Current Status and Development Trend of Natural Gas Industry in China

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Abstract: In China, the proven reserves of natural gas is 3.86 trillion cubic meters (tcm). This figure will quite possibly increase at a high speed in the future. At present, the annual production of natural gas has exceeded 34 billion cubic meters (bcm), which, likewise, will rise sharply. The pipeline construction has basically taken shape, which will be gradually perfected. And the gas consumption market is in the startup stage, which will be rapidly expanded in the quite near future.

Key words: natural gas industry, development trend, resources, demands, consumption

1. Proven reserves of natural gas is 3.86 tcm, this figure will increase at a high speed in the future

By the end of 2003, the cumulative proven gas reserve has reached 3.86 tcm in China, which are distributed among 21 basins, mainly concentrated in the 11 basins including Sichuan, Ordos, Tarim, Southeast Hainan, Yinggehai, the East China Sea, Songliao, Junggar, Tuha, etc. The reserves of the aforesaid 11 basins account for 98% of the total reserve in China.

According to the latest assessment and estimation of resources, the natural gas reserve is about 47 tcm in China, which are distributed among 21 basins, mainly concentrated in the 11 basins including Sichuan, Ordos, Tarim, Southeast Hainan, Yinggehai, the East China Sea, Songliao, Junggar, Tuha, etc. The reserves of the aforesaid 11 basins account for 98% of the total reserve in China; in other words, over 4/5 reserves are yet to be found. In the six main exploratory regions for natural gas, including Sichuan, Ordos, Tarim, Tsaidam, Ying-Qiong and the East China Sea, the prospecting degree is generally not high. In addition to a number of discovered large and medium-scale gas fields, new discoveries are on the stream during recent years, reflecting a good prospect for the continued development of gas exploration in China. According to geological analysis and multiple-approach forecasts, the proven gas reserve will continue to increase at a high speed during the following 10 years, with the yearly increase averaged over 200 bcm.

2. At present, the production of natural gas has exceeded 34 bcm, which will be raised sharply

Whereas, at the end of 1950s’, a number of medium and small gas fields were discovered in the southeast Sichuan Basin, the yearly gas production of China reached 1 billion cubic meters in 1960. Along with the discovery of many gas fields in the Songliao Basin and the Bohai Bay Basin, the production of oilfield associated gas was raised appreciably, and, by 1976, the yearly production of natural gas had exceeded 10 bcm. With the development of the YA 13-1 Gas Field in the Southeast Hainan Basin of the South China Sea, the yearly production of natural gas
exceeded 20 bcm in 1996. With the large-scale gas development in the Ordos Basin and the Tsaidam Basin during recent years, the yearly production of natural gas exceeded 30 bcm in 2001 and reached 34.128 bcm in 2003.

By the end of 2002, the residual recoverable gas reserve had been 1,863.2 bcm; and, in 2002, the yearly production of wellhead gas was 23,931 bcm, with the reserve-production ratio being 77.86. As for the PetroChina, the above three figures are respectively 1,481 bcm, 16.9 bcm, and 87.6. Generally, the gas production may be maintained stable when the reserve-production ratio is kept around 25. The reserve basis is available for the substantial increase of yearly gas production in China, and now the maturity of pipeline and market conditions is approaching.

In 1998, the production of natural gas was 22.321 bcm in China, while, in 2003, the figure is 34.128 bcm, with the yearly increase averaged at 2.36 bcm. With the completion of the West Gas to East Pipeline, the Zhongxian-Wuhan Pipeline, and the Shaan-Jing Line 2, it is hopeful that the natural gas production of China will exceed 50 bcm.

It is forecast that, after 2005, the production of natural gas will continue its increase along with the growth of markets and construction of new pipelines. By 2010, it is possible to reach or even exceed the production of 80 bcm.

3. Pipeline construction has basically taken shape, which will be gradually perfected

Through construction during the past years, the loop-type gas transmission network has been established connecting the developed gas fields in Sichuan Basin with the main consumption areas. A radiating pipeline network has been formed centered on Jingbian of the Ordos Basin, delivering natural gas to Beijing and Tianjin, the Guanzhong Plain, and the Yinchiuan Plain; and centered on the Sebei Area to the east of Tsaidam Basin, a gas pipeline connects Dunhuang, Geermu, and Xining-Lanzhou together. In addition, the submarine pipeline has been established from YA 13-1 Gas Field in the South China Sea to Hong Kong, as well as the submarine pipeline from Pinghu of the East China Sea to Shanghai City.

To be completed soon, the West Gas to East Transmission Pipeline passes across two gas-bearing basins, namely, Tarim and Ordos, which are to be the main gas sources. Besides, one gas pipeline is to be constructed for connecting the Tsaidam Basin with the Ordos Basin. Having been commenced, the Zhongxian-Wuhan Pipeline transmits the gas of Sichuan Basin to Wuhan City, which may further reach Yueyang, Changsha and Zhuzhou to the south, and northwards, the pipeline can be extended to connect the WEST GAS TO EAST Pipeline. Thus, the top four continental gas basins can be basically connected one another.

According to planning, after the Shaan-Jing Line 2 reaches at Shijiazhuang City, one branch pipe will get into Beijing, and the other branch will enter Shandong Province via Hebei Province, thus basically completing the natural gas pipeline of the Bohai Bay Area.

The gas pipeline running from the Yinggehai Basin to Hainan Province has entered the design stage, which is to extend to the Pearl River Delta after landing Hainan Province.

In the East China Sea Basin, Chunxiao, Tianwaitian and other gas fields are to be developed, of which the pipelines are to land on the Yangtze River Area, thus becoming another gas source supporting the regional market.

Thus, the pipeline network bridging the gas production base with the main consumption markets will be basically formed.

4. Gas consumption market is in the startup stage, which will be rapidly expanded in the quite near future

In 2003, the natural gas consumption is 30.1 bcm in China, which accounts for 2.8% in the consumption of primary energy. For the consumer composition, 34% is for chemical industry, 29% for industrial fuel, 23% for city gas, and 14% for power generation.

During 1995–2003, the gas consumption in China has increased from 16.6 bcm to 30.1 bcm, with the yearly increase averaged at 7.7%, much higher than the increase of primary energy. It is expected that the speed increase will be maintained above 8% over time in the future. Preliminary forecasts indicate that the natural gas demand would be 50–60 bcm in 2005, 90–110 bcm in 2010, 140–160 bcm in 2015, and 180–220 bcm in 2020.

With respect to consumption areas, rapid increase can be seen in the Yangtze River Area, the southeast coastal area, and the Bohai Bay Area. It is expected that, by 2020, the demand of the aforesaid three areas will exceed 100 bcm, accounting for more than 50%
of the nationwide consumption. While the northeast, northwest and the southwest regions have the demand of 60 bcm, accounting for 30% or so. In view of the consumption structure, the presently layout based on chemical industry and industrial fuel will be changed, and the proportion of city gas and power generation will rise significantly.

5. Strengthen international cooperation, and assure the multi-variant supply of natural gas

Despite with abundant natural gas resources, the per capita volume is quite low in China, about 1/16 of the world average. It is necessary to strengthen international cooperation for assuring the rapid and stable development of the natural gas industry of China, especially the cooperation with the Northeast Asia, the Southeast Asia and the Central Asia.

Abundant natural gas resources exist in the Far East of Russia, on which China, Russia and South Korea have carried out long-term researches. By now, the framework plan for the long-distance gas pipeline in the NE Asia has been completed, in which Kovytinskoye Gas and Condensate Field in Irkutsk oblast is regarded as the first choice, with the yearly supply of 30 bcm, so as to satisfy the gas demand of China and South Korea.

LNG related cooperation is ongoing between China and the Southeast Asia. One contract has been signed on the introduction of 3 million tons of LNG by Guangzhou, and the other contract on the introduction of 3 million tons of LNG by Fujian Province is under negotiations.