



2015 Annual Report



China National Petroleum Corporation



Energize · Harmonize · Realize

Contents

- 03** Message from the Chairman
- 04** Board of Directors · Top Management · Organization
- 06** Year in Brief
- 09** Operation Highlights
- 10** 2015 Industry Review
- 12** Safety, Environment, Quality and Energy Conservation
- 16** Human Resources
- 18** Technology
- 22** Annual Business Review
 - 22 Exploration and Production
 - 28 Natural Gas and Pipelines
 - 30 Refining and Chemicals
 - 32 Marketing and Sales
 - 34 Overseas Oil and Gas Operations
 - 37 International Trade
 - 38 Oilfield Services, Engineering & Construction, and Equipment Manufacturing
- 44** Financial Statements
- 52** Major Events
- 55** Glossary





Message from the Chairman

A profound post-crisis restoration in the world economy continued in 2015. The recovery was tortuous, with international oil prices dropping steeply. As Chinese economy entered the “New Normal”, domestic oil and gas demand growth slowed down and market competition further intensified. Facing up to the changes in the new situation, CNPC focused on oil and gas businesses and accelerated the shift in its development concepts and thinking from a scale and speed-oriented pattern of growth to a more quality and efficiency-focused approach for steady development. We have worked hard to cope with daunting tasks, risks and challenges emerging from our reforms, and obtained new achievements and progress in the process.

Steady growth in core businesses: The company's overall operating performance was better than expected, thanks to a series of pertinent initiatives in improving business coordination among production, transportation, marketing, stockpiling and trading, optimizing production & operation, cutting investment and cost, increasing income, reducing expenditure, and enhancing efficiency. Our oil and gas output recorded a historical high, and the crude runs as well as sales of oil products and natural gas increased steadily. In addition, our oilfield services, engineering construction and equipment manufacturing segments gathered pace in international market development and business transformation.

Continued deepening of enterprise reform: Being problem oriented, we furthered our reform efforts, targeting bottlenecks in our production & operation and business development. Significant progress has been made in streamlining administration and power decentralization, expanding management autonomy of our subsidiaries, optimizing management system for overseas operations, conducting asset consolidation, promoting joint-venture cooperation and facilitating the market-based reform of staff community-related services. In particular, pipeline asset restructuring has become a highlight of the company's capital operating initiatives in recent years.

Enhanced technological innovation capability: We maintained world leading position in exploration and development technologies, achieved leaping development in refining and petrochemicals technologies and became a frontrunner in oil and gas storage & transportation technologies by continually improving our innovation system, and promoting the development of key theories and applied techniques. In particular, “Theoretical and technological innovations for the exploration and development of ultra-low-permeability tight oil and gas reservoirs” was awarded the first-class National Science and Technology Progress Award.

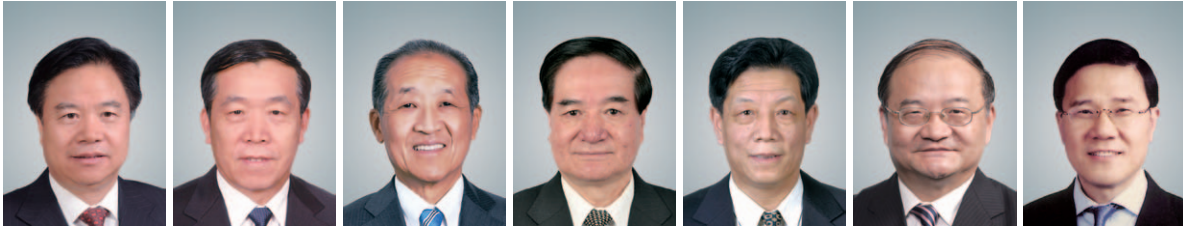
Effectively fulfilling green development: With the corporate mission of “Caring for Energy, Caring for You”, we have been upholding the sustainability concept of safe, clean and energy-saving development. We continue to change the mode of energy production and consumption, keep improving our HSE system, fulfill our corporate social responsibility and promote emission reduction, energy conservation and environmental protection, so as to fight climate change and boost socioeconomic development where we operate.

The year 2015 marks the completion of the 12th Five-Year Plan. Over these years, the company has achieved significant enhancement in both comprehensive strength and international competitiveness. Our ranking on the Fortune Global 500 has risen from 10th to 4th and on the World's Top 50 Oil Companies from 5th to 3rd. Our crude output, natural gas output and crude runs leaped to 1st, 2nd and 3rd place respectively among international peers. As at the end of 2015, the company's total assets stood above RMB 4 trillion.

2016 is the first year of China's 13th Five-Year Plan, and is also a crucial year for CNPC to tackle the challenges of low oil prices and achieve steady growth. CNPC as an international company faces increasingly complicated economic and geopolitical environments across the globe. In particular, oil price drifting low has constituted severe challenges for our ongoing production and operations. Nevertheless, national programs, such as the Belt and Road Initiative, the Yangtze River Economic Belt and Beijing-Tianjin-Hebei Metropolitan Region Development, are providing new opportunities for the company's prospective development. Also, low oil prices represent a window of opportunity for the company to seek promising oil and gas projects worldwide and optimize our assets portfolio. We will maintain a firm commitment to the development concept focusing on innovation, coordination, eco-friendliness, openness and mutual benefits, and the business guideline highlighting steady growth in implementing our strategies for resources, market, internationalization and innovation, with quality and efficiency at the heart of our business activities. Meanwhile, we will continue to optimize our business structure and promote reform and innovation with a focus on our core businesses, in a bid to reduce cost and increase benefits and mitigate risks on our way towards building CNPC into a major integrated international energy corporation.

Chairman

Board of Directors



Wang Yilin
Chairman

Lu Yaohua
Outside Director

Li Qingyan
Outside Director

Li Yuhua
Outside Director

Jin Kening
Outside Director

Huang Long
Outside Director

Wang Shihong
Employee Director

Organization

China National Petroleum Corporation

Board of Directors

Top Management

○ Strategy & Development Committee

○ Nomination Committee

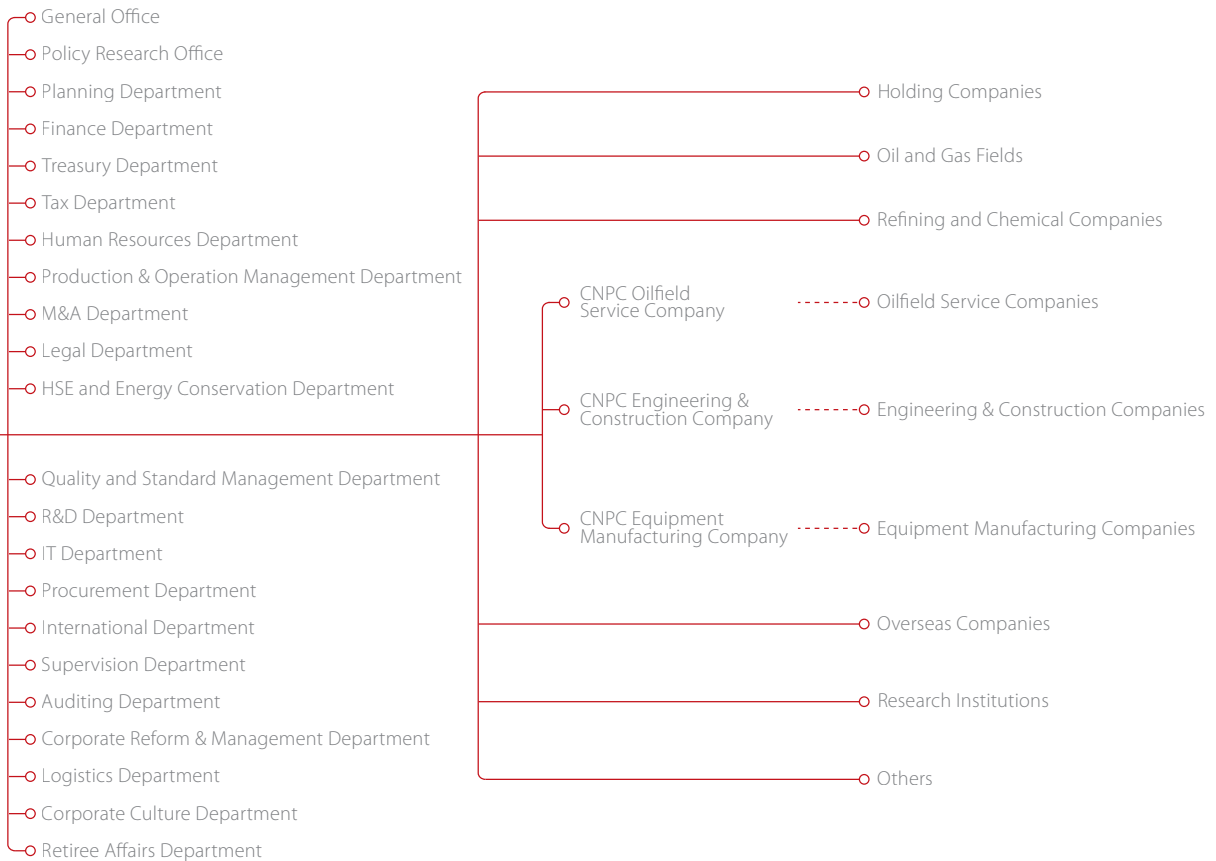
○ Remuneration and Evaluation Committee

○ Audit and Risk Management Committee

Top Management



Wang Dongjin Vice President	Yu Baocai Vice President	Shen Diancheng Vice President, Chief Safety Officer	Liu Yuezhen Chief Financial Officer	Xu Wenrong Vice President	Liu Hongbin Vice President	Zhao Zhengzhang Vice President	Xu Jiming Chief of Discipline & Inspection Group
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Year in Brief

In 2015, CNPC maintained safe and smooth production and achieved hard-won business performance by adjusting operational strategies and cutting cost in response to market conditions featuring declining global oil prices, oversupply of refined products and a sharp slowdown in gas demand growth in China. We registered a full-year operating income of RMB 2,016.8 billion and total profit of RMB 82.5 billion, maintaining a positive free cash flow and healthy financial status.

Domestic oil and gas exploration witnessed progress in the fine prospecting of favorable zones and strata, optimization of preliminary exploration and risk exploration targets, and intensified geological evaluation in key target areas. We identified five oil blocks each with over 100Mt reserves in Changqing and Xinjiang oilfields; and seven natural gas blocks each with over 100bcm reserves in Sulige, Sichuan and Tarim. New progress was made in tight oil exploration at four blocks in Changqing and Daqing oilfields. Moreover, proven shale gas reserves totaling 163.5 billion cubic meters were reported in Changning, Weiyuan and Huangjinba in Sichuan Basin. In 2015, 728.17 million tons of oil in place and 570.2 billion cubic meters of gas in place were added, exceeding 1 billion tons of oil equivalent in total for the ninth consecutive year.

The natural decline in domestic oil and gas output was effectively controlled by optimizing production program, discontinuing marginal projects, drilling more horizontal wells and releasing the potential of mature blocks. We produced 111.43 million tons of crude oil and 95.48 billion cubic meters of natural gas throughout the year. In particular, Changqing and Daqing oilfields maintained an output of more than 50 million tons and 40 million tons of oil equivalent respectively. The production capacity of 11bcm/a at Longwangmiao gas field in Moxi of Southwest Oil and Gas Field was completed and put into operation. Two shale gas demonstration projects, at Changning-Weiyuan in Sichuan and Zhaotong in Yunnan, registered an average daily output of 100kcm per well. The Baode CBM Field in Shanxi Province, the largest middle-to-low coal rank CBM field in China, was completed and put into production. The operating cost of per barrel oil equivalent was brought down by decreasing the budget for risk exploration, shutting down unprofitable facilities and improving energy efficiency. International cooperative projects in domestic upstream were operated smoothly.

In 2015, we optimized production process and adjusted our product mix in the refining and chemicals sector, allocating resources and workload to installations with higher profits. With strict cost control, 21 major technical and economic indicators were better in comparison with 2014. In particular, the total energy consumption of refineries and the fuel and electricity consumption of ethylene units kept declining. Domestically, our crude runs and refined products output were 151.32 million tons and 103.69 million tons, respectively. The production of jet fuel grew by more than 15%. We increased the production of high value-added chemicals and strengthened end user

Operating income



2,016.8
Billion RMB yuan

Total profit



82.5
Billion RMB yuan



We actively adjusted to the “New Normal” of Chinese economy, and continued to implement our strategies for resources, market, internationalization and innovation through a series of initiatives, such as focusing on oil and gas operations, restructuring business portfolio, improving profitability, controlling risks, and pushing ahead with costs and expenditure reduction, in a bid to make headway towards the goal of building CNPC into a major integrated international energy company.



marketing. We sold 25.22 million tons of chemicals, among which profitable products sales increased by 10%. With faster progress in 10 oil products upgrading projects, we supplied National V motor gasoline and diesel to 11 eastern provinces and autonomous regions and other key markets. Major facilities of Yunnan Petrochemical were basically completed.

We enhanced marketing and export of refined products and sold 116.25 million tons of refined products in the domestic market. Operations at our service stations were improved by integrating sales of refined products, pre-paid cards, non-fuel products and lubes, optimizing service at convenience stores, pioneering a new mode of “Internet + Marketing”, and promoting the 6S management.

Despite of the loose gas supply in China, our natural gas business achieved satisfactory profitability by optimizing the allocation of self-produced gas, imported pipeline gas and LNG, tapping the storage potential of pipelines and focusing on markets along newly-built pipelines and profitable markets in the eastern coastal region. In 2015, we marketed 122.66 billion cubic meters of natural gas, representing an increase of 2.7% year-on-year. Construction of oil and gas pipelines proceeded to meet market needs. A number of key oil and gas pipeline projects and supporting facilities became operational, including the Mohe-Daqing Crude Pipeline delivery boosting project and the Shandong Gas Pipeline Network project. Construction of the eastern section of the Third West-East Gas Pipeline and Jinzhou-Zhengzhou Refined Products Pipeline pressed forward steadily.

In 2015, our overseas oil and gas operations witnessed safe, smooth and effective growth. In exploration, 98.86 million tons of oil equivalent were added to our recoverable reserves, thanks to the discovery of two 100bcm gas zones in the Right Bank of Amu Darya in Turkmenistan, a 100Mt oil play in Sufyan sag of Block 6 in Sudan, and high-yield buried hill reservoirs at Block H in Chad. Differentiated production adjustment program contributed to the output of 138.26 million tons of oil equivalent, of which CNPC's share was 72.03 million tons, up 10.5% year-on-year. Our overseas JV refineries processed 43.92 million tons of crude. International trading business saw improvement in both scale and operating quality, thanks to the reorganizing of oil and gas import and a 50% year-on-year increase in exports of refined products. Throughout the year, we recorded a trade volume of 430 million tons, valuing USD 168.7 billion.

In 2015, our win-win international cooperation continued to expand. Joint projects were accelerated in countries in the Belt and Road Initiative. These included an agreement signed with Gazprom for joint construction of the eastern route of the Russia-China Gas Pipeline, and cooperation agreements with Mubadala Petroleum and Mozambique ENHL, etc. In addition, we inked a strategic cooperation agreement with BP and a MOU with GE, in oil and gas development, carbon emission reduction and environmentally friendly technologies.

Crude production
(Domestic)



111.43
mmt

Natural gas production
(Domestic)



95.48
bcm

Crude runs (Domestic)



151.32
mmt

Refined products sales
(Domestic)



116.25
mmt

Our oilfield services and equipment manufacturing sectors delivered positive results, thanks to our integrated business portfolio and overseas market development, despite the significantly shrinking market resulting from the declining oil price. Oilfield services continued to push forward general contracting mode and factory drilling. While ensuring the progress and quality of domestic E&P projects, we increased our presence in the international market. In the engineering and construction sector, projects were more strictly controlled from design and procurement to construction and supervision. BOT and EPC + Financing business modes were explored to expand overseas markets. As to equipment manufacturing, we seek for capacity exports and enhanced product marketing. Our finance business was integrated with industrial operations to control its risk and proactively tackled interest rate cuts by PBOC and exchange rate fluctuations.

We continued to deepen corporate reforms. Operational autonomy was granted to more subsidiaries on a pilot basis. PetroChina Eastern Pipelines Co. Ltd., PetroChina Northwest United Pipelines Co. Ltd., and PetroChina United Pipelines Co. Ltd. were reorganized into one company, and PetroChina Kunlun Gas Co. Ltd. was merged with Kunlun Energy Co. Ltd. Central Asia-China Gas Pipeline and Karamy Petrochemical were restructured into joint ventures. Comprehensive reform setting up professional and technical position sequences for career development of technical staff was carried out at our research institutes. We also took 33 measures in 12 categories to reduce costs and expenditure and enhance profitability. Fundamental management system integration was advanced on a pilot basis by reinforcing operational organization and coordination.

In response to the “winter time” resulting from the low oil price, we opened up new business growth points through key technical innovations and at the same time, cut down operation cost by using new technical solutions. R&D achievements have played a pivotal role in business growth and sustainable development of the company. ASP flooding, reservoir stimulation and delayed coking technologies witnessed major breakthroughs and successful application. A major theoretical and technical breakthrough in the exploration and development of the ultra-low-permeability tight oil and gas fields with 50Mt reserves at Changqing was awarded the first-class National Science and

Technology Progress Award. IT technologies were applied more extensively. IoT for oil and gas production was used at six oilfields. IoT for oilfield services was completed, with the core application system operating on a cloud platform.

In 2015, our HSE activities were subject to more strict regulations pursuant to the latest amendments to the *Safe Production Law* and *Environmental Protection Law*, which were enforced in the year. We avoided major and more serious HSE accidents by improving the HSE system review, promoting standardized operation and enforcing HSE accountability. To further control and prevent safety risks, we enhanced hazards screening, control and supervision on long-distance pipelines and hazardous chemicals warehouse. Our emergency response system was improved and three professional rescue centers were completed for well control, pipelines, and offshore operations respectively. We continued to push forward major energy efficiency projects and strengthened measures to minimize pollutant emissions. As a result, we saved 1.16 million tons of standard coal and 20.61 million cubic meters of water throughout the year, fulfilling the major pollutants emission reduction targets of the year.

Energy saved



1.16

mnt of standard coal

Water saved



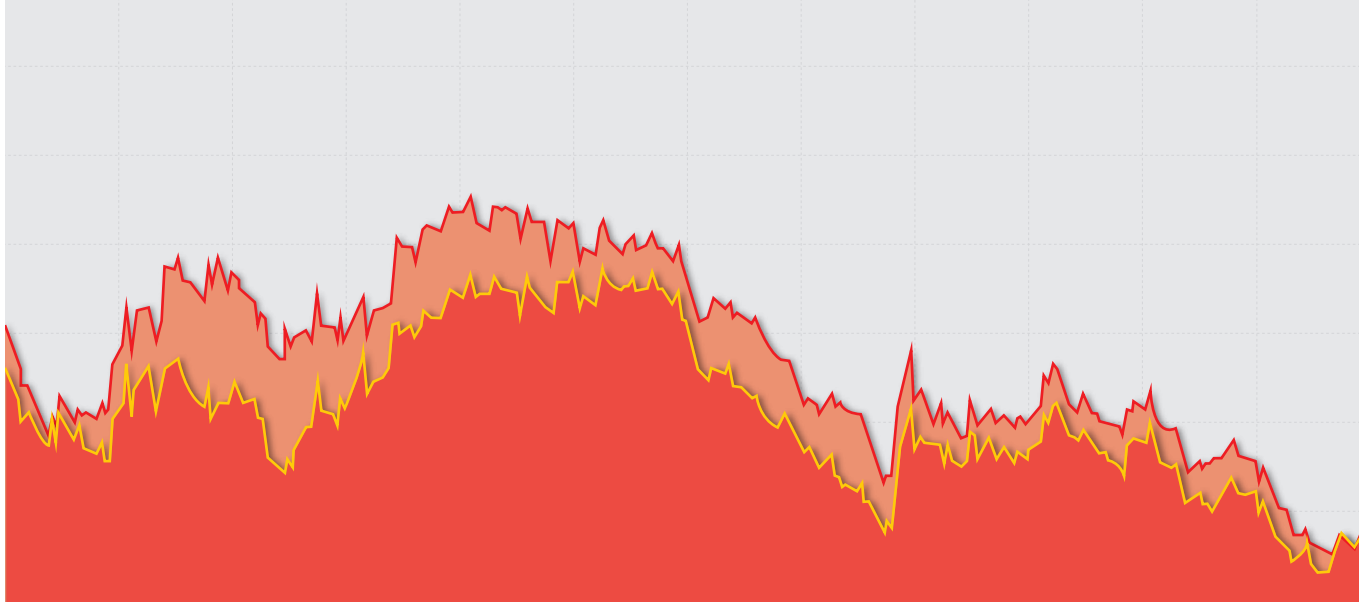
20.61

million cubic meters



Operation Highlights

	2013	2014	2015
Financial Index			
Operating income (billion RMB yuan)	2,759.3	2,730.0	2,016.8
Total profit (billion RMB yuan)	188.0	173.4	82.5
Net profit (billion RMB yuan)	140.8	123.8	56.2
Tax paid (billion RMB yuan)	407.8	407.0	338.1
Oil and Gas Production			
Oil production (mmt)	159.81	164.17	166.57
Domestic	112.60	113.67	111.43
Overseas (CNPC's share)	47.21	50.50	55.15
Gas production (bcm)	103.89	113.92	116.67
Domestic	88.84	95.46	95.48
Overseas (CNPC's share)	15.05	18.45	21.19
Refining, Chemicals and Sales			
Crude runs (mmt)	188.55	196.98	195.24
Domestic	146.02	150.16	151.32
Overseas	42.53	46.82	43.92
Domestic refined products output (mmt)	97.90	101.84	103.69
Domestic lube oil output (mmt)	1.89	1.58	1.21
Domestic ethylene output (mmt)	3.98	4.98	5.03
Domestic refined products sales (mmt)	118.33	117.02	116.25
Domestic service stations	20,272	20,386	20,714
Pipeline			
Domestic pipeline mileage (km)	72,878	79,054	79,936
Crude oil	17,640	18,132	18,917
Natural gas	45,704	50,836	50,928
Oil products	9,534	10,086	10,091
Overseas pipeline mileage (km)	13,257	15,218	14,507
Crude oil	6,671	7,653	6,604
Natural gas	6,586	7,565	7,903



2015 Industry Review

In 2015, a profound post-crisis recovery of the world economy continued with a slowdown growth rate. Major economies continued their divergent performance. Emerging economies continued the slowdown growth, while developed countries witnessed a moderate revival. Global energy consumption growth continued to slow down. In 2015, global primary energy consumption increased by 0.7% year-on-year, with a rising contribution from non-fossil energy. In China, the rate was -0.5%, the first negative growth for the past three decades, as a result of the nation's steady but slowing economy.

In 2015, the global oil supply became more ample, bringing oil prices down to the lowest level during the global financial crisis. Stimulated by low prices and the recovery of developed economies, global oil demand picked up by 1.7 million bbl/d to 94.40 million bbl/d. However, the supply increased by 2.6 million bbl/d to 96.10 million bbl/d as OPEC members raised their output to maintain their market share and the United States demonstrated resilience in its production of unconventional oil and gas. This drove the global oil supply to exceed demand by 1.7 million bbl/d, the highest level since 2000. WTI and Brent crude prices annually averaged at USD 48.76 and USD 53.60 per barrel, down by 47.52% and 46.11% year-on-year, respectively. In 2015, China's apparent oil consumption mildly rose to 543 million tons, 25 million tons more than in 2014, with the dependence on foreign oil exceeding 60% for the first time.

In 2015, the world consumed 3.48 trillion cubic meters of natural gas, representing a growth of 2.7% year-on-year, 2.3% higher than that in 2014. Gas demand was driven by Europe and the United States, which, together with the Middle East, showed significant increases in consumption, compared to the Asia-Pacific region, where consumption growth dropped to 1.2%. The gas price plummeted by 39.7% to USD 2.62/MMBtu in terms of Henry Hub year-round average and by 13.8% to USD 6.63/MMBtu in terms of the NBP year-round average. China's gas consumption registered the lowest growth for the past decade, leading to overall excess supply.

Global capital expenditure in the oil and gas sector kept plunging while the investment efficiency on exploration declined due to the decreasing scale of new discoveries and new reserves. Globally, the discoveries, mostly of gas, were concentrated in deep and ultra-deep water in Africa, especially in the Mediterranean Sea off the Egyptian coast, as well as offshore Angola and Mauritania. Despite subdued exploration, global oil and gas output increased in 2015 to 4.28 billion tons and 3.67 trillion cubic meters, up 2.8% and 2.4% year-on-year, respectively. With low oil prices, the exploration and development of shale oil and gas was no longer such an attractive prospect in the United States, and the value of reserves kept shrinking.

Growth rate of world's primary energy consumption



0.7%

Growth rate of China's primary energy consumption



-0.5%



In 2015, the oil industry entered into the “winter time”, and maintained the trend of oversupply of oil, oil products and gas in the market, and falling oil and gas prices. While China’s economic growth is slowing down under pressure, its oil consumption experienced a mild rise, oil products supply became ampler, and gas supply was surplus with consumption registering its lowest growth over the past decade.



In 2015, China’s oil and gas reserves maintained steady growth and major breakthroughs were made in the exploration and development of unconventional oil and gas. Despite declining upstream investment, 50 important discoveries were made in 2015 due to the inertia of high reserve growth period, adding more than 1 billion tons of oil and 1 trillion cubic meters of gas to the reserves in place. Exploration of unconventional oil and gas proved over 100 million tons of shale oil and tight oil reserves; and 437.3 billion cubic meters of shale gas in place in Fuling, Changning, and Weiyuan areas. Oil and gas output maintained modest growth, with crude oil production increasing 2% year-on-year, a higher growth rate than in 2014. Gas output rose by 3.5% year-on-year, lower than in the previous years.

Global crude processing capacity grew at a slower pace, while crude runs registered a record high. Global capacity increased to 4,833Mt/a in 2015, with net growth of 26Mt/a, much lower than in 2014, due to China’s large-scale elimination of outdated production capacity. Globally, 79.40 million barrels of crude were processed per day, up 2.7% year-on-year. The average utilization rate of refineries was around 84%, approximately 1 percentage point higher than in 2014. Due to consistently low oil prices, refineries around the world enjoyed much increased gross margins. The most impressive increase occurred in northwestern Europe, where the cracking margin against Brent oil was boosted by 125%. Global ethylene capacity steadily increased by 6.17Mt/a to 159Mt/a, but failed to reverse the tight supply as demand grew by 4.9 million tons.

2015 saw the first decline in China’s refining capacity, by 10.37Mt/a to 710Mt/a. However, overcapacity still prevailed. In 2015, crude runs were 522 million tons, up 3.8% year-on-year. The average utilization rate of refineries around the country was 75.4%, slightly higher than in 2014. Ethylene production capacity kept increasing to 22Mt/a, up 1.6Mt/a or 7.8% year-on-year, primarily driven by coal (methanol)-based olefins.

In 2015, the world witnessed ample supply of major oil products and steady growth in the trading of refined products. Global supply of refined products reached 82.72 million bbl/d, exceeding demand of 81.77 million bbl/d by 0.95 million bbl/d. In contrast with the generally balanced supply and demand of gasoline and naphtha, supplies of diesel, jet fuel, and residual fuel were in surplus. Inventories of refined products increased in three major markets, the United States, Europe and Singapore. Global trade of refined products showed

changes, which include: the United States further increased its exports, the Middle East became a net diesel exporter for the first time, and supplies of gasoline, kerosene and diesel remained in surplus in the Asia-Pacific region. In China, the supply of refined products became more ample as overall demand maintained mild growth in contrast to the steady increase in production. The diesel-to-gasoline consumption ratio continued to decline, as a result of sluggish demand for diesel and surging demand for gasoline, while demand for kerosene grew even faster. In 2015, China apparently consumed 318 million tons of refined products, up 5.3% year-on-year.

In 2015, growth in China’s gas demand significantly slowed down due to the slackening economy, mild climate, and uncompetitive gas price. Apparent consumption in the year was 191 billion cubic meters, up 3.7% year-on-year. A higher percentage, or 32.7%, of gas consumption was met by imports of 62.4 billion cubic meters, up 4.7% year-on-year, of which 56.7% and 43.3% were pipeline gas and LNG, respectively. In 2015, an additional 2,700km of trunk lines and branches were built for gas transportation. The utilization rate of LNG terminals dropped from 48.7% in 2014 down to 47.4%, reflecting their apparent overcapacity.

In 2016, the petroleum industry will continue to face daunting tasks due to the slow recovery of the global economy. Global oil prices will be unlikely to rebound as the market will find it hard to digest its oversupply. Since new LNG capacity will be brought on-stream as planned, the surplus of gas in the market will keep growing, holding the price at a low level. The United States, being a new oil and gas exporter, is likely to become more influential on the international market. Mergers and acquisition will be active in the industry. In China, the growth in demand for oil will slow down while that for gas will revive, with overall ample supply. More players in the refining and sales markets will aggravate competition. Reform program on the petroleum sector will facilitate the market-oriented process of the industry.

Source: *Report on Oil & Gas Industry Development in 2015* by CNPC ETRI



Safety, Environment, Quality and Energy Conservation

In 2015, CNPC recorded sound HSE performance by upholding safe, environmentally friendly and resource-saving development concept, pushing forward with HSE system management, enhancing control of operational safety, risks and hazards, and minimizing pollutant emissions.

Faced with a more complicated security situation in overseas operations, we strengthened security administration and improved HSE management to mitigate various risks, maintaining an excellent track record in security and HSE, with zero reporting of major incidents.

Operational Safety

In 2015, CNPC amended the *Management Provisions on Operational Safety*, *Management Provisions on Environmental Protection*, and *Guidance on HSE Responsibilities at CNPC Headquarters* in line with recent amendments to China's *Production Safety Law* and the *Environmental Protection Law*. We also trained and evaluated relevant management people and employees accordingly. To ensure operational compliance, we emphasized HSE accountability, enhanced HSE inspection and acceptance management in construction projects, and took corrective measures for violations.

We continuously improved the performance of our HSE management system. In 2015, we reviewed the system in all of our major subsidiaries twice and classified some subsidiaries based on quantitative evaluation. Safety-related accidents were reduced by strengthening full-process control, risk control and safety supervision. Focusing on operational improvement, we established a risk control mechanism, which is composed of risk classification, full responsibility coverage, and integrated solutions. We also defined major risks, including eight safety risks and six environmental risks. Pilot activities for risk prevention and control were carried out in 11 disciplines at 10 subsidiaries. We emphasized supervision on the safety of key processes and areas, and carried out special inspection of onshore oil and gas production, well control, hazardous chemicals storage, and offshore operations. Technical diagnosis and evaluation on HSE management with regard to surface engineering at

Changqing Oilfield, the development program of Longwangmiao Gas Field, and facilities at Fushun Petrochemical were conducted in an effort to improve the HSE management and risk control abilities of our subsidiaries. Our annual targets for hazard correction were fulfilled. These corrections included the sealing renovation of large-sized storage tanks, renovation of service stations, and treatment of highly hazardous or abandoned wells; and identification and correction of hazards in oil and gas pipelines, oil products pipelines, and municipal gas pipelines.

Environmental Protection

Environmental protection and climate change have always been focus of attention of the company. We are committed to green and low-carbon development, and conduct environmentally friendly operations, accelerate the upgrading of oil products and promote the utilization of natural gas to meet the need for clean energy. We invest heavily in the R&D of low-carbon technologies and increase carbon sequestration to minimize GHG emissions and mitigate global warming.

In 2015, we continued our efforts to minimize pollution and emissions, and overfulfilled the objectives for pollution and emission reduction during the 12th Five-Year-Plan period (2011-2015). A total of 42 pollution reduction projects were completed and put into operation, including the renovation of flue-gas desulfurization at 34 catalytic cracking units, boiler denitration treatment at Daqing Oilfield and Dushanzi Petrochemical, and eliminating coal use in all of our facilities in Beijing, Tianjin, and Hebei Province. With oil product upgrading projects completed at Dalian Petrochemical, Guangxi Petrochemical, and Karamay Petrochemical, we are more capable of producing environmentally friendly oil products to help control air pollution. Bio-safe disposal of drilling cuttings and mud waste at the Yamal project was rolled out in the Arctic region, with satisfactory environmental and economic benefits.



Safety and environmental protection is one of our three fundamental projects. We continued to improve our HSE management system and promote sustainable and low-carbon growth in the process of creating a resource-saving and environmentally friendly enterprise.



With high attention on management and control over environmental risks and pollution, CNPC avoided major environmental pollution accidents by screening out "six major environmental risks". With the *Comprehensive VOCs Control Plan* in place, we established an information platform for the comprehensive management and control of VOCs at our refining and chemical companies, such as Huabei Petrochemical and Dagang Petrochemical. Moreover, we created China's first classified full-spectrum VOCs source emission inventory, as well as the calculation method and software model of emission volume, for refining and chemical companies.

Occupational Health

We ensure the occupational health of our employees through an integrated, prevention-oriented approach encompassing infrastructure development, occupational health checks, and improved health management and services in line with the *Law of the People's Republic of China on Prevention and Control of Occupational Diseases*. In 2015, more than 98% of our employees received occupational health checks, and over 98% of the specific workplaces received occupational hazard detection.

Employee occupational health check



98%

Workplace occupational hazard detection



98%



We made new progress in the prevention and control of occupational diseases by upgrading facilities and services, and establishing a specialized supervision system for such a purpose. As an oil and gas player, we identified job-related occupational hazards in our particular operational environment, maintained strict controls on sites with hazardous operations, and improved the environment of construction operations. We provided health training to corporate executives, project managers and key technicians, to improve their professional skills and awareness of health risks.

To improve the health of our employees at our overseas projects, we perfected mechanisms for healthcare and took action to prevent and control diseases pursuant to the local environment and medical availability. In 2015, our joint initiative between the headquarters and our project in Nigeria achieved major breakthroughs in the microscopic diagnosis and treatment of malaria in Africa. Moreover, we started to build overseas health Big Data, deployed "Internet +" health management, and introduced new media platforms to instill greater understanding and awareness of health issues among our employees. In addition, we provided interactive online mental health counseling for expatriates and their family members under the Employee Assistance Program (EAP).

Energy Efficiency

In 2015, CNPC continued its energy-saving and consumption reduction activities to improve energy efficiency. We implemented 54 energy-saving technology renovation projects, covering the mechanical oil extraction system, ethylene cracking furnace, and hydrogen system. New technologies and equipment for a high-efficiency combustor and a new type of heating furnace were developed, and the performance evaluation and operation management of heating furnaces were strengthened. We continued efforts on optimizing the energy system at our refineries, and conducted model development and optimized analysis in our key subsidiaries, developing 148 optimization programs. Additionally, our energy-saving standard system was improved as six national or industrial standards and five corporate standards were formulated. Throughout the year, we reduced energy consumption by 1.16 million tons of standard coal and water consumption by 20.61 million cubic meters.

Quality Control

Upholding the principles of honesty, integrity and quality, we remain committed to providing high-standard and high-quality products and services. In 2015, we integrated our basic management systems, reinforced supervision of products and engineering quality, developed internationally-compliant standards, and improved our QMS efficiency and control capacity.

To reinforce supervision of products quality of our subsidiaries, we conducted random quality inspections of 2,340 batches of products produced, sold, purchased or used by our subsidiaries, focusing on consumer products such as motor gasoline and diesel, LPG and natural gas. Chemical agents for petroleum and petrochemical operations began to be subjected to quality approval. Standard follow-up procedures were defined to improve the efficiency and effectiveness of the supervision. More quality inspection centers were set up to extend our coverage of supervision and inspection. The quality of 906 ongoing engineering & construction projects was supervised throughout the year. Experts' random checks and inspection tours eliminated deficiencies and improved the quality of 18 major ongoing projects at Yunnan Petrochemical and other facilities.

In 2015, we improved and optimized our corporate standard system by amending 156 national or industrial standards and 196 corporate standards. In particular, we developed ISO 18871, the *Method of Determining Coalbed Methane Content*, and another two international standards. In addition, we strengthened our exchanges and cooperation with API and NACE, and organized the annual meetings of ISO/TC263 and ISO/TC193/SC3 and work group meetings of ISO/TC67/WG 21 and ISO/TC193/SC1/WG22. This indicated our growing role in orienting international standards.

Energy saved



1.16

mnt of standard coal

Water saved



20.61

million cubic meters



Flue gas purification facility at Jinxi Petrochemical



Human Resources

CNPC adheres to the principle of “people-first” and attaches great importance to and protects our employees’ rights and interests. We strive to create a workplace based on fairness, impartiality and harmony, and build favorable career development platforms and promotion channels for our employees. We are trying to foster strong human resources composed of various tiers of talents and help employees grow together with our company.

CNPC enforces a fair and non-discriminatory employment policy and provides impartial and fair job opportunities and development platforms regardless of nationality, race, gender, religion, and cultural background in accordance with relevant laws, regulations and rules. We recruit the best people for technical and management positions from both inside and outside the company on an open, fair and competitive basis. In 2015, we recruited 6,735 college graduates and 136 overseas students. By the end of 2015, CNPC had 1.46 million employees, 29.9% of whom holding bachelor’s or higher degrees. Women accounted for 34.4% of our staff, including 61 senior executives and 2,138 in middle management positions.

CNPC supports employee development by providing a variety of training. With an innovative management system and mechanism in place, we promoted four major training programs and set up training infrastructures, whereby the competence and skills of our workforce were improved through training on occupational skills and job operations, as well as skill competitions. In 2015, we offered 163 training programs to nearly 20,000 participants, including 351 senior managers, national experts, corporate experts, and professionals in lesser-known languages trained in 15 preparatory and overseas training (study) classes. Our e-learning network was upgraded to be an improved platform with more courses. In 2015, our E-learning College trained 780,000 person-times in total.

With a reformed compensation and benefits system, we set up a profit-oriented optimal salary structure in which employees in grassroots, front-line, mission-critical, and harsh positions are paid more. We implemented the “Double Hierarchy of Professional and Technical Positions” reform in all our R&D units. Nine tiers of technical positions with a term of office of three years were built

and subject to strict evaluation and dynamic management. The compensation system of these positions was improved to motivate our R&D staff. In addition, we improved the skill-assessment mechanism for our operational staff and further developed our team of senior technical experts and senior skilled experts. By the end of 2015, CNPC had 398,200 skilled employees of senior or higher competency, of which 366,600, or 92%, were senior workers, 26,500, or 6.7%, technicians, and 5,048, or 1.3%, senior technicians. We also had 352 skilled experts at the corporate level and 1,200 skilled experts at the subsidiary level.

In our overseas oil and gas operations, the number of local employees amounted to 53,694 by the end of 2015, accounting for 91.7% of the total staff. To build up the competence of local employees in host countries, training was provided to them on the job, at local professional institutions, in third countries, or in China, in order to extend their basic knowledge and improve their basic skills and operational qualifications. At our Block 6 Project in Sudan, 10 training classes were offered to 265 participants in line with the pragmatic situation of site production. Members of the oilfield community and graduates majoring in petroleum were organized to systematically study the principles and practice of geophysical prospecting, drilling, workover, pipeline transportation, and oil and gas gathering and transportation. Some excellent trainees have become key employees in the project. Our Central Asia-China Gas Pipeline Project financed 27 young Kazakh students to study at the Kazakh-British Technical University, and selected 18 middle managers to participate in administration training in China. In 2015, our overseas projects provided 122 training classes to 2,864 local employees.

We keep employees motivated and productive and optimized the mechanisms for human capital management by streamlining the organizational structure, restricting headcount and cutting labor costs, in a bid to achieve our business objectives.

We continuously reinforce the construction of overseas training facilities to help train foreign employees. These facilities include training centers set up by BGP in the United States, Pakistan, Sudan, Saudi Arabia, Libya, Nigeria and Iraq; and four training centers set up by CPECC in Sudan, Kazakhstan, Turkmenistan and Iraq. The technical level of local employees was improved by

a variety of training sessions offered at these facilities. In addition, we launched cooperation on education, research and training between the University of Basra and the China University of Petroleum (Beijing), which was aimed at improving the skill levels of local employees in Iraq and cultivating young talents for the local oil industry.

Skilled employees are the essential part of our workforce and are irreplaceable for our development. CNPC initiated the establishment of National Skill Master Studios and Corporate Skill Master Studios named after front-line operators in 2011 and 2013, respectively. By the end of 2015, we had 13 national studios and 41 corporate studios.



Shu Binxia

Having joined CNPC in 1983, Shu Binxia is now Deputy Head of No. 103 Oil Production Crew of Huanxiling Production Plant, Liaohe Oilfield. She leads her crew members in searching and implementing "7 steps" for "ball reset by touch and go" and the classification method in oil well management to maximize per well output. Shu is the winner of "China's Role Model of Ingenuity" and the "Skill Award of China". The Shu Binxia Production Skill Master Studio was established in 2012 and is staffed by 37 members.



Zuo Chengyu

Having joined CNPC in 1984, Zuo Chengyu is now a senior technician at the Cracking Workshop of Daqing Petrochemical. His studies on the operating pattern of ethylene units has resulted in the "best control method of compressor flow" and "operating method to boost unit circulation", which have been the best practices for the avoidance of shutdown and trip of compressor units. Zuo is the winner of "National May 1st Labor Medal" and the "Skill Award of China". Established in 2012, the Zuo Chengyu Skill Master Studio has fostered dozens of excellent operators of ethylene units.



Zhao Hui

Zhao Hui joined CNPC in 1991 and works as an international welding trainer at the Sixth Construction Company of China Huanqiu Contracting & Engineering Corp. His pioneering results of the "welding mode for fully inaccessible furnace tubes" and the "gas-protected welding technique for inner wall of heat-resistant steel" have been put into wide application. He transfers years of experiences to his trainees, many of whom have become excellent welders. Established in 2013, the Zhao Hui Welding Skill Master Studio gathers seven specialists.



Technology

In 2015, CNPC continued to improve its technological innovation system and implement "Three Major Programs of Technical Innovation". Positive results were achieved in overcoming key technical bottlenecks constraining the development of our core business, massively deploying major technologies and equipment, building and running key laboratories and test bases, and promoting international exchange and cooperation in technology R&D. These led to further enhancement in our innovation capabilities and core competitiveness, rendering strong support to the steady development of the company.

Construction of Technological Innovation System

In 2015, we accelerated the reform of our technological research system and mechanism. Our science and technology infrastructure platforms, including 18 at national level, played a more important role in supporting technological innovation. National Research Center for Oil and Gas Drilling Equipment was completed on schedule. The setup of two key laboratories, one for the control and treatment of petroleum and petrochemical pollutants and the other for material service behaviors and structure safety of petroleum pipes and equipment, was approved by the Ministry of Science and Technology.

Policies for promoting the application of R&D achievements were further perfected. We issued and implemented *CNPC's Opinions on Promoting the Application of Major Technology and Equipment with Independent Innovation in Equipment Manufacturing Sector*. Moreover, we persistently improved the management over outcomes from major R&D projects and pushed forward with the initiative of achieving the tangibility of key technologies.

Major R&D Advancements

Exploration and Development

Breakthroughs were made in the theory and understanding of tight oil and gas geology, and key exploration and development technologies as well as a scale development model were developed, facilitating the E&P of tight oil and gas in the Ordos Basin and helping Changqing Oilfield maintain an annual output of 50 million tons.

With innovative exploration approach and geological theory on ultra-deep and super-large subsalt sandstone gas fields in Kuqa foreland thrust belt of Tarim Basin, we discovered a gas reservoir from over 7,000m-deep formations in the area.

New technologies were developed for the physical simulation of multiple components in the whole process of basin forming, hydrocarbon generating and hydrocarbon accumulating in petroliferous basins. These technologies enable the quantification, visualization and normalization of the simulation of hydrocarbon accumulation elements, providing a new approach for revealing reservoir-forming rules in complicated basins and guiding petroleum exploration deployment.

With deeper understanding on the mechanism of ASP flooding, we optimized and stereotyped six key technologies and set up and improved an integrated management mode. These make up a packaged ASP flooding technology system that has been industrially rolled out, yielding an oil output of more than 3.5 million tons in 2015. In fact, the packaged ASP flooding technology has become a strategic replacement technology for the ongoing development of Daqing Oilfield.

Assisted by an innovative simulation technology for lab test of heavy oil fire flooding, we uncovered the mechanism of fire flooding and tackled major technical difficulties in downhole high-power electric ignition and burning front control. The vertical well fire flooding technique has been put into industrial test on site, and will be a next generation technology for heavy oil development.

Vigorously implementing the innovation strategy and adhering to the R&D concept of core business-driven, target-oriented and top-down design, we continued to build capabilities for proprietary innovation, integrated innovation and re-innovation, enabling a transit from a growth model driven by investment, capital and labor to the one powered by innovation.

Innovative core technologies for shale gas exploration and development powered the advancement of our shale gas operations. These technologies cover geophysical data acquisition, processing and interpretation, logging data acquisition and evaluation, comprehensive geological evaluation and development optimization, horizontal well drilling and completion, and SRV fracturing.

A methodology system for the evaluation of conventional and unconventional oil and gas resources worldwide has been developed, speeding up the evaluation of new projects and exploration of existing projects in Central Asia, Africa, Asia & Pacific, the Middle East, and South America. Major technological breakthroughs in developing large carbonate reservoirs enabled the efficient development of large bioclastic carbonate reservoirs in Iraq.

Refining and Chemicals

Major breakthroughs were made in the development and application of an internationally advanced technical package for 10Mt/a refineries, making CNPC capable of undertaking the overall design and the independent design of all major processing units for refineries of such a scale.

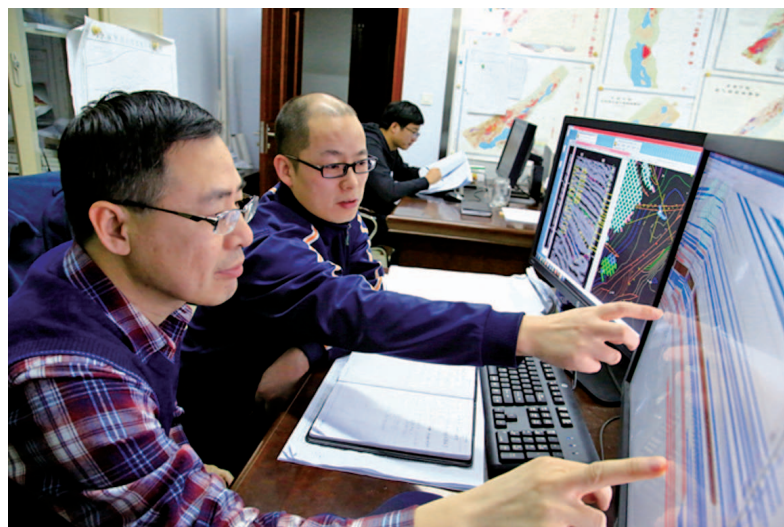
A technical package for the production of clean-burning gasoline meeting the National IV Emission Standard for Automobiles provided technical guarantee for us to upgrade our oil products. An industrial test for the steady production of National V Standard gasoline blending components proceeded steadily, with the blending products of gasoline pool meeting National V Standard.

Breakthrough was made in the development and industrial application of new polyolefin products. Polyolefin for gas pipes and additional 35 kinds of polyolefin products were developed and produced on an industrial scale. An innovative mode of product development and promotion that integrates "production, marketing, research and consumption" took shape, helping us increase the economic benefits of polyolefin production units.

Technical package for industrial production of NdBR was developed and tested successfully, making CNPC capable of producing a rare earth catalyst system of BR (cis-1, 4-polybutadiene rubber) and commercially producing NdBR.

Oilfield Services and Storage & Transportation

In **geophysical prospecting**, our research on seismic technologies for fine development saw significant breakthroughs in data acquisition and processing, providing effective technical support for fine adjustment and potential tapping in mature oilfield development. The world-leading technologies for precise seismic imaging and gas reservoir identification in complex mountainous structures were developed and widely applied in oil and gas exploration at seven basins in China and such structures in 12 countries, facilitating the discovery of four gas reservoirs with over 1tcm reserves each in Tarim Basin and Sichuan Basin.



In well logging, we developed the azimuthal resistivity imaging LWD tool, providing a new means for fast evaluation of complex reservoirs and geo-steering in horizontal wells. The technical package for ultra-deep carbonate imaging logging was widely deployed and much improved the interpretation coincidence rate.

Regarding drilling operation, high-performance water-based drilling fluids for horizontal shale gas wells were developed and would become an effective alternative to oil-based drilling fluid for shale gas development. The matching technologies for superior and fast drilling and completion of deep and ultra-deep wells helped us massively increase reserves and quickly ramp up production in key regions. Factory-like operations in horizontal well drilling and completion as well as reservoir stimulation became a major approach for the exploration and development of tight oil and gas, shale gas, and other unconventional resources.

In terms of storage and transportation, our innovative X80/Φ1422 pipeline construction technologies facilitated the building of the eastern route of the Russia-China Gas Pipeline. Sixteen categories of pipeline equipment such as high-power gas-driven compressor unit could be domestically manufactured, reducing the cost by more than 20%.

Technological Cooperation

We promoted technological exchange and cooperation in terms of EOR, unconventional hydrocarbons, and wastewater treatment and recycling both at home and abroad. With a mechanism in place for a variety of well-organized, targeted communication and cooperation, we made new progress in technology R&D and the nurturing of internationalized talent. Our work with Chinese Academy of Sciences (CAS) and China Aerospace Science & Industry Corporation (CASIC) drove organic integration between the innovation and industrial chains. We held a high-level forum with GE on technological



innovation and management, and signed a MOU on R&D cooperation in CCUS, low carbon and environmental protection technologies, and development of unconventional hydrocarbons. We actively participated in the exchange activities held by international and industrial academic organizations and utilized international meetings as a platform to present our intelligent waterflooding, chemical flooding for EOR, sophisticated well drilling and completion and other new technologies.

Intellectual Property Rights

Our portfolio of intellectual property rights was further expanded and improved with a record number of 5,153 patents (2,778 of which were invention patents) applied for and 4,753 patents (1,145 of which were invention patents) granted in 2015. We had 391 registered computer software copyrights and 220 recognized know-hows. In particular, six of our patents were awarded National Patent of Excellence. The number and quality of our IPR achievements witnessed continuous improvement.

Science and Technology Awards

In 2015, four of our major R&D achievements won China's national award of science and technology. Particularly, "Theoretical and Technological Innovations for the Exploration and Development of Ultra-Low-Permeability Tight Oil and Gas Reservoirs" was awarded the first-class National Science and Technology Progress Award; and "Technology for Precise Seismic Imaging and Gas Reservoir Identification in Complex Mountainous Structures and Its Industrial Application" was awarded the second-class National Technical Invention Prize. Our Smart Driller Indicator (SDI) became one of the 16 winners of US E&P's 2015 Special Meritorious Awards for Engineering Innovation. This is the first time for CNPC to win the award.

Patents applied



5,153

Patents granted



4,753

Breakthroughs in geologic theories and technologies facilitate tight oil E&P in the Ordos basin

With new understandings on tight oil geology, CNPC innovated a series of key technologies for tight oil exploration and development, leading to major breakthroughs in tight oil E&P in the Ordos Basin and stable oil production of 50Mt/a in the Changqing Oilfield.

The theoretical and technological breakthroughs include: (1) establishing a semi-deep lake — deep lake "lobe + channel" gravity flow sedimentation model for continental lake basins, overcoming obstacles in hydrocarbon prospecting in deep zones and expanding the exploration scope of tight oil in the Chang-7 block of the basin; (2) discovering differences in the reservoir space and oil/gas microscopic occurrence state of tight reservoirs and low permeability reservoirs, and confirming that the seepage system of tight reservoirs is dominated by inter-connected cluster pore throats and SRV fracturing is an effective way to tap tight oil; (3) deepening the tight oil accumulation mechanism of "high intensity hydrocarbon generation, continually charging, proximal concentration" for large continental lake basins, and putting forward the physical

property threshold for hydrocarbon accumulation in tight reservoirs; (4) setting standards and specifications for tight oil sweet spot prioritizing and resource/reserve evaluation, and bringing forward the "horizontal well + SRV fracturing" method for tight oil development; and (5) working out the quasi natural energy development mode for horizontal wells, well pattern form, the reservoir energy reestablishment approach and the R&D plan, and realizing scale development of tight oil for the first time in China.

These theoretical and technological breakthroughs have been successfully applied in the exploration and development of tight oil, as the exploratory success rate increased from 60% to 78%, output per single well increased by 4-6 times, and 13 favorable target zones ascertained. China's first 100-million-ton tight oil field — Xin'anbian — was discovered, and an annual production capacity of 1 million tons has been built.





Annual Business Review

Exploration and Production

In 2015, we maintained reserve growth through fine exploration in favorable zones and strata series in China. A number of reservoirs were identified, each containing 100 million tons of oil or 100 billion cubic meters of natural gas. We aimed at maximizing the investment efficiency and integrated profitability and maintained stable oil and gas production, through optimizing development program and rigid cost control.

Sulige, Block Gaoshiti-Moxi in the Sichuan Basin, and Keshen Block in the Tarim Basin. In addition, more reserves of tight sandstone gas were ascertained in Shilou region of the Ordos Basin; and shale gas reserves totaling more than 100 billion cubic meters were first reported in Changning, Weiyuan and Huangjinba regions in the Sichuan Basin.

Exploration

We made a profit from our focused, fine exploration which boasted a higher success rate, thanks to optimally adjusted deployment which targeted at massive, premium, and producing reserves in large basins and oil/gas enriched sags. We domestically proved 728.17 million tons of oil in place in 2015, exceeding 600 million tons for the tenth consecutive year, and 570.2 billion cubic meters of gas in place, exceeding 400 billion cubic meters for the ninth consecutive year. With a reserve replacement ratio of more than 70% (USD 70/bbl) under SEC classification, we had a sound resource base to sustain robust growth under low oil prices.

Major Discoveries

Our oil exploration was fruitful, including the identification of five areas each with 100 million tons of reserves in Changqing and Xinjiang oilfields, and additional proven or controlled oil in place of more than 30 million tons in Daqing, Liaohe and Tarim oilfields respectively. Enhanced regional geological evaluation resulted in breakthroughs in tight oil exploration in four blocks in Changqing and Daqing oilfields.

Progress in gas exploration included the identification of a number of reserves each with 100 billion cubic meters of gas in Block West-2 and Block South in

Newly proven oil in place
(Domestic)



728.17
mmt

Newly proven gas in place
(Domestic)



570.2
bcm

Our production and operation activities were conducted in an orderly and efficient manner. A range of retrenchment and cost efficiency measures were implemented, facilitating the shift in our growth from a scale and speed-oriented pattern to a more quality and efficiency-focused approach.

Development and Production

In 2015, our domestic oil and gas production maintained steady levels of output through enhancing dynamic adjustment of development programs, optimizing capacity layout, discontinuing marginal and non-performing projects, drilling more horizontal wells, and controlling natural decline at mature fields. We achieved production capacity increments of 12.25 million tons for crude oil and 15.4 billion cubic meters for natural gas, and produced 187.51 million tons of oil equivalent.

Crude Oil

In 2015, we intensified geological study and the application of new technologies with an aim to increase per well output and the profitability of development. Efficient development was realized through well organizing production capacity deployment, exploring new ways in capacity building, and deepening full-process project management. We produced 111.43 million tons of oil throughout the year.

Daqing Oilfield produced 38.39 million tons of oil through fine waterflooding, efficient polymer flooding, extensive deployment of ASP flooding, and

intensive development management. Changqing Oilfield maintained high reserve growth by promoting integrated exploration and development technologies. With these technologies, we located new oil and gas formations

Crude production
(Domestic)



111.43
mmt

Natural gas production
(Domestic)



95.48
bcm

Reserves and operating data (Domestic)

	2013	2014	2015
Newly proven oil in place (mmt)	670.13	689.80	728.17
Newly proven gas in place (bcm)	492.30	484.00	570.20
2D seismic (kilometers)	27,089	19,170	15,909
3D seismic (square kilometers)	12,477	11,739	9,095
Exploration wells	1,746	1,584	1,588
Preliminary prospecting wells	1,006	910	924
Appraisal wells	740	674	664

and favorable blocks as strategic reserve replacement zones, and effectively increased the development profitability of tight oil and gas reservoirs. As a result, Changqing produced 24.81 million tons of oil in 2015. Liaohe Oilfield implemented a new mode of 3D development allowing for the cost-effective extraction of inferior reserves in deep and tight reservoirs. As a result, heavy oil in deep zones can be developed efficiently throughout its life cycle.

Tapping potential of mature fields

As the development of an oil/gas field proceeds, output from its production wells significantly declines. To mitigate this decline, we took a variety of measures to release the potential of mature fields.

Fine reservoir description using six sets of technical solutions was carried out on an extensive basis. 3D digital and dynamic models were set up at all major oilfields. Research programs on chemical flooding, gas flooding, and thermal recovery of heavy oil were conducted to increase the economic results of mature blocks.

Fine waterflooding was intensively applied. With a long-standing system in place, the natural decline rate dropped from 13.84% in 2008 to 9.8% in 2015. In Daqing Oilfield, the natural decline rate of waterflooding and the composite decline rate were cut down to 6.69% and 4.75%, respectively, thanks to third-generation zonal water injection. In Xinjiang Oilfield, stimulation measures for individual wells were combined with comprehensive reservoir treatment to tap residual reserves.

Fine management of the entire process of oil and gas development was promoted. In Changqing Oilfield, gas wells were managed with a "multi-dimensional matrix" and quantified stimulation parameters in a three-level system, increasing the running rate of stripper wells by 2-3%.

Pilot Development

In 2015, we performed research and testing of key technologies and applied proven ones for high-water-cut, low-permeability, and heavy oil reservoirs. Major pilot development projects were pushed forward in an orderly manner, further boosting reserves and production. ASP flooding was industrially applied in 42 units covering 190 million tons of oil in place in Daqing Oilfield. A polymer flooding project increased the annual output from 30,000 tons to 180,000 tons in Xinjiang Oilfield. Surfactant/polymer flooding increased the daily oil output from 63 tons to 360 tons, in a pilot zone at Liaohe Oilfield, with the increase in the recovery factor of 18%. Pilot fire flooding projects in Liaohe Oilfield and Xinjiang Oilfield produced 450,000 tons of oil annually, with the recovery factor increasing by 40%. SAGD for ultra-heavy oil recovery helped 12 wells in Liaohe Oilfield each produce 100 tons per day. In a test of miscible natural gas gravity drive project in Tarim Oilfield, more than 13 million cubic meters of gas were accumulatively injected, yielding 172,000 tons of oil in 2015. Pilot air/foam flooding projects proceeded smoothly in Daqing, Changqing, and Dagang oilfields.

Natural Gas

In 2015, CNPC produced 95.48 billion cubic meters of natural gas, thanks to capacity building in major producing regions and major projects, as well as optimized development plans and well locations. Changqing Oilfield produced 37.46 billion cubic meters of natural gas through capacity building based on overall evaluation and zonal optimization, and by tapping gas well capacity through fine management. Good development results were achieved from the massive deployment of horizontal wells in Sulige Gas Field and large well groups in Shenmu Gas Field, and new breakthroughs were made in reservoir evaluation in the Longdong area. Tarim Oilfield achieved a natural gas output of 23.55 billion cubic meters mainly contributed by the Kela-2, Dina-2, and Keshen fields, being the second-largest gas producing region in China. Southwest Oil and Gas Field produced 15.48 billion cubic meters of natural gas and will be able to more effectively supply gas to the Sichuan and Chongqing region with its 11bcm/a production capacity from Longwangmiao Formation in Moxi Block of Anyue Gas Field.

Sulige Gas Field

Sulige, located on the northern edge of the Ordos Basin, is the largest uncompartimentalized onshore gas field in China. Despite its low permeability, low pressure, and low abundance characteristics which are rare among gas fields around the world, it has been massively and effectively developed by pursuing a low-cost strategy based on integrated technologies, standardized construction, digitalized management, and market-based services. As the number of low-output and marginal wells increase along with development, a series of measures such as optimizing the production profile of belching wells, water discharge gas production and fine management were applied in an effort to increase the recovery of low-yield wells and maintain stable production of the field. In 2015, Sulige reached an output of 23.39 billion cubic meters, registering an accumulative gas production of 124.05 billion cubic meters.



Production Commenced at the Giant Gas Reservoir in Longwangmiao Formation of Anyue Gas Field

On October 20, 2015, production fully commenced at the super-large gas reservoir in Longwangmiao Formation of Anyue Gas Field, with an annual capacity of 11 billion cubic meters.

The reservoir is located in the middle of the Sichuan Basin, spanning Sichuan Province and Chongqing Municipality. With 440.38 billion cubic meters of proven gas in place, it is the largest uncompartimentalized monomer marine-facies carbonate gas reservoir ever discovered in China. Its discovery took place on September 9, 2012, when well Moxi-8 in Anyue Gas Field produced more than 1.9 million cubic meters of gas per day after formation testing.

During the development of the reservoir, we improved our geological understanding and innovated a "high-yield well incubator" technology. We deployed 30 target locations for high-yield wells in the first place in "two blocks and ten zones" that were most favorable for development. The number of production wells was greatly reduced by drilling horizontal or highly-deviated wells based on studies of the geography, landform, and reservoir thickness and distribution. This enabled us to efficiently develop the gas field. By the end of 2015, the average daily gas output per single well during production test at Longwangmiao Formation exceeded 1.64 million cubic meters.

Gas layer identification and gas production were conducted simultaneously, thanks to an innovative mode comprising integrated exploration and development, modular engineering design, factory equipment manufacturing, and skid-based and "PMT+EPC" construction. Compared with traditional approaches, this mode not only reduced the land use by 20%, but also significantly curtailed the construction period and time to marketplace. In fact, it took only three years to prove the reserves and complete 11bcm/a capacity building since its discovery.

Aiming at "zero pollution and zero emissions", the development program employed the most proven technologies for the treatment of waste water and gas in order to build an environmentally friendly gas field. A recently completed gas purification plant can recover 99.8% of sulfur in total through a CPS process and Shell Claus Off-gas Treatment (SCOT). And all produced wastewater can be recycled by using "evaporation and crystallization" technology.

As the reservoir is in full production, it can meet half of the newly added gas consumption of the country, and plays an important role in optimizing the energy consumption structure in the Sichuan area.



Exploration and Development of Unconventional Oil and Gas

In 2015, CNPC made important progress in the exploration, development, and technological innovation of CBM, shale oil and gas, tight oil and gas, and other unconventional hydrocarbons. We developed key technologies for the exploration and development of tight oil, proved new tight oil reserves, and pushed forward the construction of CBM industrial bases and shale gas demonstration zones.

CBM

CNPC supplied 1.76 billion cubic meters of CBM to the market in 2015, a steady increase of 28.5% year-on-year. We obtained a more profound understanding on the development pattern of the CBM fields based in Erdong and Qinshui areas. We have built China's largest medium-to-low-coal-rank CBM field in Block Baode, and developed the first medium-coal-rank CBM field in the country in Block Hancheng. In the Zhengzhuang and Hancheng blocks, automatic water drainage and gas extraction based on bottom-hole flowing pressure control was applied. We also promoted 3D exploration and development in coal measure strata and improved pilot development by drilling cluster wells and horizontal wells. In 2015, we completed 31 exploration wells and 261 development wells, adding 170mcm/a production capacity, with the accumulative capacity totaling 2.3bcm/a.

Shale Gas

In 2015, our shale gas operations focused on two demonstration zones of Changning-Weiyuan and Zhaotong. We drilled 55 new wells and completed 80 ones, and obtained 100kcm/d from single well on average. Moreover, we built 2.85bcm/a production capacity, and supplied 1.3 billion cubic meters of commercial gas. Internal gathering and transportation facilities, water supply facilities, four dewatering stations, and five export pipelines were completed and commenced operations. After nearly two years of development and evaluation, we gained an understanding of the enrichment pattern of each block. In 2015, we reported reserves totaling 163.5 billion cubic meters of shale gas in place in Changning, Weiyuan, and Huangjinba regions for the first time. Major development technologies, technologies for the fostering of high-yield wells, and efficient management modes took shape. The average daily output per production testing well and their expected final output for the first year met the conceptual design.

Tight Oil

In 2015, we made important achievements in tight oil exploration and development in China's Ordos, Sichuan, Songliao, Qaidam, and Santanghu basins.



Sand fracturing operation at Weiyuan shale gas block in Sichuan

In Changqing Oilfield, integrated exploration and development in Block Chang-7 led to new industrial oil flows from 103 wells and further proved three highly abundant zones in Longdong, Xin'anbian, and Shaanbei. Moreover, a 1.07Mt/a production capacity was built by the end of 2015. Daqing Oilfield found more than 100 million tons of controlled and predicted oil in place by emphasizing geological evaluation in sweet point zones and favorable zones, improving and rolling out stimulated reservoir volume (SRV) fracturing in horizontal wells, and integrating exploration and development in Fuyu oil formation. Jilin Oilfield considerably reduced its drilling and fracturing costs by seeking measures to tap its inferior resources with lower costs and higher returns. Moreover, new industrial flows were obtained from seven horizontal wells in the Linzijing-Biezijing region, with favorable results in production test. Tuha Oilfield lowered its drilling and fracturing costs by integrated technical solutions and newly proved 30.09 million tons of tight oil in place and built 138kt/a production capacity in Block Ma-56 in Malang Sag of Santanghu Basin.

Joint E&P in China

As authorized by the Chinese government, CNPC works with international partners to explore and develop oil and gas resources in China. Most of the joint projects focus on low-permeability reservoirs, heavy oil, tidal and shallow water zones, sour gas, high-temperature and high-pressure gas reservoirs, CBM, and shale gas.

By the end of 2015, we had 35 joint E&P projects in operation, producing 3.92 million tons of crude oil and 6.6 billion cubic meters of natural gas, which totaled 9.17 million tons of oil equivalent.

Executive Summary of Major Projects

Zhaodong Oil Project

The project covers 77 square kilometers at the tidal and shallow water zone in the Bohai Bay Basin. New XCL-China LLC. and Australia's ROC Oil (Bohai) Company are our partners.

This is the first joint project in the tidal and shallow water zone where CNPC took over the operatorship in April 2015. The project proceeded in a safe and smooth manner after takeover, and high yield was obtained from five wells newly put into production.

Changbei Natural Gas Project

The project covers 1,691 square kilometers in the Ordos Basin. Shell Group is our partner in the project.

It maintained a high output of 3.64 billion cubic meters of natural gas in 2015. CNPC became the operator in January 1, 2016 pursuant to a handover agreement that CNPC and Shell Group signed with respect to the operatorship of the Changbei Phase I Project under the project contract.

Chuangdongbei Natural Gas Project

The project covers 876 square kilometers in the Sichuan Basin. Chevron is our partner in the project.

Well group A in Luojiashai Sour Gas Field was smoothly put into production in Kaixian County of Chongqing Municipality on December 30, 2015.

South Sulige Natural Gas Project

The project covers 2,392 square kilometers in the Ordos Basin. Total is our partner and CNPC is the operator.

With continuously improved factory development program, the project proceeded efficiently through optimal selection of well locations, deployment of cluster wells, standardized design and construction, and modular surface construction. In 2015, the block produced 1.48 billion cubic meters of natural gas.

Crude output from
joint E&P projects



3.92
mmt

Natural gas output
from joint E&P projects



6.6
bcm

Natural Gas and Pipelines

2015 saw steady momentum in our natural gas business. Gas production from major producing regions remained stable. Construction of pipelines and gas storages in key regions witnessed steady progress. Despite the weak market, we registered a slight increase in natural gas output and marketed 122.66 billion cubic meters, an increase of 2.7% year-on-year.

By the end of 2015, we operated 79,936 kilometers of pipelines in China, including 18,917 kilometers for crude oil, 50,928 kilometers for natural gas, and 10,091 kilometers for refined products, around 69.8%, 76.2%, and 46.3% of China's total respectively. These pipelines constitute a safe and reliable network with flexible dispatch capacity to deliver multiple sources of oil and gas.

Pipeline Operation and Control

In 2015, faced with ample gas supply in the market, we rationally arranged pipeline gas imports and LNG purchase on spot, made the best use of the storage capacity of pipelines, and increased gas injection into underground storages.

We operated pipelines more efficiently through optimized management. Stable gas supply in peak consumption periods was guaranteed by optimizing operation and eliminating transmission bottlenecks. Through improving management and coordination among gas production, transportation and marketing, pipeline network deliverability were further optimized and resources more effectively allocated. Self-produced and imported gas, peak-shaving gas from underground gas storages, and coastal LNG were made available to consuming regions to secure supply in key periods and regions.

Underground Gas Storages

We continued to expand our underground gas storage capacity. By the end of 2015, we had 10 storages including Dagang, Jintan, Liuzhuang, Suqiao and Hutubi. With a peak shaving capacity of up to 5.2 billion cubic meters, these storages further secured supply in case of emergency. Underground gas storage Shaan-224, the first one in Changqing Oilfield, became operational for gas injection. With a designed capacity of 1.04 billion cubic meters, the storage received a daily average of 2.5 million cubic meters of gas, helping to stabilize the supply of the Shaan-Jing Gas Pipelines.

Crude pipeline mileage
in the nation's total



69.8%

Natural gas pipeline mileage
in the nation's total



76.2%

Storage and Transportation Facilities

In 2015, several major oil and gas pipelines and their associated facilities were completed and put into operation. These included the upgraded Mohe-Daqing Crude Pipeline, the Harbin-Shenyang Gas Pipeline (Changchun-Shenyang Section) and the Shandong Gas Pipe Network (Qingdao-Weihai Section). Construction of the eastern section of the Third West-East Gas Pipeline and Jinzhou-Zhengzhou and Yunnan Refined Products Pipelines proceeded smoothly.

The Third West-East Gas Pipeline

The Third West-East Gas Pipeline, including one trunk and eight branches, runs from Horgos in the Xinjiang Uygur Autonomous Region to Fuzhou in Fujian Province, with a total length of 7,378 kilometers. The 5,220km-long trunk line has a designed pipe diameter of 1,016-1,219mm, transport pressure of 10-12MPa and an annual delivery capacity of 30 billion cubic meters. It was constructed and put into operation on a section-by-section basis.

The western section runs from Horgos to Zhongwei in the Ningxia Hui Autonomous Region, with a total length of 2,445 kilometers. Construction of this section began in October 2012, and was completed on August 25, 2014. The eastern section runs from Ji'an in Jiangxi Province to Fuzhou in Fujian Province, with a total length of 827 kilometers. It has a designed pipe diameter of 1,016-1,219mm, transport pressure of 10MPa, and an annual delivery capacity of 15 billion cubic meters. Construction of this section commenced in May 2013. By the end of 2015, 815 kilometers of the pipeline had been welded. The section is expected to become operational in 2016.

Jinzhou-Zhengzhou Products Pipeline

Jinzhou-Zhengzhou Products Pipeline starts at Jinzhou in Liaoning Province and ends at Zhengzhou in Henan Province. Consisting of one trunk, two input branches, and seven output branches, the pipeline has a total length of 1,636 kilometers, with a designed pipeline diameter of 219-660mm, transport pressure of 8-10MPa, and annual delivery capacity of 13 million tons. When completed, it will help establish a sophisticated supply network of refined products and optimize the allocation of refined products in Northeast China and the central and eastern regions of the country.

Construction of the pipeline commenced on August 18, 2012, and 57% of it had been completed by the end of 2015, including 1,290 kilometers pipeline welded, 1,118 kilometers backfilled, and 152 railway, road and river crossings.

Natural Gas Utilization and Marketing

In 2015, CNPC marketed 122.66 billion cubic meters of natural gas, 68% of China's total, through pipelines reaching 30 provinces, municipalities and autonomous regions.

Faced with slowing growth in gas demand, we launched promotion activities, and sold gas directly to industrial users and major customers at favorable prices. Moreover, we continued to develop the markets along major new pipelines, including the middle-section trunk and Fujian-Guangdong sub-trunk of the Third West-East Gas Pipeline, as well as economically-developed areas in eastern coastal region. Throughout the year, we signed 84 long-term sales contracts, with annual contract volume of nearly 10 billion cubic meters, in which urban and industrial users taking up 70%.

New breakthroughs were made in developing the city gas and CNG market. Projects in Chaozhou and Jiayang in Guangdong Province and the Wafangdian-Changxing Island Project in Dalian, Liaoning Province, saw smooth progress. Construction of the Hunan Branch and Yunnan Branch was implemented at a faster speed.

We actively promoted the market reform of the natural gas industry. In July 2015, Shanghai Petroleum & Natural Gas Exchange (SHPGX), a joint venture of ten parties including CNPC, Sinopec and CNOOC, started trial operation successfully. There have been over 100 downstream registered users on this trade and settlement platform, and a total amount of 3.5 billion cubic meters of pipeline gas was traded on line in 2015.

Liquefied Natural Gas (LNG)

In 2015, our LNG business witnessed smooth progress in market development and capacity building. By the end of 2015, we had 12 LNG plants in operation with total capacity of 7 million cubic meters per day and produced 560 million cubic meters in 2015. Five LNG plants were in pilot operation, including Huanggang in Hubei Province, Guangyuan in Sichuan Province, and Taian in Shandong Province. Three LNG plants were being built, including one at Wuhai in the Inner Mongolia Autonomous Region, one at Zhaoqing in Guangdong Province, and one at Weinan in Shaanxi Province, with a total capacity of 1.9 million cubic meters per day. We had 550 LNG refueling stations in operation and another 136 under construction. The year-round terminal sales were 1.54 billion cubic meters, accounting for 27.3% of the total sales by all LNG refueling stations in China.

Jiangsu, Dalian and Tangshan terminals kept playing their role in gas supply and peak shaving. In 2015, they received 5.8 billion cubic meters of LNG. The 10Mt/a gasification plant as part of Phase-II of Jiangsu Terminal was successfully put into operation upon its first startup. Mechanical works of Phase-II of the Dalian terminal was completed. The two projects will further secure the smooth supply of natural gas to the Yangtze River Delta and North China regions.

We also made progress in the development of LNG vehicles, LNG transportation, and the formulation of relevant standards. In 2015, we co-developed 105,000 LNG vehicles, accounting for 52.5% of LNG vehicles in China. We also set up demonstration stations for the refitting of LNG vehicles in Chongqing Municipality, Wuhai in the Inner Mongolia Autonomous Region, and Wuhan in Hubei Province, and worked out a series of refitting techniques and solutions. We built/renovated 33 LNG vessels, accounting for 30% of the LNG vessels in China. We also completed a number of tests for LNG transportation by container ships, small ships and railways in 2015.



Routing inspection at gas station

Refining and Chemicals

In 2015, we reorganized production arrangement and optimized product portfolio of refining and chemical business in response to market changes, and allocated resources and workload to installations with higher profit and closed marginal ones. We also improved the efficiency of our facilities and ensured their safe and smooth operation through well-organized overhauls. A total of 21 major technical and economic indicators improved compared to 2014.

Domestically, we processed 151.32 million tons of crude, and produced 103.69 million tons of refined products. Production of profitable products increased, with the yield of refined products growing by 0.7% and the percentage of black products decreasing by 0.5%. Outputs of jet fuel, -35# diesel, and aromatic hydrocarbons increased by 14.5%, 15.4%, and 12.4%, respectively. The production of green products, such as high-grade gasoline and National V standard diesel increased by 1.6% and 7%, respectively.

We improved the profitability of our chemical business by increasing the output of high value-added chemicals and enhancing terminal marketing. In 2015, we produced 5.03 million tons of ethylene and 1.85 million tons of synthetic ammonia, and sold 25.22 million tons of chemicals, up 3% year-on-year. In particular, we increased production of synthetic resins by 3.1%, and boosted sales of 15 high value-added products by 21%.

Crude runs
(Domestic)



151.32
mmt

Refined products
output (Domestic)



103.69
mmt

Refining and chemicals operating data (Domestic)

	2013	2014	2015
Crude runs (mmt)	146.02	150.16	151.32
Utilization rate of refining units (%)	86.9	82.6	84.5
Refine products output (mmt)	97.90	101.84	103.69
Gasoline	32.97	34.10	36.47
Kerosene	6.06	7.14	8.34
Diesel	58.87	60.60	58.88
Lubricating oil output (mmt)	1.89	1.58	1.21
Ethylene output (mmt)	3.98	4.98	5.03
Synthetic resin output (mmt)	6.64	8.07	8.32
Synthetic fiber output (mmt)	0.07	0.07	0.07
Synthetic rubber output (mmt)	0.67	0.75	0.71
Urea output (mmt)	3.77	2.66	2.57
Synthetic ammonia output (mmt)	2.58	1.89	1.85



Construction and Operation of Large Refining & Petrochemical Bases

Our major petrochemical facilities in China operated smoothly in 2015. Urumqi Petrochemical optimized process parameters and processing flows, strengthened process control, and maintained the safe and smooth operation under high workload. Ningxia Petrochemical's 5Mt/a refining unit ran for 500 days in its second long period operation, with all of its economic and technical indicators continuously optimized.

Construction of major refining and petrochemical projects proceeded smoothly. Yunnan Petrochemical's 10Mt/a Refinery was completed, with the equipment and process piping installed and the mechanical works of atmospheric-vacuum distillation unit, gas fractionation unit, and another six units finished. In addition, steady progress was made in the refinery upgrading and HSE system renovation at Guangdong Petrochemical and Huabei Petrochemical, and the efficiency improvement renovation at Liaoyang Petrochemical.

Upgrading of Refined Products and Development of New Products

Vehicle emission is a source of pollutants for haze in China's medium and large-sized cities. CNPC has accelerated the pace of its upgrading of gasoline and diesel quality to help mitigate air pollution aligned with the government's intensified environmental concerns. In 2015, we made progress in 10 projects for upgrading to the National V standard, including the units at Dalian Petrochemical, Guangxi Petrochemical, and Karamay Petrochemical. These units have started to produce National V products which were supplied to 11 eastern provinces and cities. Moreover, preliminary work commenced on 47 National V standard upgrading projects. By the end of 2015, we had 19 refining and chemical enterprises capable of producing National V standard motor gasoline, and all our enterprises were ready to deliver National V standard motor diesel. In addition, we enhanced top-down design and conducted research programs on technologies for clean-burning oil products upgrading, and developed technical solutions for the production of clean-burning gasoline and diesel, which were applied extensively at Dagang Petrochemical and Urumqi Petrochemical.

In 2015, we launched 75 new chemical products with a total output of 1.12 million tons, including PE pipes, hollow materials, and PP impact materials. Sichuan Petrochemical, Fushun Petrochemical and Daqing Petrochemical were enabled to produce more types of ethylene products. Achievements were made in the promotion of 20 new products, including Jilin Petrochemical's ABS, Fushun Petrochemical's PP fiber, Sichuan Petrochemical's PE100 pipe material, and Lanzhou Petrochemical's SBR feedstock.

Marketing and Sales

In 2015, our marketing and sales business became more market-oriented and customer-based, by continuously optimizing sales structure. We focused on integrated marketing of refined products, pre-paid fuel cards, non-fuel products and lube oil, and actively exploring new modes such as "Internet + Marketing". As a result, our market responsiveness was considerably improved.

Refined Products

In 2015, we sold 116.25 million tons of refined products, 80.54 million tons, or 69.3%, of which were retail. The contribution of high value-added products, including high-grade gasoline and jet fuel, kept increasing.

Marketing Network

We continued to build up our marketing network by optimizing its layout, focusing on development of key stations in a flexible way, and enhancing brand promotion. In 2015, 321 new service stations were developed, adding 2.53 million tons to the existing sales capacity; and 11 depots were built, renovated or upgraded, increasing the storage capacity by 235,000 cubic meters. By the end of 2015, we had 20,714 service stations operating in China.

We improved the operation efficiency of existing stations, especially those with poor sales and low profitability, by rolling out fine and 6S management. Some of our stations were upgraded into smart stations with internet technologies. With an optimized logistics and storage structure, we reduced the inventory, maximized the efficiency of depot turnover, and ensured market supply. The Kunlun fuel card was promoted to the market at a faster pace, with 17,210,000 cards issued in 2015, increasing the total number issued to 81,280,000.

Refined products sales
(Domestic)



116.25
mmt

Refined products retail
volumes (Domestic)



80.54
mmt

Non-Fuel Products

Further consolidated as part of our core business, non-fuel products became a new profit growth point. Taking advantages of the retail network, we realized integrated marketing at service stations by upgrading our convenience stores and carefully selecting of commodities. We pushed forward the development of our self-produced commodities and, in particular, strengthened the promotion of the Kunlun Star commodity family. Vehicle services were offered at service stations, either by ourselves or our JVs, or by renters. Overall profitability was improved by utilizing the resources of non-fuel suppliers through joint marketing and brand integration. In 2015, our non-fuel products reported revenue and profit of RMB 12.42 billion and RMB 1.45 billion, up 25.6% and 42.5% year-on-year, respectively. The number of convenience stores with annual revenue of more than RMB 1 million each increased by 23% year-on-year, with daily average revenue per store growing by 17%.

Lube Oil and Miscellaneous Refined Products

In 2015, CNPC pushed forward the standardized management at production sites and optimized the layout of production capacity, and improved our customer service capability by strengthening ties between production and marketing. Moreover, lube oil and refined products were integrated in our retail network of service stations. We improved our marketing system for all products, including motor oil, industrial oil, service oil, special oil and bunker oil. With intensified research programs, we launched new products, such as metal working fluids, grinding lubricants, aluminum roll oils, and long-acting anti-rust oil. In 2015, we sold 1.27 million tons of lube oil (grease). Sales of premium motor oils and byproducts grew year-on-year significantly.

Sales of miscellaneous refined products increased steadily by 2.42 million tons year-on-year. In 2015, we sold 6.7 million tons of asphalt products, an increase of 270,000 tons year-on-year, by targeting at major engineering projects, intensifying research on special asphalts, and strengthening marketing management. To add even more value to miscellaneous refined products, a blend of FCC slurry and crude oil was processed to produce asphalt on an industrial scale, and progress was made in naphtha and bunker fuels marketing.

"Internet +" Powers Smart Service Stations

Our first smart service station powered by "Internet +" became operational in Shijiazhuang, Hebei Province, on August 15, 2015.

Based on the sales system and network of conventional stations, our smart stations aim to "care for you, your car, and your life", and provide one-stop services by leveraging the Internet-based Big Data, Cloud, the Internet of Vehicles (IoV), the Internet of Things (IoT), and mobile payment. Services include vehicle decoration, inspection, insurance agency, and maintenance. More than 1,000 commodities are available in convenience store inside station. Customers can choose to pay online by their pre-paid fuel cards, WeChat, or Alipay, and then pick their purchase at the nearest service station, where they can also send and receive parcels, book tickets, withdraw money, and pay utilities charges, etc.

Based on internet technologies, our smart service stations provide services in a more diversified way online and offline, inside and outside the station. Smart station expands services from oil products marketing to vehicle life span care, upgrades the operation mode from traditional service station to a more open and consolidated mode, from entity marketing to big data marketing.

By the end of 2015, the first 26 smart stations saw an increase of 38% and 59% in terms of revenues from oil and non-oil products, respectively. Now the brand new business mode is rolling out across China.



Overseas Oil and Gas Operations

In response to the declining oil prices and fluctuating exchange rates in 2015, we proactively adjusted our operational strategy and achieved safe, stable and effective growth in our overseas oil and gas operations. Risk exploration and progressive exploration led to a number of discoveries. Oil and gas production saw sustained growth. Pipelines and refining and chemical projects operated smoothly, while ones under construction saw progress. Besides, our cooperation with Belt and Road Initiative countries was further deepened.

Exploration and Development

In 2015, we optimized the deployment of our overseas exploration, by focusing on effective exploration, enhancing progressive exploration, and holding back risk exploration. We postponed offshore exploration and unconventional resource exploration that featured high risk, huge investment, and a long return cycle. Through technical innovation and well-organized exploration program, we obtained a number of major breakthroughs and discoveries.

Progressive exploration: New reserves were added in oil-rich blocks by progressive exploration. In Sudan, we discovered two reserves of 100 million tons of oil for each, one in Sufyan sag of Block 6 and the other in Hilba region of Block 4. In Chad, a high-yield oil reserve was found in buried hills in Block H. In Kazakhstan, we made progress in No. 1057 central uplift area and Block Doshan of the South Turgai Basin, and had more outcomes from lithologic exploration on the western slope of Hope Oilfield in the Pre-Caspian Basin. Moreover, we revealed potential in new bed series for the first time in the west of Block T of the Andes project in Ecuador, and obtained important discoveries in new bed series and low-resistance reservoirs in Block Jabung of Indonesia.

Risk exploration: We focused on the preliminary prospecting at the eastern piedmont zone on the Right Bank of Amu-Darya in Turkmenistan. Natural gas flows of more than 1 million cubic meters per day were obtained from well testing in each of the two formations of the Joramergen structure. Testing of exploration wells in the Gokmiyar structure showed good results in Upper Jurassic limestone and Jurassic and Lower Jurassic sandstone. Appraisal wells in the Agayry structure further proved gas reserves, leading to the formation of two gas zones with the reserves of 100 billion cubic meters for each, one being Hojakashmir-Gokmiyar in the south, and the other being Agayry-Tagara in the north.

Offshore exploration: By deploying key exploration wells, we obtained a high-yield oil flow from the first deep-water subsalt exploration well in two formations being tested in our Libra project in Brazil. The flow essentially proved an uncompartimentalized oilfield with a reserve of 500 million tons in the western Libra structure.

Production

In 2015, we took a series of measures to ensure the efficient and sustainable development of overseas projects, and achieved an increment in profitable production, under the principle of profit-oriented and project-specific management. These measures included pushing forward the redevelopment of mature oilfields, focusing on waterflooding, optimizing development program, cutting down the number of newly drilled wells and stimulation work, reducing cost, and promoting technological innovation.

We produced 138.26 million tons of oil equivalent, of which CNPC's equity oil was 72.03 million tons, up 10.5% year-on-year, including 115.50 million tons of crude oil and 28.65 billion cubic meters of natural gas, with CNPC's taking up of 55.15 million tons and 21.19 billion cubic meters.

Central Asia and Russia: Despite the number of new wells greatly reduced, our Kazakh company withheld the fast decrease in output from some major oilfields by optimizing E&P program and surface engineering design. AktobeMunaiGas started Phase-III production of its Third Oil & Gas Processing Plant in Zhanazhol Oilfield. Completion of water injection facilities in North Truva Oilfield greatly mitigated the decline in formation pressure and improved development profitability. Amu Darya project in Turkmenistan ran smoothly. The captive power station expansion project and surface construction works in Girsan, Bota, Tangiguyi and Uzyngyi gas fields were put into operation, with CNPC's equity gas of 11.9 billion cubic meters in 2015. The Yamal LNG project, an integrated condensate gas development and gas liquefaction project together with Russia's Novatek and France's Total, was launched and progressed smoothly in Russia near the Arctic.

CNPC's share in overseas crude production



55.15
mmt

CNPC's share in overseas natural gas production



21.19
bcm

Latin America: Our Latin American company kept stable production through enhancing oilfield management, achieving an output of 14.02 million tons of oil and 820 million cubic meters of natural gas in 2015. In Venezuela, the 40,000 bbl/d production buildup project and a new diluting agent pipeline were put into operation in the MPE3 project.

Middle East: Our Iraqi company produced more than 57 million tons of oil by continuous waterflooding. In Iran, our North Azadegan project began trial production and the MIS project progressed smoothly to resume production. In the United Arab Emirates, high yield was obtained in the formation testing of the first offshore appraisal well in our Al Yasat UAE project.

Africa: Despite the unfavorable conditions in Sudan and South Sudan, we achieved an equity oil production of 6.91 million tons in 2015, thanks to an optimized investment structure, accelerated commissioning of new wells, and improved production management. Daily production of 160,000 bbls was maintained through fine management and potential release in Block 3/7 in South Sudan; and the capacity building project in Sufyan Oilfield of Block 6 in Sudan started production ahead of schedule. In Chad, we enhanced study on reservoir geology and optimized stimulating operations, achieving an equity production of 2.6 million tons. Our newly built degassing tower and settling tanks were put into operation as planned. In Niger, we completed the surface construction of the Agadi Oilfield, greatly increasing its production capacity.

Pipeline Construction and Operation

In 2015, we operated 14,507 kilometers of overseas oil/gas pipelines, including 6,604 kilometers for crude and 7,903 kilometers for gas, which transported 26.54 million tons of crude and 40.3 billion cubic meters of natural gas throughout the year. The Central Asia-China Gas Pipeline, the Kazakhstan-China Crude Pipeline, the Russia-China Crude Pipeline, and the Myanmar-China Gas Pipeline (Myanmar Section) saw safe and stable operation. Major pipeline construction projects proceeded smoothly. The Myanmar-China Crude Pipeline (Myanmar Section) started trial operation and Maday Island Port was opened for operation. The 306km-long Stage-2 of Phase-II Kazakhstan-China Gas Pipeline (Southern Kazakhstan Line) was completed and put into operation. Construction of the Chinese section of eastern route of the Russia-China Gas Pipeline commenced.

Refining and Chemicals

In 2015, our overseas refineries processed 43.92 million tons of crude oil. Khartoum Refinery in Sudan, N'Djamena Refinery in Chad and Zinder Refinery in Niger achieved safe, steady and efficient operation with optimized processes and production plans. In Kazakhstan, Phase-I of PetroKazakhstan's refinery revamping project was pushed ahead with a 4kt/a sulfur production unit brought into operation.

Project Cooperation and Development

In 2015, CNPC kept conducting extensive international petroleum cooperation. We signed a series of JV and cooperation agreements with peer companies in the energy sector, further expanding the areas of our collaboration. Meanwhile, we expeditiously implemented the joint projects with the countries along the Belt and Road, in pursuit of mutually beneficial results.

Our energy cooperation with Russian partners was further deepened. CNPC and Gazprom signed an agreement to design and construct the cross-border section of the Eastern Route of the Russia-China Gas Pipeline, and an MOU on cooperation between CNPC and Gazprom Neft. The agreement set the procedures for the design, engineering and construction of the cross-border section, and provided requirements on project quality and environmental protection. According to the MOU, the two sides will jointly seek upstream cooperation opportunities in Russia and third countries, and conduct cooperation in petroleum exploration and development, oil products marketing, oilfield services, and trading of petroleum equipment.

In the Middle East, CNPC and Mubadala Petroleum signed a strategic cooperation agreement. Under the agreement, the two companies will cooperate in upstream investment and relevant project services outside the United Arab Emirates, specifically in conventional onshore projects, offshore projects, and LNG projects, etc.

In Africa, CPECC, a subsidiary of CNPC, signed a JV agreement with ENH Logística (ENHL) of Mozambique to set up China-Mozambique Petroleum Engineering Company, which will provide consultation, survey, measurement, design and construction services for oil/gas field surface works, long-distance pipelines, storage and transportation, refining and chemical installations.

In addition, CNPC and BP signed a framework agreement on strategic cooperation to further strengthen cooperation in oil and gas development, and continuously develop fuel retailing cooperation in China in both scope and mode. The two sides will push forward with cooperation in the redevelopment of Rumaila oilfield in Iraq, explore cooperation opportunities in international marketing of crude oil, oil products and natural gas, and carbon emissions trading, and share best practices and experience on technology and corporate governance.

Regarding technical cooperation, CNPC and GE signed an MOU on R&D cooperation in CCUS, low carbon and environmental protection technologies, and the development of unconventional oil and gas.

Eastern Route of Russia-China Gas Pipeline

Construction commenced of the Chinese section of the eastern route of the Russia-China Gas Pipeline in Heihe, Heilongjiang Province, on June 29, 2015.

The pipeline runs from the Kovykta Gas Field in Irkutsk Oblast of East Siberia and the Chayanda Gas Field in the Sakha Republic, and enters China at the Russia-China border at Heihe, Heilongjiang Province, before running through eight provinces, municipalities and autonomous regions such as Heilongjiang, Jilin and Inner Mongolia and ending in Shanghai. Construction of the 2,680km-long Russian section started on September 1, 2014. In China, a 3,170km-long pipeline and auxiliary underground gas storages will be built, and an existing 1,800km-long pipeline in parallel will be used.

The eastern route is expected to be completed and become operational in 2018. According to a gas purchase and sales contract with CNPC, Gazprom will export gas to China via the route for 30 years since its commencement of operation, with the delivery gradually increasing to 38 billion cubic meters per year.

To build the route, which is China's first long-distance gas pipeline of 1,422mm in diameter, we initiated research on the application of X80 steel pipes of 1,422mm in diameter beforehand. We took three years to overcome the difficulties in pipe making, fracture control, and equipment development, and formulated 13 technical standards.

Construction of the Chinese section faces challenges from the complex geology, rivers, frosts, and natural reserves, as well as permafrost along most of its route. In the preliminary planning of the section, we took into full consideration the potential environmental risks, and took measures for water protection, forest-fire prevention, and layered backfill to minimize the environmental impact.

The eastern route is one of the underpinning projects of China's Belt and Road Initiative. Its construction and operation will drive the development of infrastructure and associated industries, which will create job opportunities and boost the local economy along its route.



International Trade

Supported by our overseas operation hubs and distribution networks, we conduct trading in crude oil, refined products, natural gas, and petrochemicals, as well as international carbon trading, sales of our overseas equity oil and transactions in oil and refined products futures in over 80 countries around the world. The trade was improved in both scale and operating quality in 2015. Throughout the year, we posted a trade volume of 430 million tons, worth USD168.7 billion.

With improved capability to regulate and secure supply and optimize resource allocation, we reduced purchase cost of crude through groupage, optimized shipping schedule and inventory operation, helping our refining and chemical companies lower their costs and enhance profitability. In addition to maintaining our current advantages in existing markets, we extended our presence in North American and North European markets. We also enhanced benchmark crude operations to enhance cross-region synergy and trading flexibility.

In terms of refined products, we further expanded processing volume of pipeline oil from Russia, conducted naphtha import, deepened trade cooperation with Venezuelan partners, got access to high cost-effective fuel oil and jet fuel resources, and actively participated in Platts window benchmark oil trading. By enhancing cross-market operations and opening more routes, we maintained our position as the largest aviation fuel supplier in Singapore and Hong Kong, and explored new markets in Ireland and Latin America. We also consolidated and increased our market share in Southeast Asia and the Middle East, and even reached the high-end market in Australia, to which we first exported our National V standard gasoline and diesel.

Our natural gas procurement cost was reduced by coordinating and optimizing import schemes for pipeline gas and LNG. Positive results were achieved in the negotiations of the 10bcm/a gas supply contract with Turkmen gaz, the gas supply agreement via the Western Route of the Russia-China Gas Pipeline, and volume and price reduction of long-term LNG supply.

As to chemicals business, we built more channels for sulfur export, established a monitoring model for polyolefin production from naphtha, and locked in forward margin by leveraging Singapore's paper market and China's future market. We made satisfactory profits by increasing physical trading of PX and PTA together with arbitrage, financial operations, and inventory operations.

In ocean shipping, we prevented major accidents of oil contamination and cargo damage for many years by effectively controlling risks, and stipulating and amending safety management provisions on prevention and control measures for time-chartered vessels in risky waters. We also optimized the capacity structure of our own fleet of time-chartered vessels with further increased scale and operating capacity.

In Asia, we built and perfected regional network to enhance our cross-area and cross-market operational capability, with our market shares in Myanmar and Sri Lanka exceeding 40%, and our aggregate oil & gas sales volume occupying 22% of Hong Kong's terminal market. We managed to build a regional oil supply network with Hong Kong as the hub and radiation effect to markets like Taiwan and Thailand, and established stable channels for export of jet fuels. We achieved new progress in developing Japanese and Korean markets, with the volume of Middle East crude and South America heavy oil marketed by us increasing by 82% and 20% respectively. In Europe, we successfully developed transit trade of Black Sea heavy oil and entrepot trade in Western Europe. We further optimized the operation of our JV refineries in UK and France, yielding fairly good profits. We won the diesel, jet fuel and marine diesel oil procurement tenders in Tunisia, Ireland and UK Ministry of Defense respectively. We perfected our Brent benchmark oil trading portfolio, and enhanced the degree of our participation in the market. In America, we took an active part in the operation of WTI benchmark oil, achieving crude blending trade and physical delivery of future contracts, becoming one of the largest crude traders in Bakken area of the US. We initiated transit trade of gas condensate and NGL business in the US, and realized direct export of oil products to Mexico and Brazil for the first time. And our crude trading with Brazil witnessed rapid growth.

Trade volume



430
mmt

Trade value



168.7
billion USD

Oilfield Services, Engineering & Construction, and Equipment Manufacturing

In 2015, we continued to speed up the transformation and upgrading of oilfield services, engineering & construction and equipment manufacturing sectors, enhance innovation of technologies and management, optimize business structure, expand high-end market, and intensify R&D as well as industrial application of advanced products. These efforts made us more competitive and competent in supporting our oil and gas businesses. Globally, we provide technical services in geophysical prospecting, well drilling, well logging and mud logging, downhole operations, as well as construction and engineering services for oil/gas field surface works, large refining and chemical facilities, pipelines and storage tanks. Our petroleum equipment and materials were exported to 81 countries and regions around the world.

Oilfield Services

2015 saw increased operational efficiency in our oilfield services, thanks to improved operating speed and profitability from innovative management and technologies, new modes of production organization such as EPC and factory drilling, and the application of new technologies.

Geophysical Prospecting

In 2015, CNPC deployed 163 seismic crew-times (84 2D and 79 3D) in 206 projects, acquiring data of 132,714 kilometers of 2D lines and 47,219 square

kilometers of 3D profiles. With data acquisition registering 100% acceptance of on-site profiles and final processed profiles, the 2D and 3D surveys recorded shots per average day increase by 5.6% and 6.8%, respectively.

We consolidated our position in the domestic geophysical prospecting market by promoting economic and technical integration, optimally allocating resources and organizing production, and improving the operation and profitability of projects. In the 2D seismic project of Nyima Basin & Long'eni-Esima in northern Tibet, BGP acquired satisfactory seismic data and recorded good results in shot density and folds in the Qiangtang Basin, by selecting a landform-based optimal plan comprising high-density wide-line observation, low frequency vibroseis, and strictly controlled operating steps.

In 2015, our innovative mode of development achieved good results in the depressed international geophysical prospecting market. In the Middle East, we maintained steady growth and increased our share in the high-end market with contracts awarded on data acquisition of the Saudi Arabian S78 transition zone in the Red Sea and on a PDO project in Oman.

With enhanced market development, our deep-sea exploration saw steady growth in multi-user business. We completed offshore towing acquisition in the Australian blocks of Numbat & Quoll and Bilby, as well as Block Yucatan in the Gulf of Mexico. Processing and interpretation delivered higher profitability through proactive services and integration. The building of three major processing centers in the Middle East, South America and Southeast Asia has been improving. Information, reservoir geophysics, borehole seismic exploration, unconventional geophysics, and integrated geophysical & chemical prospecting services achieved synergy and steady development.

We intensified R&D in core software and equipment for geophysical prospecting and obtained considerable results in the application of matching technologies. The GeoEast software family gained new members and kept improving its functionality and performance. Important progress was made in velocity modeling, anisotropic migration, Q-migration, and full waveform inversion. KLSeis II software was upgraded with enhanced functionality in efficient data acquisition, complex-zone design, and static correction. G3iHD wired seismograph was launched and the performance of the Hawk wireless-node seismograph kept improving. LfV3 low frequency vibroseis was put into widespread application; and production tests were conducted on EV56 precise vibroseis. Our proprietary "wide azimuth, broadband and high density" exploration technology + efficient acquisition technology with low frequency vibroseis saw extensive application in nine Chinese 3D seismic projects covering 1,840 square kilometers, and in six overseas projects covering 10,396 square kilometers.

Geophysical prospecting operations

	2013	2014	2015
Seismic crews in operation	165	166	166
Domestic	95	96	96
Overseas	70	70	70
2D seismic data acquired (kilometers)	114,364	103,645	132,714
Domestic	40,274	42,798	22,521
Overseas	74,090	60,847	110,193
3D seismic data acquired (square kilometers)	64,491	63,990	47,219
Domestic	17,542	14,485	10,722
Overseas	46,949	49,505	36,497

Well Drilling

In 2015, our 1,230 drilling rigs spudded 9,390 wells and completed 9,387 wells, with a total footage of 20.89 million meters.

We promoted the EPC mode of drilling operation and kept improving the drilling speed and efficiency. Deep wells were drilled much faster, with the penetration rate increasing by 4.9% year-on-year and the average drilling cycle of wells deeper than 4,000 meters reducing by 8.5%. Our Xibu Drilling Engineering Company, as the EPC drilling contractor in Block Zhahaquan of Qinghai Oilfield, recorded several highs, with the monthly drilling rate and penetration rate increasing by 24.8% and 14.6% and the well construction cycle decreasing by 31% over 2014. These achievements were made by assigning a dedicated management team for the block and applying premium and fast drilling technology. In Chuanqing Drilling's Tazhong EPC project, 24 wells were completed with an average depth of 5,377 meters, and the average monthly drilling rate and penetration rate increased by 37% and 16.6% and the drilling cycle decreased by 16 days year-on-year. The project saw the completion of our deepest well, Keshen-902, at a depth of 8,038 meters. Our Great Wall Drilling Company finished the drilling of well Ga-E31P 16 days ahead of schedule in its EPC-contracted Block Garraf in Iraq. The company recorded the quickest drilling and completion of highly-deviated directional wells with an inclination of over 40° in the block.

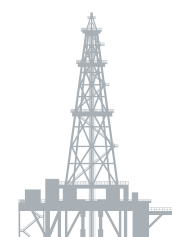
Drilling operations

	2013	2014	2015
Drilling rigs in operation	1,018	1,018	1,230
Domestic	823	824	979
Overseas	195	194	251
Wells drilled	13,378	12,286	9,387
Domestic	12,035	10,970	8,289
Overseas	1,343	1,316	998
Footage drilled (million meters)	27.50	24.92	20.89
Domestic	24.32	21.98	18.38
Overseas	3.18	2.94	2.51

Factory operations were deployed extensively in the development of tight oil and shale gas. Applied in more than 50 platforms and over 300 wells, the operation increased efficiency by 40% and decreased costs by more than 30%. In factory tight oil operations, our Daqing Drilling Engineering Company greatly increased its drilling efficiency by furnishing key equipment such as rig-walkers, top-drive drilling equipment, and crawlers, formulating six sets of code of practices on drilling and completion, and improving the technical templates for increasing speed in seven blocks. In a joint development project in Sulige Gas Field, Great Wall Drilling Company maintained high standard in single well controllable reserves, stage-specific recovery rate, as well as drilling, completion, and reservoir stimulation, by taking the lead in using an overall development mode of "horizontal wells + multi-stage fracturing" as well as a large-platform "well factory" operating mode. In the Weiyuan shale gas project, the operation efficiency was greatly enhanced by combining engineering with geology to predict and encounter sweet points and by using a mode comprising "dual-rig factory operation" and "zipper factory fracturing".

The spread of new technologies achieved remarkable results. The vertical drilling system, precise PCD system, and drilling acceleration tools were extensively used. Further breakthroughs were made in new technologies such as coiled-tubing sidetracking. Our Bohai Drilling Engineering Company kept researching and upgrading domestic manufacturing of vertical drilling tools, with stability and reliability further improved. In Tarim Oilfield, the BH-VDT vertical drilling tool registered the longest single well footage of 3,959 meters and greatest drilling depth of 4,303 meters. The precise PCD system was deployed in Sichuan and Xinjiang in China and in the Indonesian Block Jabung. Our drilling acceleration tools such as hydraulic rotary impact tools and hydro-oscillators were extensively used, greatly increasing the percentage of net drilling time and reducing the drilling cycle.

In 2015, we extended our reach in the international drilling market and won new contracts in Kazakhstan, Uzbekistan, Venezuela, Indonesia, the United Arab Emirates, Iraq, Iran and Kenya. We were also awarded the EPC contracts for the Maysan project and an integrated project of LUKOIL's Block 10 in Iraq.



Well logging operations

	2013	2014	2015
Logging crews	725	760	803
Domestic	587	623	662
Overseas	138	137	141
Well logging operations (well-time)	106,092	93,533	88,926
Domestic	100,129	88,000	85,953
Overseas	5,963	5,533	4,993

Well Logging and Mud Logging

In 2015, CNPC deployed 803 well logging crews and completed 88,926 well times of logging in 18 countries; and 1,252 mud logging crews and completed mud logging on 9,718 wells.

We actively changed our mode of well logging service based on the present service and production needs at oilfields. To reveal hydrocarbon content, we used imaging logging to tackle reservoir complexity and maximize output of single well. Moreover, new technologies and techniques were extensively employed to help reduce costs and enhance the profitability.

EILog, our independently developed imaging logging outfit, was widely deployed. It greatly reduced the average time taken for operation in single uncased hole compared with conventional methods. The 15-meter "One-String" fast logging tools reduced the logging duration per well by four hours, increasing the efficiency by more than 30%. Hard-cable well logging technology was applied on a large scale, reducing the logging duration per well by 22.96 hours. The pup joint for logging cables in horizontal wells resulted in cable protection, lower costs, a higher success rate and lower operating risks since its first application at Block Longdong in 2012. We developed digital core imaging techniques, which reduced the time taken to fully describe cores from one or two months in the past down to three or four days. We also rolled out a synergistic work platform for well logging and independently developed a synchronized remote control system for mud logging, to establish highway to transmit digital information. To perform well logging under complex conditions in horizontal or highly-deviated wells, we improved and furnished techniques such as through-drill-pipe logging, crawler, coiled tubing, memory logging, and logging while drilling. These operations improved the operation capacity of each crew, reduced well-occupying time for logging, and increased the efficiency and success rate of well logging under complex conditions.

In 2015, our well logging and mud logging services proceeded smoothly in Iraq, Iran, Uzbekistan, Bangladesh, Russia and Canada. To promote the global application of our new technologies, we set up an overseas technical support center for R&D and services, as well as interpretation and evaluation of well logging data.

Downhole Operations

In 2015, our 2,153 downhole crews completed 128,879 downhole operations and 7,782 layers of formation testing.

We rolled out new technologies and techniques to improve the quality of downhole operations. High-efficiency hydraulic jet SRV fracturing delivered much greater efficiency when it was extensively used in horizontal wells for tight oil development. Sand fracturing performed at well Qing-2-40 in Yumen Oilfield at an altitude of 2,600m registered the highest pressure of 177.6MPa and the highest displacement with 960 cubic meters of fluid being pumped. This also proved our capacity for reservoir stimulation in high altitude regions. In PDM Block in Venezuela, we completed chemical plug removal with coiled tubing and gas lift by liquid nitrogen.

Factory fracturing was widely used in shale gas development, with efficiency much improved by specialized, modular, and streamlined operation under procedural control. Good results were shown with technologies of staged fracturing with drilling-free large-bore bridge plugs and fast bridge plugs, multi-cluster perforation with pump-down bridge plugs, fracture monitoring and continuous on-site blending. In Sichuan Province, well Wei-202H1-4 registered CNPC's highest amount of fluid, up to 51,600 cubic meters, pumped

Downhole operations

	2013	2014	2015
Downhole operation crews	2,052	2,090	2,153
Domestic	1,831	1,849	1,929
Overseas	221	241	224
Downhole operations (well-time)	143,100	143,405	128,879
Domestic	141,019	140,713	126,062
Overseas	2,081	2,692	2,817
Formation test (layers)	7,558	6,965	7,782
Domestic	6,251	5,099	5,051
Overseas	1,307	1,866	2,731

into a single well; and platform Wei-204H3 for shale gas development recorded CNPC's highest efficiency, up to six stages in a single day, of factory fracturing. After the fracturing, the highest single well output of shale gas was up to 328,600 cubic meters.

New breakthroughs were made in downhole operation technologies. Dry sand fracturing with CO₂ saw success in six wells at Changqing and Jilin oilfields, pioneering a new approach for waterless fracturing. Our independently developed drilling-free large-bore bridge plugs were successfully sent downhole and provided excellent packing and fracturing in Sulige. BH-SFP, a technology and a tool for selective multi-stage fracturing and extraction control, performed well in separate layer stimulation, testing, result evaluation, and extraction control for each layer and interval. Formation testing techniques for ultra-deep wells were improved. We designed an innovative "5-valve + 1-packer" string technique for formation testing, which addressed the challenges of mud displacement, well killing, and unpacking in its successful application in ultra-deep well Keshen-902 in Tarim Oilfield.

Engineering and Construction

In 2015, we steadily proceeded with our major engineering and construction projects by intensifying prior coordination and risk prevention, improving contractor management, enhancing project control, and perfecting our plans throughout the production management process. We implemented 21 major engineering and construction projects throughout the year.

We strengthened top-level design of market development, and explored the commercial modes of BOT, BOOT, financing + EPC, and equity investment and vigorously developed the markets along the Belt and Road, especially the high-end external market and emerging strategic markets. By doing so, we set up a market network of Central Asia, the Middle East, Africa, Asia-Pacific, the Americas, and key countries.

We kept adjusting and optimizing our business structure, in which the contribution by EPC, design, consulting, and other high-end business in our revenue increased from 47% to more than 60% in 2015. Our influential brands included CPP, CPECC, CPE, China Huanqiu and Daqing Oilfield Engineering, which had been listed as ENR Top 250 International Contractors for consecutive years. And Kunlun Engineering Corporation has become a renowned supplier of techniques and outfits for polyester and PTA production.



Gas processing plant in Tanzania

Oil and Gas Field Surface Engineering

We maintained leading position in China in production capacity building in onshore oil and gas fields. We have surface engineering technology packages for conventional fields, for high water cut, low permeability, ultra-heavy oil and high condensate content oil fields, as well as high pressure, high yield, and high sulfur content gas fields. In addition, we are capable of building 20Mt/a oil production capacity and 10bcm/a gas production capacity.

In 2015, our major capacity building projects proceeded smoothly. The surface engineering work for 6bcm/a development of Longwangmiao gas reservoir of Anyue Gas Field in Sichuan Province and the project for coal-fired boiler at Fengcheng Oilfield in the Xinjiang Uygur Autonomous Region were completed and put into operation. Construction of the 4Mt/a indirect liquefaction unit at Ningxia Coal of China Shenhua Corporation was pushed ahead as planned.

Overseas, we completed and put several major projects into operation, including the surface engineering work at North Azadegan Oilfield in Iran, Phase-II of the Halfaya project in Iraq, and the 8bcm/a renovation and upgrading project in Block A of Amu-Darya in Turkmenistan. Construction of a natural gas processing plant in Tanzania was generally completed. Smooth progress was made in gathering and transportation works at Girsan, Bota, Tangiguyi, Uzyngyi, and Odjarly-Sandykly gas fields in Block B of Amu-Darya in Turkmenistan and in the expansion of AktobeMunaiGas' No. 45 captive power station. Moreover, we were awarded many engineering and construction contracts, including an EPC contract for a clean energy project in Texas, USA.

Construction of Refining and Chemicals Facilities

In 2015, we proceeded with major domestic projects as planned and completed a number of gasoline and diesel upgrading projects. A diesel hydrogenation unit was completed and became operational at Urumqi Petrochemical. The 10Mt/a refinery is expected to be completed at Yunnan Petrochemical in 2016.

2015 also saw new progress in our overseas projects. Construction of the modern renovation project (Phase I) at Shymkent Refinery in Kazakhstan proceeded smoothly. We further extended our overseas reach by signing EPC contracts, with Petronas for a RAPID PP project in Malaysia and with Uzbekistan for a PVC project.

Pipeline and Storage Tank Construction

Regarding construction capacity and engineering technology for long-distance pipelines, we can build 6,700-9,700 kilometers of pipeline with a diameter larger than 711mm every year. In addition, we have the technologies to design and build 150kcm crude tanks and 10kcm spherical tanks. We are capable of building 26 million cubic meters of crude tanks and 16 million cubic meters of refined product tanks annually.

In 2015, the construction of a number of oil and gas pipeline made new progress. The Fangchenggang Branch of the Myanmar-China Gas Pipeline (Chinese Section) was completed and became operational. The Myanmar-

China Oil Pipeline (Chinese section) was welded, pressure-tested, and ready for operation. The main part of the Yunnan Products Pipeline was completed. Construction of the eastern section of the Third West-East Gas Pipeline, Jinzhou-Zhengzhou Refined Products Pipeline, Tianjin Port-Huabei Petrochemical Crude Pipeline and Dayawan Offshore Pipeline in Huizhou City was pushed forward in an orderly manner. Construction of the Chinese section of the eastern route of the Russia-China Gas Pipeline commenced.

Our overseas pipeline construction projects proceeded smoothly. We completed and put into operation the Myanmar-China Oil Pipeline (Myanmar Section), Tanzania natural gas pipeline and Halfaya export pipeline in Iraq; finished the pilot operation of the Nakhon Sawan Gas Pipeline Project in Thailand; and steadily pushed forward Badra Crude Gathering and Transportation Pipeline and Majinooon FCP Gas Pipeline in Iraq, the Shahdol-Phulpur project in India, and the GULF project in Thailand. In addition, we also signed several pipeline construction contracts, including those for the Limbe-Yaounde Products Pipeline in Cameroon and the MEPE Gas Pipeline in Myanmar.

New progress was made in storage projects. The main part of the State Petroleum Storage Base in Jinzhou was completed. Expansion of the State Petroleum Storage Base in Zhoushan and Phase-II of the Jiangsu LNG Terminal proceeded smoothly. Internationally, we completed and put into operation the Angola Product Depot Expansion Project, completed the main part of a tank yard for asphalt and refined products in Myanmar, and proceeded with the Nassiriya oil depot project and Rumaila crude storage tanks in Iraq and petroleum storage tank project for a refinery in Papua New Guinea. We were also awarded an EPC contract for the LAUGFS LPG tank yard in Sri Lanka and the TEMA storage yard project in Ghana.

Offshore Engineering

We have the capability to provide integrated and comprehensive services for offshore production, well drilling, well completion, well cementing, production test, downhole operation, design and construction of marine engineering, and vessel services. By the end of 2015, we had 16 offshore drilling and operating platforms and 25 vessels. In 2015, we recorded 56.4% utilization with drilling platforms and 85% utilization with operating platforms. Seven platforms realized a drilling footage of more than 10,000 meters. Our vessels provided service for 4,217 working days, with the vessels of 4,000HP or higher duty utilized by 79.3%.



In 2015, our Offshore Engineering Ltd. (CPOE) completed a total drilling footage of 131,000 meters in the Bohai Sea, Yellow Sea, and the Persian Gulf. The company spudded 59 wells, completed 33 wells, and provided downhole operations for 28 well-times, acid fracturing and sand control for 81 layer-times, and formation testing in six layers.

With improved support provided by the Qingdao offshore engineering construction base and the Tangshan production support base, CPOE commenced construction of MWP4 and FWP5 engineering packages for the Russian Yamal Project at the Qingdao base in January 2015. By the end of 2015, FWP5 was completed and MWP4 proceeded smoothly. Following these packages, CPOE won the bidding for MWP10A and FWP1D engineering packages and contracted reels for MWP8 and spray painting for MWP1 as part of the Yamal Project, becoming the subcontractor involved in most engineering packages in the project.

Petroleum Equipment Manufacturing

Thanks to the "Made in China 2025" plan, our petroleum equipment manufacturing business underwent greater structural adjustment. It has been transformed and upgraded from sheer production to integrated business of product R&D, manufacturing, sales, and service offering. In addition to emphasizing core and advantageous categories of drilling equipment, recovery equipment, petroleum steel pipes, and power units, we sped up the R&D and industrial manufacturing of new high-end products, thereby increasing the percentage of high value-added products and optimizing product portfolio. We actively expanded the international market and improved the layout of our overseas marketing network. Our petroleum materials and equipment were exported to 81 countries and regions.

Progress in the R&D of petroleum equipment included the following: intermediate results were achieved in the research on the automatic handling system of deep-water rigs and strings; the first domestically made automatic rig with 7,000m string was put into use; the prototype of the Model 2500 fracturing truck passed the industrial test; 27 sets of 105MPa well-control outfits for fracturing and extraction of shale gas were applied; BJC-I premium connection casings passed downhole testing; X80-grade $\Phi 1422 \times 21.4$ mm longitudinal submerged arc welded pipes and spiral submerged arc welded pipes were produced for 1,000 tons on trial; field tests of 52MPa natural gas compressor commenced; and the integrated V-type compressor passed the industrial test.

Major equipment projects saw smooth progress. We made steel pipes for a natural gas processing plant and transportation pipeline in Tanzania by following a scientific plan based on the world-leading design principle of "skid-based stations and modular plants". Our standard was for premium steel pipes, higher than that in the technical specifications of the owner's order. Subsea pipes with anchors were locally made in facilities established in Tanzania. The second batch of 16 rigs supplied to UAE National Drilling Company (NDC) was delivered, and manufacturing of 14 rigs for Venezuela commenced.

We beefed up overseas market development. In 2015, we were awarded contracts to supply 10 rigs to Turkmenistan, the third batch of 12 fast-moving desert rigs (a total of 39 rigs), to NDC of the UAE, 64,000 tons of SSAW pipes to Saudi Aramco, and 110,000 tons of piling tubes to Port Said in Egypt, as well as electric submersible pumps on a rental basis to Block 3/7 in South Sudan.

We actively conducted joint venture cooperation and collaboration with foreign enterprises. We improved the manufacturing level of hydraulic drilling rigs by setting up a JV with Herrenknecht AG and elevated the technical performance of domestically made fracturing equipment by cooperating with Schlumberger. Also, we cooperated with other international manufacturers and set up manufacturing plants overseas. Major projects, including the construction of a steel pipe plant in Kazakhstan proceeded as planned.



Construction of MWP4 engineering package of Yamal LNG project

Financial Statements

Consolidated Balance Sheet

million RMB yuan

	2014	2015
Current assets		
Cash and cash equivalent	312,079.87	342,772.93
Financial assets at fair value through profit or loss	15,889.06	8,386.01
Bills and accounts receivable	134,903.03	132,646.36
Prepayments	155,799.42	252,184.67
Other accounts receivables	55,360.92	21,331.55
Inventories	271,559.06	228,310.10
Other current assets	86,569.57	106,604.43
Total current assets	1,032,160.93	1,092,236.05
Fixed assets		
Available-for-sale financial assets	111,994.01	105,723.80
Held-to-maturity investments	105,424.55	109,347.69
Long-term equity investments	136,425.59	93,055.99
Fixed assets-net value	814,374.81	891,011.90
Construction in progress	365,498.23	340,766.92
Oil and gas assets	959,201.39	957,299.20
Intangible assets	82,562.46	86,054.09
Other fixed assets (other long-term assets)	298,653.88	358,602.15
Total fixed assets	2,874,134.92	2,941,861.74
Total Assets	3,906,295.85	4,034,097.79
Current liabilities		
Short-term loans	109,804.13	55,361.49
Bills and accounts payable	374,438.30	320,601.92
Prepayments	83,494.86	80,306.50
Employee pay payable	21,306.06	21,311.56
Taxes payable	62,837.70	48,134.39
Other payables	111,929.05	88,431.51
Other current liabilities	350,156.19	450,122.04
Total current liabilities	1,113,966.29	1,064,269.41
Non-current liabilities		
Long-term loans	13,323.57	17,266.61
Estimated liabilities	114,240.95	124,243.92
Deferred income tax liabilities	24,007.67	23,621.25
Other non-current liabilities	417,441.83	406,407.95
Total non-current liabilities	569,014.02	571,539.73
Total liabilities	1,682,980.31	1,635,809.14

Consolidated Balance Sheet (continued)

million RMB yuan

	2014	2015
Owners equity		
Paid-in capital	468,007.69	486,855.00
Other equity instruments	109,540.88	209,511.78
Capital reserves	264,289.14	275,212.89
Other comprehensive income	-33,637.66	-44,117.41
Special reserves	29,894.05	30,961.72
Surplus reserves	1,082,961.47	1,105,198.51
General risk preparation	7,072.37	7,752.71
Retained profits	18,143.69	8,020.88
Total owners' equity attributable to parent company	1,946,271.63	2,079,396.08
Minority interests	277,043.91	318,892.57
Total owners' equity	2,223,315.54	2,398,288.65
Total liabilities and owners' equity	3,906,295.85	4,034,097.79

Consolidated Profit Statement

million RMB yuan

	2014	2015
Operating income	2,729,956.16	2,016,756.66
Income from core businesses	2,725,330.68	2,012,901.65
Income from other businesses	4,625.48	3,855.01
Less: Operating cost	2,085,698.82	1,513,431.54
Cost of core businesses	2,081,554.94	1,510,337.27
Cost of other businesses	4,143.88	3,094.27
Business tax and supertax	237,755.67	207,785.05
Sales expenses	73,361.80	73,581.19
Management expenses	114,585.63	107,646.79
Financial expenses	22,984.11	3,623.02
Loss on depreciation of assets	19,454.29	40,875.23
Others	23,896.80	19,823.55
Plus: Income from change in fair value (Loss is presented with "-")	50.08	-15.94
Income from investments (Loss is presented with "-")	18,522.42	33,034.59
Operating profit (Loss is presented with "-")	170,791.54	83,008.94
Plus: Non-operating income	17,983.14	15,440.45
Less: Non-operating expense	15,364.71	15,980.55
Total profit (Loss is presented with "-")	173,409.97	82,468.84
Less: Income tax expense	49,565.29	26,226.96
Net profit	123,844.68	56,241.88
Net profit attributable to owners' equity of the parent company	100,798.25	44,560.43
Loss and gain from minority	23,046.43	11,681.45

Notes to the Financial Statements

A. Description of Principal Accounting Policies and Accounting Estimates

1. Accounting standard and accounting system

CNPC (hereinafter referred to as the Company) follows *Accounting Standards for Business Enterprises—Basic Principles* and the specific rules of accounting standards, guidelines for the application of accounting standards, interpretations of accounting standards and relevant regulations issued by the Ministry of Finance.

2. The fiscal period

The fiscal period starts on January 1 and ends on December 31 each calendar year.

3. Standard accounting currency

The Company and most of its subsidiaries adopt RMB yuan as currency used in bookkeeping. The combined financial statement of the Company is listed in RMB yuan.

4. Accounting basis and valuation

Accounting is based on the accrual system. Unless otherwise specified, all assets are measured at historical cost.

5. Foreign currency accounting and conversion of financial statements in foreign currency

(1) Foreign currency transaction

Our foreign currency transactions are converted into RMB yuan at the spot exchange rate on the days the transactions occurred; the monetary foreign currency items on the balance sheet date are converted into RMB yuan at the spot exchange rate on the balance sheet date. The exchange gains and losses arising from these translations that occurred in construction preparation, production and operation are taken into financial expenses; those related to the acquisition and construction of fixed asset, oil and gas asset and other assets in line with the capitalization condition are handled according to relevant provisions about borrowing costs; and those occurred in the period of liquidation are taken into liquidation gain or loss.

A non-monetary foreign currency asset measured at historical cost is converted into RMB yuan at the spot exchange rate on the trading day, with its amount in RMB yuan unchanged. A non-monetary foreign currency

asset measured at fair value is converted into RMB yuan at the spot exchange rate for the date when the fair value was determined, with the difference thus caused taken into the current profits and losses as a change in fair value.

(2) Conversion of financial statement in foreign currency

All asset and liability items presented in Foreign Currency Balance Sheet are converted into RMB yuan at spot exchange rate on the balance sheet date; the owner's equity other than "undistributed profit" is converted at spot exchange rate when occurred. Foreign incomes and expenses presented in the Income Statement are converted at the average of reference rates for RMB announced by PBC on a daily basis over the period of time covered by the income statement.

The opening balances of cash and cash equivalents in the Foreign Currency Cash Flow Statement are converted at statement's initial exchange rate; and the closing balances are converted at the spot exchange rate on the balance sheet date. And other items are converted at the arithmetic average of reference rates for RMB announced by PBC on a daily basis over the period of time covered by the cash flow statement. The converted difference of cash flow statement arising from the conversions mentioned above is presented separately in Effect of the Change of Exchange Rate on Cash.

6. Recognition of cash and cash equivalents

The cash presented in the Cash Flow Statement comprises cash in hand and the deposits available for payment from time to time. Cash equivalents presented in the Cash Flow Statement are short-term (mature within three months), highly liquid investments that are readily convertible into cash and almost have no risk of change in value.

7. Financial instruments

Financial instruments include financial assets, financial liabilities and comprehensive income.

(1) Categorization of financial instruments

Financial instruments, based on the purpose of obtaining a financial asset or assuming a financial liability, are categorized into: financial assets at fair value through profit or loss; loans and receivables; available-for-sale financial assets; held-to-maturity investments; and other financial liabilities etc.

(2) Recognition and measurement of financial instruments

a. Financial assets at fair value through profit or loss (financial liabilities)

Financial assets/liabilities are initially recognized at fair value (minus: cash dividends declared but unpaid or interests on bonds due but unpaid), with the transaction costs stated in profit and loss accounts.

Interests or cash dividends from the assets held are recognized as investment income. End-of-period change in fair value is recognized in profit or loss. When disposed, the difference between its fair value and initially recognized amount is recognized as gain/loss on investment, and its gain/loss on changes in fair value is adjusted accordingly.

b. Receivables

Accounts receivable for goods supplied and/or services rendered as well as debts of other enterprises other than debt instruments quoted in active market, including accounts receivable, notes receivable and other receivables, are initially recognized at the contractual amount due from the buyer; a receivable for financing is initially recognized at its present value and measured at amortized cost using the effective interest method; when recovered or disposed, the difference between the price of obtaining such investment and the book value of receivable shall be determined as the income statement.

c. Available-for-sale financial assets

Available-for-sale financial assets are initially recognized at fair value (minus: cash dividends declared but unpaid or interests on bonds due but unpaid) plus the transaction costs. Interests or cash dividends from the assets held are recognized as investment income. End-of-period fair value is measured and the change in fair value is recognized in other comprehensive income. When disposed, the difference between the acquisition cost and the carrying value is recorded as investment income; meanwhile, the accumulative amount of the changes in fair value originally recorded in owner's equity and corresponding to the disposition is recorded into losses from investment.

d. Held-to-maturity investments

Held-to-maturity investments are initially recognized at fair value (minus: interests on bonds due but unpaid) plus the transaction costs. Interests from the assets held are measured at amortized cost using the effective interest method and recorded as investment income. The effective interest rate is determined upon acquisition and remains unchanged in the expected life thereof or a shorter period of time, if applicable. When disposed, the difference between the acquisition cost and the carrying value is recorded into profits from investment.

e. Other financial liabilities

Other financial liabilities are initially recognized at fair value plus the transaction costs and measured at amortized cost. The Company's other financial liabilities include accounts payable, borrowings and notes payable etc.

(3) Recognition and measurement of financial assets transfer

Upon the transfer of a financial asset, if all or a substantial part of the risks and rewards incidental to ownership of the asset are transferred to the transferee, the asset should be derecognized; if all or a substantial part of the risks and rewards incidental to ownership of the asset are retained, the asset should not be derecognized.

To decide whether the transfer of a financial asset will lead to the derecognition of such asset, the "substance over form" principle shall apply. There are two types of asset transfer, i.e. full and partial. When a full asset transfer is eligible for the derecognition of such asset, the difference between the two items listed below should be recorded into profits or losses of the current period:

- a. The carrying value of the financial asset being transferred;
- b. The consideration received for the transfer, plus the accumulative amount of the changes in fair value originally recorded in owner's equity (when the financial asset being transferred falls under the category of available-for-sale financial asset).

(4) Derecognition of financial liabilities

A financial liability should be derecognized in whole or in part when the present obligation is fully or partially discharged; if the Company signs an arrangement with its creditor on replacing an existing financial liability with a new financial liability on the terms and conditions that are substantially different from those of the existing financial liability, the existing financial liability should be derecognized and, at the same time, the new financial liability should be recognized. For an existing financial liability with substantial changes in all or part of its terms and conditions, the existing financial liability should be derecognized in whole or in part and such financial liability should be recognized as a new financial liability on the revised terms and conditions. When a financial liability is derecognized in whole or in part, the difference between the carrying value of financial liability derecognized and the consideration paid (including a non-cash asset being transferred or a new financial liability being assumed) should be recorded into profits or losses of the current period. For a partial

repurchase of a financial liability, the carrying value of the financial liability as a whole should be allocated between the derecognized part and the retained part at their relative fair values on the date of such repurchase. The difference between the carrying value of the financial liability derecognized and the consideration paid (including a non-cash asset being transferred or a new financial liability being assumed) should be recorded in profits or losses of the current period.

(5) Determination of fair value for financial assets and liabilities

For an asset or liability measured at fair value, the fair value should be determined based on the following assumptions:

- a. Fair value measurement assumes an orderly transaction between market participants at the measurement date under current market conditions;
- b. Fair value measurement assumes a transaction taking place in the principal market for the asset or liability, or in the absence of a principal market, the most advantageous market for the asset or liability;
- c. The appropriate assumptions that market participants would use in pricing to maximize their economic benefits.

A fair value measurement of a non-financial asset takes into account a market participant's ability to generate economic benefits by using the asset in its highest and best use or by selling it to another market participant that would use the asset in its highest and best use.

(6) Impairment of financial assets

An assessment of carrying value of financial assets, except for financial assets at fair value through profit or loss, is made at the balance sheet date to determine whether there is objective evidence of impairment.

(7) Entrusted loans

a. Valuation of entrusted loans and recognition of interests

Entrusted loans are accounted for at the actual amount being entrusted. The accrued interest receivable at the end of the reporting period is recorded as investment income. For accrued interest that is due and irrecoverable, the accrual of interest should be stopped and withdrawn.

b. Recognition of and provision for impairment of entrusted loans

A comprehensive review of entrusted loans is conducted at the end of the reporting period. If the result indicates the impairment of entrusted loans, the carrying value of such entrusted loans is written down to its present value of estimated future cash flows, with the amount of impairment recognized in profits or losses of the current period.

8. Inventories

(1) Categories of inventory

Raw materials, work in progress and semi-finished goods, finished goods, goods sold etc.

(2) Acquisition and sales valuation for inventory

Inventories are carried at the actual cost when acquired, using perpetual inventory method; actual cost of delivered or sold inventories are carried at weighted average.

(3) Amortization of low-value consumption goods and packing materials

Low-value consumption goods and packing materials are amortized using one-off amortization method when they are put into use.

(4) Year-end inventory valuation, impairment recognition and inventory provision

Year-end inventories are carried at the lower of cost and net realizable value. Based on wall-to-wall inventory at the end of the period, provision for inventory write-down is retained at the difference between cost and net realizable value of inventory on the individual item basis in the following circumstances, where the net realizable value is lower than the cost. For inventory of large quantity and low unit price, provision for inventory write-down may be recognized by category. The net realizable value is expected selling price less estimated complete cost, selling cost and related tax.

- a. The market price of inventory continues to fall with no hope of recovery in the foreseeable future;
- b. The product using the raw material is manufactured at a cost higher than the selling price thereof;
- c. The existing raw material fails to meet the needs of new products as a result of product upgrading and the market price of such raw material is lower than its carrying cost;
- d. The goods or services are obsolete or there is a preference-driven change in market needs, resulting in a gradual decline in the market price thereof;
- e. Other circumstances demonstrating a substantial impairment of inventory.

9. Long-term equity investment

(1) Determination of investment costs

For a long-term equity investment obtained through a combination of entities under common control, the carrying value of the owner's equity in the combined entity stated in the ultimate controlling party's consolidated financial statements should be recognized on the combination date as

investment cost. For a long-term equity investment obtained through a combination of entities not under common control, the combination cost should be accounted for the cost of the long-term equity investment. For long-term equity investments obtained in a manner other than combination of entities, if a long-term equity investment is obtained through payment of cash, the actual purchase price thus paid should be recognized as initial cost of the long-term equity investment; if a long-term equity investment is obtained through issuing equity securities, the fair value of the equity securities being issued should be recognized as initial cost of investment.

(2) Subsequent measurement and profits & losses recognition

a. Long-term equity investments under cost method

The Company's long-term equity investments in its subsidiaries are accounted for using the cost method. In addition to the cash dividends or profits declared but not yet paid as included in the price or consideration actually paid upon acquisition, the cash dividends or profits that the investee has declared to distribute and the Company's is entitled to are recognized in investment income.

b. Long-term equity investments under equity method

Long-term equity investments in associates and joint ventures are accounted for using the equity method. For the positive difference between the initial cost of investment and the investor's share of the fair values of the investee's net identifiable assets on acquisition of the investment, no adjustment to the initial cost of such long-term equity investment is made; for the negative difference between the initial cost of investment and the investor's share of the fair values of the investee's net identifiable assets on acquisition of the investment, such difference is recorded into profits or losses of the current period.

The investor's share of the net profit/loss and other comprehensive income of the investee is recognized in investment income and other comprehensive income respectively, along with the adjustment to the carrying amount of the long-term equity investment; distributions of profits or cash dividends received from the investee reduce the carrying amount of the investment; adjustments in the carrying amount of the investment for the changes in the owner's equity other than those arising from the investee's net profit or loss, other comprehensive income and profit distribution are necessary and recognized as owner's equity.

c. Disposal of long-term equity investments

For disposal of long-term equity investments, the difference between the carrying amount and the actual purchase price is recorded into profits or losses of the current period. Upon disposal of a long-term equity method investment, all amounts previously recognized in the Company's other

comprehensive income in relation to that investment are accounted for on the same basis as would have been required if the investee had directly disposed of the related assets or liabilities. The changes in the owner's equity other than those arising from the investee's net profit or loss, other comprehensive income and profit distribution are transferred to profits or losses of the current period in proportion.

(3) Determination of the basis for joint control and significant influence over the investee

Joint control means the contractually agreed sharing of control of an arrangement which exists only when decisions about the relevant activities require the unanimous consent of the parties sharing control. A joint venture is a joint arrangement whereby the parties that have joint control of the investee have rights to the net assets of the investee.

Significant influence means the power to participate in the financial and operating policy decisions of the investee but not control or joint control of those policies. For an investor with significant influence over the investee, the investee is considered an associate of the investor.

(4) Depreciation test and provisions for depreciation

At the end of the year, the long-term equity investment is reviewed and the provision for the depreciation of the long-term equity investment is retained against the difference between the recoverable amount and the carrying value. Once the provision for the depreciation of the long-term equity investment is retained, it should not be reversed during subsequent accounting periods.

For non-marketable long-term equity investment, depreciation is likely in the following circumstances:

- a. There is a change in the political or legal environment of the invested business, such as an enactment of or amendment to the tax and trade regulations, that may result in huge losses of the invested business;
- b. The goods or services of the invested business are obsolete or there is a change in market needs, resulting in a serious deterioration in the financial conditions of the invested business;
- c. The invested business has lost its competitive edge due to a major technological change etc. in the sector, resulting in a serious deterioration in the financial conditions of the invested business such as clean-up or liquidation;
- d. Other circumstances demonstrating a substantial failure of the invested business to generate economic benefits for the Company.

10. Government subsidies

(1) Types of government subsidies

Government subsidies comprise mainly of treasury funding, interest subsidies, tax rebates and free allocation of non-monetary assets etc.

(2) Acknowledgment of government subsidies

The Company has acknowledged government subsidies that it is eligible for and granted.

Asset-related governmental subsidies are recognized as asset and deferred income when received, and contributed averagely to gains/losses of the period against the expected useful life of such asset. For a disposal upon or before end of the useful life of such asset, the un-contributed deferred income is carried into gains/losses of the period.

Income-related governmental subsidy used to recover related expenses or losses in the subsequent period is recognized upon receiving as deferred income, and is taken into the income statement of the period in which the related expenses is recognized; those used to recover related expenses and losses occurred in this period are directly recognized upon receiving as the gains/losses of the current period.

For those that are confirmed to be returned by governmental subsidy, involve with related deferred income or write down the book balance of deferred income, and the exceeding portion is taken into the gains/losses of the current period; those that do not involve with related deferred income are directly recognized upon receiving as the gains/losses of the current period.

(3) Measurement of government subsidies

Government subsidies in the form of monetary assets are measured at the amounts received or receivable.

Government subsidies in the form of non-monetary assets are measured at fair value, and in the case of inability to determine fair value reliably, measured at the nominal amount, which is RMB 1.

11. Deferred tax assets and deferred tax liabilities

Deferred tax assets and deferred tax liabilities are recognized at (temporary) difference between the carrying value of an asset or liability and the tax base of such asset or liability. Deductible losses and tax credits that are carried forward to reduce taxable income in future years under the tax provisions are deemed temporary differences and accounted for deferred tax assets. Deferred tax assets and deferred asset liabilities as of the balance sheet date are measured at the applicable rate for the period when such assets or liabilities are estimated to be recovered or settled.

Deferred tax assets are limited to the taxable income that is likely to be obtained to reduce temporary differences, deductible losses and tax credits. For recognized deferred tax assets, when it is unlikely to obtain sufficient taxable income to offset against deferred tax assets by the future period, a write-down of the carrying amount of deferred tax assets is necessary. If it is likely to obtain sufficient taxable income, the write-down amount should be reversed.

Deferred tax assets and deferred tax liabilities are presented on a net basis, provided that the following conditions are satisfied:

(1) Deferred tax assets and deferred tax liabilities are related to the income tax imposed by the same taxing authority on the same entity in the Company.

(2) Such entity in the Company has the legal right to offset current tax assets against current tax liabilities.

B. Main Taxes

1. Corporate income tax

The rate of corporate income tax applicable to the Company is 15% or 25%. In accordance with the *Directive on Tax Policy Issues in Relation to the Further Implementation of the Western China Development Strategy* announced by the Ministry of Finance, the General Administration of Customs and the State Administration of Taxation, business establishments in the industries encouraged to develop in the western region are entitled to a reduced corporate income tax rate of 15%. This preferential rate of 15% is applicable to the calculation and payment of corporate income tax of some of the Company's branches and subsidiaries located in western China.

2. Value added tax

The value added tax rate is 17% for petroleum and petrochemical products and 13% for natural gas and LNG. Value added tax rates of 11% and 6% are applicable to some of the Company's pipeline transportation service and R&D technology services respectively.

3. Business tax

The business tax rate is 3% for construction, 5% for oil and gas transportation services, finance and insurance, service industry, transfer of intangible assets and real estate sales. In accordance with the *Directive on Business tax Exemption Policies Regarding Buying or Selling Personal Financial Products* (CS [2009] No. 111) and the *Directive on Business Tax Exemption for International Transportation Services* (CS [2010] No.8) announced by the Ministry of Finance and the State Administration of Taxation, the Company (as a domestic enterprise) is exempt from business taxes on overseas operations in construction and international transportation.

4. Surtaxes and surcharges

The urban maintenance and construction tax rate is 1%, 5% or 7% of the amounts actually paid for business tax, value added tax and excise tax. The rate of education surcharge is 3% of the amounts actually paid for business tax, value added tax and excise tax.

5. Excise tax

In accordance with the *Directive on Continued Increase of Excise Tax on Oil Products* (CS [2015] No.11) announced by the Ministry of Finance and the State Administration of Taxation, the per unit excise tax has increased since January 13, 2015 from RMB 1.40 per liter to RMB 1.52 per liter for gasoline, naphtha, solvent oils and lubricants, and from RMB 1.10 per liter to RMB 1.20 per liter for diesel and fuel oils. A suspension of excise tax remains unchanged for jet kerosene. In accordance with the *Directive on Excise Tax Exemption for Oil Consumption in the Production of Oil Products* announced

by the Ministry of Finance and the State Administration of Taxation, the Company has been exempt from exercise tax since January 1, 2009 on self-provided refined oils used as fuel, power and raw materials to produce oil products.

6. Resources tax

The resources tax rate is 6%, based on crude oil and natural gas sales.

7. Mineral resources compensation fee

The tax rate is 0%, based on oil and natural gas sales.

8. Special oil gain levy

The special oil gain levy is based on excess sales revenue from domestic crude oil prices exceeding the threshold of USD 65 per barrel and imposed at the five-level progressive ad valorem rates between 20% and 40%.

9. Personal income tax

The employees are responsible for their own income tax, which is withheld and remitted by the Company.

Major Events

January

January 30 The Myanmar section of the Myanmar-China Oil Pipeline jointly invested and built by CNPC and Myanmar Oil and Gas Enterprise (MOGE) was put into trial operation, and the Port of Maday Island was officially opened.

February

February 6 A strategic cooperation framework agreement was signed between CNPC and China Aerospace Science & Industry Corporation (CASIC). The two companies will collaborate in manufacturing of special petroleum equipment, overseas market development, corporate capital operation, and technical research and development.

March

March 9 The Jiangsu Rudong JV Pipeline Company was officially established by PetroChina, Shenergy (Group) Company Limited and Yangkou Port Company Limited, with each holding a share of 50%, 40%, and 10% respectively.

March 27 CNPC and Caterpillar signed a strategic cooperation agreement. Under the agreement, the two companies will reinforce cooperation in business globalization, products and services, sharing of knowledge and best practices, equipment manufacturing and remanufacturing, circular economy, and sustainable development.

April

April 3 CNPC's Dagang Oilfield Company took over the operating right of Zhaodong project. Located in the tidal and shallow water zone of the Bohai Bay Basin, Zhaodong project is CNPC's first successful foreign cooperation project for tidal oilfield development.

June

June 10 CNPC and Tencent signed a strategic cooperation framework agreement to explore cooperation opportunities in business development and promotion, mobile payment, O2O business, cloud services, big data application, and joint marketing. By utilizing respective core competences and strategic resources, the two sides expect to promote innovation in relevant products and services as well as industrial upgrading.

June 29 The Chinese part of the Eastern Route of Russia-China Gas Pipeline started construction. The pipeline runs from the China-Russian border in Heihe city of Heilongjiang Province and ends in Shanghai. A 3,170km-long pipeline will be built, and an existing parallel 1,800km-long pipeline will be included. The project is expected to start operation in 2018.

March 9



April 3



June 29



July 18



July

July 18 Karamay Petrochemical Co. Ltd, a joint venture between PetroChina Karamay Petrochemical Company and Xinjiang Investment and Development (Group) Co., Ltd, was officially launched, with each side holding a share of 99% and 1% respectively.

August

August 4 A strategic cooperation agreement was signed between CNPC and Bank of China under the national Belt and Road Initiative. The two sides will expand cooperation in financing, cash management and international settlement, insurance, and investment banking.

August 31 Main installations became operational at Phase-III project of the Third Gas Processing Plant of CNPC AktobeMunaiGas in Kazakhstan.

September

September 14 Bota, Tangiguyi and Uzyngyi gas fields of Amu Darya Project in Turkmenistan became operational, with an annual capacity of 1 billion cubic meters.

October 10



October

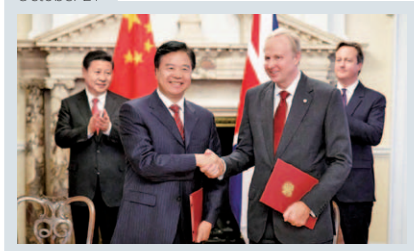
October 9 A strategic cooperation agreement was signed between CNPC and SAIC Motor Corporation Limited (SAIC Motor). CNPC and SAIC will deepen cooperation in sales of new car, oil products and other vehicle products, and promote network construction and use of co-branded card nationwide. In addition, the two companies will also explore cooperation opportunities in big data, internet cars, new energy automobile, third party payment, and internet finance.

October 10 Two natural gas processing plants and a transportation pipeline in Tanzania was completed, with China Petroleum Technology & Development Corporation (CPTDC) as the main EPCC contractor. The gas pipeline has a total length of 535 kilometers, consisting of an onshore trunk line, an onshore branch and a subsea section.

October 20 The Longwangmiao gas reservoir at the Moxi block of Anyue Gas Field was put into production, with an annual capacity of 11 billion cubic meters. The gas reservoir, located in the central part of Sichuan Basin, was discovered in September 2012. With proven gas in place of 440.38 billion cubic meters, it is the largest monomer marine uncompartimentalized gas reservoir ever been discovered in China.

October 21 CNPC and BP signed a strategic cooperation agreement to further strengthen cooperation in oil and gas development, and continue to expand fuel retailing business in China in terms of both scope and cooperation mode. Also, both parties are expecting to push forward the joint development project at Rumaila oilfield in Iraq.

October 21



October 22 CPECC and Mozambique ENHL signed an agreement to set up a JV engineering company.

November

November 4 An MOU was signed between CNPC and GE to promote R&D cooperation in CCUS, low carbon and clean technology, and technical services for unconventional oil and gas development.

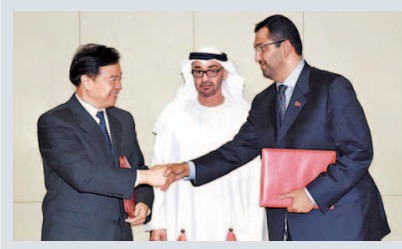
December

December 13 CNPC and Mubadala Petroleum signed a strategic cooperation agreement. The two companies will join hands in upstream oil and gas investment and relevant project services outside the UAE, specifically in conventional onshore projects, offshore projects, and LNG projects, etc.

December 16 The Kyrgyz Government and a CNPC subsidiary signed an investment agreement for constructing the Kyrgyzstan section of Line D of the Central Asia-China Gas Pipeline. According to the agreement, technical standards and specifications will be determined for the design and construction of the pipeline, and the Kyrgyz Government will provide support to ensure the smooth progress of the project.

December 17 CNPC and Gazprom signed an agreement to design and construct the cross-border section of the Eastern Route of Russia-China Gas Pipeline, and an MOU on cooperation in the oil sector between CNPC and Gazprom Neft. The agreement has set the procedures for the design, engineering and construction of the pipeline, and provided standards on the project quality and environmental protection. According to the MOU, the two sides will collaborate in upstream operations in Russia and third countries, and seek cooperation opportunities in petroleum exploration and development, sales of oil and gas products, oilfield services, and trade of petroleum equipment.

December 13



Glossary

Proven reserves

According to China National Standards, proven reserves are estimated quantities of mineral deposits. They can be recovered from reservoirs proved by appraisal drilling during the period of reservoir evaluation, with a reasonable certainty or a relative difference of no more than 20%.

Reserve replacement ratio

The reserve replacement ratio refers to the value of the amount of oil and gas reserves added in a year divided by the amount of oil and gas produced during that same year. It can be further expressed in terms of the oil reserve replacement ratio, gas reserve replacement ratio, and oil and gas equivalent reserve replacement ratio.

Oil equivalent

Oil equivalent is the conversion coefficient by which the output of natural gas is converted to that of crude oil by calorific value. In this report, the coefficient is 1,255, i.e. 1,255 cubic meters of natural gas, is equivalent to one metric ton of crude oil.

Recovery rate

The percentage of oil/gas in place that is recoverable from underground.

Decline rate

A decline in production occurs in an oil or gas field that has been producing for a certain period of time. The natural decline rate is defined as the negative relative change of production over a period of time, without taking into account an increase in production resulting from EOR (enhanced oil recovery) techniques. The general decline rate is defined as the rate of decline in the actual production of such an oil or gas field, taking into account an increase in production from the new wells and EOR techniques.

Water injection

The pressure of the reservoirs continues to drop after the oilfield has been producing for a certain period of time. Water injection refers to the method where water is injected back into the reservoir through the water injection wells to raise and maintain the pressure, increase oil recovery, and thereby stimulate production.

Tertiary recovery

Tertiary recovery is also called enhanced oil recovery and is abbreviated as EOR. It is a method to increase the recovery of crude oil by injecting fluid or heat to physically or chemically alter the oil viscosity or the interfacial tension between the oil and another medium in the formation, in order to

displace any discontinuous or hard-to-tap oil in reservoirs. EOR methods mainly include thermal recovery, chemical flooding and miscible flooding.

Polymer flooding

This is an EOR method by which a polymer solution is used as the agent to displace oil. Polymer is injected to increase the viscosity of formation water, changing the oil/water viscosity ratio and reducing the difference between water flowability and oil flowability in the formation. This will increase the swept volume of water flooding and thereby the oil displacement efficiency.

ASP flooding

A flooding system is prepared with alkali, surfactant and polymer. It not only has a high viscosity but also can create ultra-low water-oil interfacial tension to improve the oil-washing capability.

Redevelopment

It is a process to enhance the ultimate recovery of a mature field which should have reached its limit or should have been abandoned with the use of conventional primary-development techniques. The development system of the oilfield is reconstructed by consolidating new concepts, and using and developing new secondary recovery technologies.

LNG

Liquid Natural Gas is produced by dewatering, deacidifying, dehydrating and fractionating the natural gas produced from a gas field and then turning it into liquid under low temperatures and high pressure.

Horizontal well

A class of nonvertical wells where the wellbore axis is near horizontal (within approximately 10 degrees of the horizontal), or fluctuating above and below 90 degrees deviation. A horizontal well may produce at rates several times greater than a vertical well, enhance recovery efficiency and prolong the production cycle, due to the increased wellbore surface area within the producing interval. Meanwhile, the environmental costs or land use problems that may pertain in some situations, such as the aggregate surface "footprint" of an oil or gas recovery operation, can be reduced by the use of horizontal wells.

EPC

Under an EPC contract, the contractor carries the project risk for quality assurance, safety, schedule and budget within the scope of work, i.e. engineering, procurement and construction.

HSE management system

The HSE management system provides a framework for managing all aspects of health, safety and the environment. It is defined as the company structure, responsibilities, practices, procedures, processes and resources for implementing health, safety and environmental management.

Occupational diseases

A disease or ailment caused due to excessive exposure to noxious fumes or substances in a working environment.

Internet +

China's Internet Plus action plan refers to the application of the internet and other information technology in conventional industries. It is an incomplete equation where various internets (mobile Internet, cloud computing, big data or Internet of Things) can be added to other fields, fostering new industries and business development in China.

VOCs

Volatile organic compounds (VOCs) refer to organic compounds with saturated vapor pressure over 70Pa under room temperature, and boiling point below 260°C under atmospheric pressure. VOCs also refer to all organic compounds that easily evaporate at temperature of 20°C and vapor pressure of 10Pa or higher.

About this Report

In this report, the expressions "CNPC", "the corporation", and "the company" are used for convenience where references are made to China National Petroleum Corporation in general. Likewise, the words "we", "us" and "our" are also used to refer to China National Petroleum Corporation in general or to those who work for it.

This report is presented in Chinese, English, Russian, Spanish, and French. In case there is any divergence of interpretation, the Chinese text shall prevail.

Recycled/recyclable paper are used for this annual report.

Planning: CNPC International Department

Editing: CNPC Economics & Technology Research Institute

Photographer: Bian Haijun, Fu Yu, He Bingyan, Jia Weiyuan,
Jin Tian, Shan Zhongjian, Wang Maohuan,
Wang Min, Wang Tianpeng, Wang Yongli,
Yang Zhimin, Zhou Minghua

Design: Beijing FineDesign Co., Ltd.

Printing: Beijing Duocai Printing Co., Ltd.

