gas is to be delivered onshore through the pipeline networks from gas fields to the depots where there are concentrated demands. Compression is required to deliver natural gas through the pipeline networks. Compressor stations are built at an interval of 40 to 100 miles along the pipeline in order to ensure the natural gas is safely delivered under constant pressure.

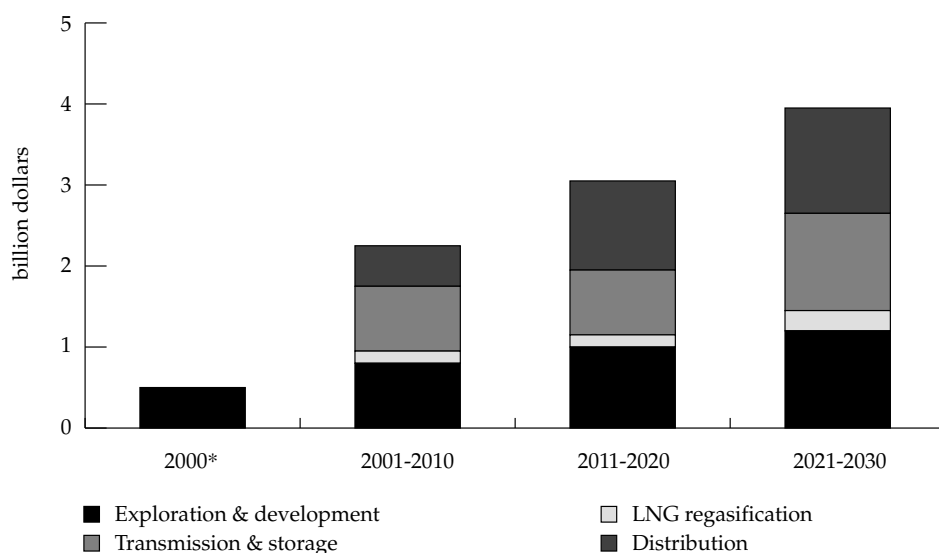
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Large pipeline networks, ocean tankers and large storage and processing facilities at the import terminals are generally used to transport and deliver natural gas in large volume and long distances.

For comparatively shorter distance of delivery, natural gas, either in the form of LNG or CNG, can be delivered through pipeline networks or trailers or tank trucks. It is commonly regarded that CNG provides a convenient and economical way of delivery at place where pipeline networks to end users are not well established.

The Directors expect that as the PRC Government is committed to further develop the natural gas market, equipments, machinery and pipeline networks are necessary to be put in place for the purposes of exploitation, storage, transportation and distribution and delivery.

The PRC Government plans to invest approximately RMB220 billion in developing natural gas industry by 2020, including 50,000 kilometers of pipelines, LNG terminals and LNG/CNG transportation facilities. The PRC Government has been making a long-term plan to better exploit and utilise natural gas to enhance the national energy supply and consumption mix. The following chart shows the annual investment amount in association with the natural gas market in the PRC for the periods from 2000 to 2030:



Source: *World Energy Investment Outlook 2003 Insight*, International Energy Agency, 2003.

### PRC regulations for manufacturing, designing and selling gas equipment

A series of regulations on quality and safety supervision for special gas products and equipment have been enacted by the PRC Government, including without limitation, the Supervision Administration Regulation for Manufacture of Boiler and Pressure Vessel 《鍋爐壓力容器製造監督管理辦法》, the Regulation on Safety Supervision of Special Equipment 《特種設備安全監察條例》, the Administrative and Qualifying Rules for the Design of Pressure Vessels and Pipelines 《壓力容器壓力管道設計單位資格許可與管理規則》, Regulation For Compulsory Product Certification 《強制性產品認證管理規定》,

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Measures for the Administration of Manufacturing Licence for Industrial Products 《工業產品生產許可證管理辦法》, the Notice Relating to the Reform of Vehicles Production Enterprises and Products Record Management (《關於車輛產品目錄管理改革有關問題的通知》), the Announcement regarding Vehicles Production Enterprises and their products 《車輛生產企業及其產品公告》 and Law of People's Republic of China on Prevention and Control of Radioactive Pollution 《中華人民共和國放射性污染防治法》.

### Pressure vessel

GAQSIQ is the authority responsible for safety supervision and administration of special equipment manufactured and used in the PRC. The Special Equipment Licensing Office of GAQSIQ is in charge of special equipment manufacturers' application for special equipment licence, generate survey for GAQSIQ to review, and maintain a licensing database of overseas and domestic special equipment manufacturers.

On 1 January 2003, GAQSIQ launched Supervision Administration Regulation for Manufacture of Boiler and Pressure Vessel 《鍋爐壓力容器製造監督管理辦法》, which is aimed to regulate the manufacturing and sales of boilers and pressure vessels in the PRC and assure their compliance with safety performance standards of both human life and property. The three supporting documents, namely the Requirements for Boiler and Pressure Vessel Manufacture Licensing, the Procedures for Manufacture Licensing of Boiler and Pressure Vessel, and Supervisory Inspection Rule for Safety Performance of Boiler and Pressure Vessel Products took effect on 1 January, 2004. The key terms of these regulations include: (1) All boiler and pressure vessel products manufactured and/or used in the PRC, shall be subject to registration and mandatory supervisory inspection for safety performance; (2) manufacturers shall apply special manufacturing licences to sell their products in the PRC; (3), manufacturers must meet specific standards, and their products shall pass the required trial-production test to obtain licence; (4) manufacturers can only produce those product categories stated in its licences (currently, the Administrative and Qualifying Rules for the Design of Pressure Vessels and Pipelines classified all pressure vessels into four classes: A, B, C and SAD grade); (5) manufacturing licence is valid for a period of four years and subject to renewal; (6) safety performance of boilers and pressure vessels will be inspected in manufacturing process; and (7) manufacturing licence will be suspended or revoked if manufacturers' products have serious problems or cannot be in conformity with the requirements of manufacturing licence.

On 18 August 2002, GAQSIQ announced the Administrative and Qualifying Rules for the Design of Pressure Vessels and Pipelines. This regulation states that pressure vessels designing institutions and manufacturers must obtain the qualification required for conducting design activities of pressure vessels.

The State Council promulgated the Regulations on Safety Supervision of Special Equipment on 19 February 2003 to supervise the safety performance inspection of production process (including design, manufacture), the testing and examination process and the associated service (including installation, alternation, maintenance and repair) of special gas equipment including boilers, pressure vessels, pressure pipelines, etc.



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The Group has obtained Manufacturing Licence for Pressure Vessel, Certificate of Registration for Manufacturing of Seamless Pressure Cylinder and Design Permit for Pressure Vessel to conduct its manufacture and design activities in relation to pressure vessel respectively.

According to the Notice Relating to the Reform of Vehicles Production Enterprises and Products Record Management (《關於車輛產品目錄管理改革有關問題的通知》) promulgated by the SETC on 22 May 2001, all automobile manufacturers and the models of vehicles manufactured by them must obtain the registration on the Nation-wide Catalogue of Enterprises engaged in the Production of Automobiles, Modified Automobiles and Motorcycles and Related products (“Approved Catalogue”) before they can legally sell their products in the PRC. The automobile manufacturers and the model number of automobiles, which have been approved by SETC, will be published by way of the Public Notice. The Group has obtained relevant registration under the No. 40 Approved Catalogue published by NDRC dated 13 July 2004 for selling its trailer and tank truck products in the PRC.

### **Compressor**

Measures for the Administration of Manufacturing Licence for Industrial Products (“Measures”), enacted by GAQSIQ on 19 April 2002, formulated the Catalog of Products subject to the System for Industrial Products (“Catalog”). Pursuant to the Measures, the manufacturing and selling of compressor products in the Catalog are required to obtained National Industrial Product Manufacturing Licence issued by GAQSIQ.

### **Integrated business solutions**

As the integrated business solutions of the gas energy industry is a newly emerged business model which includes the provision of value-added service, such as system design, on-site installation and training program as well as the sale of gas equipment like natural gas compressors, pressure vessels and CNG trailers to the customers who are the operator of CNG refueling stations, so far only the regulations in relation to the gas equipment including compressors and pressure vessels as mentioned in this section above apply to this business as at the Latest Practicable Date.

As confirmed by the PRC legal advisers, the Group has obtained relevant licences, permits and certificates necessary to conduct its operations in the PRC and has complied in all material respect with all applicable laws and regulation in the PRC since its establishment.