

Promoting Industrial Development



The West-East Gas Pipeline Project is a platform for innovation and cooperation. While supplying clean energy for areas along the pipelines, the project has also promoted the upgrading of relevant industries and regional economic restructuring and development.



5 types of key equipment



have been produced domestically, driving the industrial upgrading of metallurgy and machinery manufacturing to reach the world advanced levels

RMB 1 billion



The First West-East Gas Pipeline alone has contributed RMB 1 billion of financial revenue to Xinjiang each year

1. Boosting Industrial Upgrading

Direct investment in the project has exceeded RMB 300 billion, and the indirect investment was over RMB 50 billion, driven by upgrading auxiliary works such as branch lines, city gas pipelines, CNG stations, and gas plants. This has boosted the development of relevant industries including machinery, electronics, metallurgy, building materials, steel, pipes, equipment, material production, construction, and natural gas utilization. With the support of the National Development and Reform Commission and the National Energy Administration, CNPC strives to build the project into a platform for the development of the nation's manufacturing industry. Relying on our technology resources and partnering with competitive domestic enterprises, we realized domestic production of key oil and gas pipeline materials and major equipment, cutting construction costs and enhancing the technological independence and international competitiveness of China's manufacturing industry in the high-end market.

Through years of technical research in partnership with more than 20 institutes and enterprises such as steel companies, pipe plants, machinery and electrical manufacturing companies, we have successfully

developed X70 and X80 linepipe steel, 20 MW high-speed direct-connected motor driven compressor unit, 30 MW gas turbines driven compressor unit, high-pressure large-diameter welded ball valves and other major key equipment. Fifteen steel companies including Baosteel, Wuhan Iron and Steel (Group) Corp, and Ansteel are capable of producing X70 and X80 linepipe steel, and 13 production lines have been set up at CNPC Baoji Petroleum Steel Pipe Co., Ltd., CNPC Bohai Equipment Manufacturing Co., Ltd. and other pipeline manufacturing enterprises. Compared to imported products, domestically produced equipment helped lower procurement costs by over 20%, lead time by over 2 months, and operating costs by over 30%.

According to incomplete statistics, since the commencement of the West-East Gas Pipeline Project, more than 700 technical research studies have been conducted on the application of domestic production of high-grade pipeline steel, domestic production of key equipment, and project design and construction. The research results have helped enhance the technological competitiveness of the national gas industry, by filling 30 industrial gaps, with 60 confidential technologies were developed, 350 patents applied, and over 110 standards established.

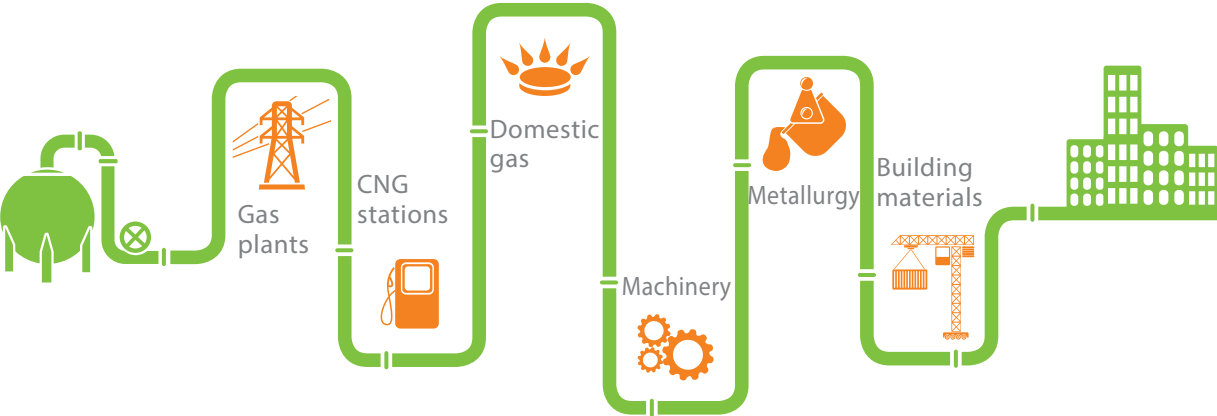


↑ Wuhan Iron and Steel Plant

Domestically produced key equipment in the project

Equipment	Researched by	Technical Value
Compressor for long-distance gas pipeline	Shenyang Blower Works Group Corporation	A major breakthrough in design and manufacturing of domestic large centrifugal compressors, ending long-term dependence on import over the years.
20 MW ultrahigh-speed, explosion-proof and frequency-converting synchronous motor	Shanghai Electric Power Generation Group Shanghai Electric Motor Factory, etc	At the industrially advanced level, with a speed of 5040 rpm, and with special features such as being explosion-proof.
30MW gas turbine for gas compression	CSIC 703 Research Institute, etc	Boosting the development of industry gas turbine technology in China, laying a solid technical and experimental foundation for the serial development of compressed gas turbines, enhancing the national technology level and international competitiveness in gas turbine development.

The West-East Gas Pipeline Project promoting industrial development



↑ Humen power plant in Guangdong using clean natural gas



Figures

2.67 million tons

2.67 million tons of X80 steel was used for the Second West-East Gas Pipeline, equivalent to the total amount of X80 steel used globally for 20 years before 2008.

4.2 billion

Compared to X70 steel pipes, X80 steel pipes used for the Second West-East Gas Pipeline saved 420,000 tons of steel, reducing the investment by RMB 4.2 billion.

8.4 billion

Domestically produced 1,219mm X80 steel pipes were used for the first time, reducing the investment by RMB 8.4 billion, with their price being about 30% less than imported products.

15 billion

In 2013, China's annual production capacity of X80 steel pipes reached 1.5 million tons, and the annual output value of steel companies and tube plants was about RMB 15 billion.



Tips

Pipeline transmission capacity and steel materials

Gas transmission through pipelines resembles traffic on the expressway, the larger the pipe diameter, the higher its transmission capacity. However, larger diameter means the use of more steel, a greater ecological impact, and a greater requirement for matching ancillary valves, compressors and other equipment. Therefore, it is impossible to infinitely expand the pipe diameter. What we can do is enhance the bearing capacity of steel pipes to supply compressed natural gas to the gas market. World-class pipeline steel has been used for the long-distance West-East Gas Pipelines with such a huge transmission capacity. The X80 pipeline steel used for the Second West-East Gas Pipeline is only 1,219mm in diameter and 18.4mm in wall thickness, capable of withstanding pressure of 12 MPa.



The successful development of the compressors for long-distance gas pipelines helped Shenyang Blower Works Group Corporation establish its dominant position among the world's large centrifugal compressor manufacturers. When reviewing the development of the first motor-driven compressor unit, the company's President Su Yongqiang said: "We owe our technological advances to the support of the National Energy Administration and China Machinery Industry Federation, and also to CNPC for its commitment to revitalizing China's equipment manufacturing industry through sincere cooperation."



Social evaluation

Qiu Zhongjian from Chinese Academy of Engineering: the independent intellectual property developed by CNPC has helped enhance the technological competitiveness of China's pipeline industry.

2. Driving Local Development

The West-East Gas Pipeline Project connects resource-rich western China with resource-poor eastern China. While transforming the resource advantages in the west into economic advantages, it provides strong energy support for development in eastern China.

Local Economic Development

People of all ethnic groups in Xinjiang were the first to benefit from the project. A 67% of project investment is in the central and western areas. The First West-East Gas Pipeline alone can bring more than RMB 1 billion of additional financial revenue to Xinjiang each year. The financial revenue of Baicheng County, where Kela-2 Gas Field (the main gas source of the project) is located, has increased almost 20-fold in 10 years. The completed Yining-Horgos Branch Line of the Third West-East Gas Pipeline is China's first large-diameter SNG pipeline. Capable of delivering 30 billion cubic meters of SNG from Yili Prefecture each year, it has boosted the development of the SNG industry in Xinjiang. The gas-related petrochemical industry has grown vigorously to become the pillar industry of Xinjiang, accounting for nearly 60% of local industrial added value and creating a great number of jobs for local residents. In recent years, the average annual growth rate of new employees is over 18% in Bayingol Mongolian Autonomous Prefecture.

The project has also driven the development of local transportation. As of December, 2013, the highways and pipeline roads built by CNPC in the deserts exceeded 2,000 kilometers. Among them, the 522km-long desert highway across the Taklimakan Desert has cut the road distance from Hotan to Urumqi by 500 kilometers on average, and is hailed by the local people as a "road to happiness".



↑ Petroleum development promoting the development of Korla



Case Study

South Xinjiang Gasification Project

With the large-scale gas development in the Tarim Basin, CNPC has implemented the South Xinjiang Gasification projects since 1999, and accelerated the development of medium and small gas fields and the construction of long-distance pipelines in the Tarim Oilfield. A gas supply network covering 26 counties and cities in 5 prefectures, and 20 regiments of the Xinjiang Production and Construction Corps has been established, making clean and efficient natural gas accessible to the people of all ethnic groups living around the Tarim Basin, who have bid farewell to coal and tamarisk for fuels. Based on annual gas consumption of 2 billion cubic meters, the project can reduce 5.2 million tons of carbon dioxide emissions every year, further improving the fragile ecological environment in South Xinjiang.



We now live in gas-heated buildings, and use natural gas for cooking every day. Formerly, we used stoves, coal, and firewood, which made our hands very dirty. Now, we cook very quickly with natural gas, and our houses are clean and warm, and we lead a good life.

Bulabiya Aihemaiti
villager in Xiamalebage Town,
Kashi City in Xinjiang



Industrial Upgrading in Receiving Cities

The Yangtze River Delta and the Pearl River Delta, major gas markets of the project, have witnessed faster industrial development driven by the extensive use of gas in gas-fired power generation, gas chemicals and industrial gas fuels. Gas-fired power plants and combined heat and power (CHP) plants are gradually replacing coal-fired and thermal power plants, greatly easing the power shortages in these regions in the summer and winter peak periods. Enterprises have also turned to natural gas to produce glass, ceramics and glass fibers instead of coal, heavy oil and other fuels, accelerating industrial restructuring and improving product quality.

Thanks to the West-East Gas Pipeline Project, Nanjing experienced deeper industrial restructuring, with faster development in power generation and the chemical industries. HuanengJinling Power Plant started to use gas instead of coal since 2004 when the West-East Gas Pipeline Project started to supply natural gas directly to Nanjing. In addition, a number of petrochemical companies experienced prosperous development, making Nanjing a city renowned for its petrochemical industry. The number of people directly employed in the petrochemical industry is over 100,000, whereas the number in indirect employment has exceeded 300,000.

In 2004 when the First West-East Gas Pipeline became operational, gas utilization was promoted in Yixing City, Jiangsu



↑ CNPC Jinchang Gas Corporation has created a large number of jobs for undergraduates

Province, which is famous for its ceramic industry. Many ceramic producing companies started to use gas as it has stable calorific value with almost no impurities. This has not only cut their production costs, but also helped enhance the product quality with better surface finish and color effects.



3. Opening up and Cooperation for Common Development

Promoting Cooperation

Striving to build the project into a platform for innovation and cooperation, we invite enterprises and research institutes in relevant industries for cooperation, and transform achievements into industrial knowledge and experience for overall improvement.

Cooperation in the Project

1. We invited relevant research institutes and 14 steel companies and pipeline enterprises to establish a research team for the development of X80 steel.
2. We established a leading group with the State Administration of Cultural Heritage for cultural heritage protection in oil and gas pipeline projects, to carry out cooperation in oil and gas pipeline construction, cultural heritage protection, industrial heritage protection, and overseas project construction consultation. We also established a communication and coordination mechanism with the administrative departments for heritage protection at the provincial level.
3. We invited experts from the Ministry of Environmental Protection, the Ministry of Water Resources and China Agricultural University to form an expert team. After several onsite inspections, the team developed a design program for ecological restoration in Sayram Lake and Guozigou.
4. We completed the "Risk Assessment of Environmental and Geological Disasters for West-East Gas Pipelines", "Research on Risk Assessment Technology of Third Party Damage in West-East Gas Pipelines" and "Research on Risk Assessment Technology of Defects in West-East Gas Pipelines", in cooperation with Southwest Petroleum University and other research institutes.
5. We established a research team in partnership with the China Machinery Industry Federation for the domestic production of relevant equipment for long-distance pipelines.
6. We invited the National Council for the Social Security Fund and Baosteel Group to invest in the Third West-East Gas Pipeline Project.
7. We established PetroChina United Pipelines Company Limited in partnership with Taikang Assets Management Co., Ltd. and GTJA Allianz Funds to operate the western sections of both the first and the second West-East Gas Pipelines.

Introducing Private Capital

As a clean and efficient energy, natural gas enjoys broad prospects for development. The participation of private capital in the construction and operation of the project will bring long-term gains and diversify financing channels.

Therefore, CNPC invited private capital for the Third West-East Gas Pipeline. By the end of 2013, the National Council for the Social Security Fund and Baosteel Group have participated in project construction; Taikang Assets Management Co., Ltd. and GTJA Allianz Funds have participated in the operation of part of the pipelines.