



# 2017

## Annual Report

China National Petroleum Corporation



## **Energize · Harmonize · Realize**

China National Petroleum Corporation (CNPC) is an integrated international energy company, with businesses covering oil and gas operations, oilfield services, engineering and construction, equipment manufacturing, financial services and new energy development.



# Contents

Message from the Chairman	03
Report of the President	04
Operation Highlights	06
Board of Directors • Top Management • Organization	07
Comprehensively Deepen Corporate Reforms to Boost Steady and Sound Growth	10
Deepening International Oil and Gas Cooperation Under the Belt and Road Initiative	12
Phase I of Yamal LNG Project Became Operational	13
2017 Industry Review and Outlook	14
Safety and Environmental Protection	16
Human Resources	20
Technology and Innovation	24
Annual Business Overview	28
Financial Statements	52
Major Events	62
Glossary	64





## Message from the Chairman

In line with the decisions of the CPC Central Committee and the State Council, CNPC implemented our strategies of resources, market, internationalization and innovation in 2017 steadily in pursuit of stable and sound growth and operational excellence, and made new headway in our business activities.

Under the leadership of the Board of Directors, the company saw moderate yet stable and healthy growth over the year. Our production and operation were under well control amidst steady progress of reforms. Business development was achieved in a harmonious environment with corporate image being continuously improved. Our operational results outperformed targets, thanks to stronger capabilities in supplying oil and gas, major breakthroughs in international operations and remarkable performance in the services market. Our development concepts were more in line with the government requirement and our business environment was favorable, leading to an uplifted morale of employees.

In 2017, our domestic newly proven reserves exceeded 1 billion tons of oil equivalent for the 11th consecutive year. Crude oil production remained stable at over 100 million tons, and natural gas production mounted to over 100 billion cubic meters for the first time. Refining and chemicals business became a main source of earning after constant optimization. The sales network of refined products kept expanding with continuous improvement in quality and efficiency. A number of oil and gas pipelines became operational and gas sales surged. Major breakthroughs in overseas operations led to double-digit growth in both equity production and profits and we achieved important results in new project development. In services business, the value of contracts newly signed and market shares both increased, and there was ongoing improvement in competence and competitiveness.

In 2017, the company reviewed and launched a range of key reform initiatives and made new progress in reforms with regards to corporate governance, work process of the Board of Directors, specialized restructuring and mixed ownership etc. Meanwhile, the company pushed forward the reform of its R&D system and implemented the innovation strategy, resulting in a wide range of achievements in technology development and application. The reform of overseas operation systems, ongoing restructuring of oilfield services and optimization of headquarters functions moved forward as scheduled. The ownership reform towards the structure of a limited liability company was successfully completed. The pilot program for promoting autonomy in management advanced steadily. China Petroleum Engineering Co., Ltd. (CPEC) and CNPC Capital Co., Ltd. were publicly listed.

During the convening of Belt and Road Forum for International Cooperation in Beijing in May 2017, CNPC held the first Belt and Road Roundtable for Oil and Gas Cooperation to share ideas and promote international cooperation in the oil and gas circle. In face of new historic opportunities, CNPC expected to work closely with our peers and partners home and abroad to further expand oil and gas cooperation. In the principle of "achieving shared growth through discussion and collaboration", the partners would address major changes in the energy sector and create a win-win and mutually beneficial oil and gas community of common interests. With these efforts, we would supply more high-quality clean energy and facilitate the sustainable and healthy development of human society.

With a strong commitment to regulatory compliance, corporate social responsibility, poverty alleviation and brand building, the company continued to reshape its corporate image. Our business activities remained stable and harmonious as a whole, without major safety or environmental accidents or violence incidents related to oil and gas. Our achievements in the past year were by no means easy to accomplish. I would like to take this opportunity to express my sincere gratitude to all sectors of the society for their support!

The year 2018 is the beginning year to implement the decisions of the 19th CPC National Congress. It also marks the 40th anniversary of China's Reform and Opening-Up Policy, 20th anniversary of our corporate restructuring and a milestone in the "13th Five-Year Plan" period. In line with the fundamental requirements for operational excellence and the general principle of stable and sound development, the company will adopt a holistic approach in stabilizing growth, promoting reforms, shoring up weak points, mitigating risks and increasing profits as well as improving the corporate image. We will accomplish all business objectives and achieve further progress in our business activities in support of the sustainable and healthy development of China's economy and society.

Chairman



## Report of the President

In 2017, despite the gradual recovery of the oil and gas industry, the company still faced tough challenges like volatility in oil prices, increased competition in the refined oil market, widened peak-trough gap in natural gas demand, especially the arduous task of securing winter gas supplies. Leveraging its integrated strengths, the company took a well-planned and coordinated approach to coping with the changing market, optimizing production operations, cutting cost and boosting efficiency to achieve steady increase in outputs and healthy growth in earnings. The company reported RMB 2,340.3 billion in total revenue and RMB 53.3 billion in total profit for the year.

In 2017, we made remarkable achievements in all business segments:

**Domestic E&P business saw transformation in development mode with lower costs and rising profitability.** With an emphasis on high-quality reserves, the company optimized exploration deployment and focused its technical and financial resources on high-efficiency exploration, making a number of major discoveries in the Junggar, Tarim and Sichuan basins and proving a series of high-quality and sizable producible reserves in the Ordos, Songliao and Bohai Bay basins. The full-year additions to proven oil and gas in place were 659.45 million tons and 569.8 billion cubic meters respectively, providing a solid ground for stabilizing oil production and ramping up gas output. Our efficiency-centered development activities aimed to optimize the development schemes and production structure and stably implemented a range of key capacity projects including the Mahu project at Xinjiang Oilfield and the Halahatang project in the Tarim Basin. We produced 102.54 million tons of crude oil throughout the year. Taking advantage of growing demand for natural gas, the company adopted a dynamic approach to gas production based on seasonal

consumption patterns and tapped the potential of production capacity to ensure ample supply, registered a full year gas output up to more than 100 billion cubic meters. In particular, unconventional gas production such as shale gas and coalbed methane continued to increase.

The lifting costs per unit for oil and gas continued to decrease on a comparable basis, as a result of a series of measures for improving reserve management, cutting inefficient capacity, saving land with well clustering, increasing recoverable reserves through fine reservoir description and enhancing recovery through subdivision waterflooding, etc.

**Refining and chemicals business achieved record-high earnings by optimizing operation and adjusting products mix.** The company ensured the long-term, high-utilization operation of its integrated refining- petrochemical complexes and high-performing facilities by optimizing the allocation of crude oil resources and producing more chemicals. In 2017, we processed 152.45 million tons of crude, and produced 103.51 million tons of refined products and 5.76 million tons of ethylene, up 3.6%, 4.2% and 3.1% respectively. The upgrading of products mix and products quality led to a lower diesel-gasoline ratio of 1.28 and an increase of 10.2 percentage points in high-value refined products. The supply schedules for the National VI Standard-compliant gasoline and diesel in "2+26 Cities" were completed on time. Chemicals marketing kept optimizing resource allocation and logistics and promoting new products, selling 27.98 million tons of chemical products throughout the year. We made headway in a range of key projects. The refining facility was successfully commissioned at Yunnan Petrochemical; upgrading and expansion project proceeded smoothly at Huabei Petrochemical and Liaoyang Petrochemical; and a number of alkylation projects for gasoline upgrading advanced steadily. Refining and chemicals business remained an important source of revenue for the company, with 20 technical and financial indicators better than those in 2016.

**Oil products sales continued to grow with marketing capabilities increased gradually.** The company's full-year oil products sales reached 114.16 million tons, up 1% year-on-year, as a result of coordinating production and marketing activities, addressing regional imbalances, increasing exports, promoting integrated marketing and boosting the sales of high-value oil products such as premium gasoline and jet fuels. A series of marketing initiatives were launched, including third-party billing and retail apps, theme sales joint promotion and integrated marketing of oil products, fuel cards, non-fuel products and lubricants. Our marketing network was further expanded with a growing number of newly established, leased and joint-venture service stations.

**Natural gas and pipelines business ensured growing supply and steady profitability.** Given a sharp increase in natural gas demand, the company coordinated and balanced the transportation, allocation and marketing of domestically produced gas, pipeline gas imports and LNG to keep the market well-supplied. The company sold 151.8 billion cubic meters of natural gas domestically in 2017, up 15.5% year-on-year. The management on natural gas sales and purchase contracts was strengthened. The first online auction of 1 billion cubic meter of natural gas was made. An integrated natural gas sales framework was taken shape, based on sale and purchase contracts,

prepayment system and online/offline transactions. Oil and gas pipeline operations stayed safe and efficient through centralized planning, scheduling and control. Key projects saw solid progress. Construction of the northern section of the Eastern Route of the Russia-China Gas Pipeline was in full swing; the Myanmar-China Crude Pipeline, the Second Russia-China Crude Pipeline, the Fourth Shaanxi-Beijing Gas Pipeline, Zhongwei-Jingbian spur line of the Third West-East Gas Pipeline and Yunnan Refined Products Pipeline were put into operation on schedule.

**Overseas operations continued to expand with robust growth in operating efficiency.**

Embracing the opportunities emerging under the Belt and Road Initiative, new projects including ADCO onshore in Abu Dhabi, South Pars in Iran, Peroba in Brazil were launched and a number of cooperation agreements were signed with energy companies from the United States, Russia, and Kazakhstan, etc. Based on comprehensive research and prioritization of prospects, new breakthroughs were made at Libra (Brazil), Amu Darya (Turkmenistan) and Andes (Ecuador), etc. Our newly added recoverable reserves amounted to 90.93 million tons of oil equivalent for the full year. Our full-year equity production hit a record high, including 68.80 million tons of crude oil and 25.5 billion cubic meters of natural gas, as a result of optimizing development plans, beefing up the development of high-value projects, accelerating drilling and operation of new wells, and boosting EOR efforts. In 2017, the company saw important achievements in its overseas projects, including the successful commissioning of the first phase of Yamal LNG in Russia, the first phase of the Shymkent Refinery upgrading project in Kazakhstan and the EGR project at the Saman-Depe Gas Field in Turkmenistan. Meanwhile, taking advantage of three overseas operation centers, our international trading business actively organized oil and gas imports, expanded oil products exports and increased sales of shared oil from overseas projects. In 2017, our trading volume was 470 million tons with turnover of USD 184.4 billion.

**Service businesses made more market expansion efforts with performance continued to improve.**

The company's oilfield service business kept promoting general contracting and factory operation to boost speed and efficiency. We were awarded a number of major projects in Kuwait, Iraq and Venezuela. We participated in the offshore gas hydrate pilot project as the general contractor for the first time and achieved historic success, setting a new record in recovery duration and production volume. Giving full play to specialized advantages, our engineering construction business ensured the construction of key projects. We actively explored international market and won the contracts for the Amur Gas Processing Plant in Russia, integrated facilities at the Bab oilfield in UAE and Saudi Aramco's pipeline in Saudi Arabia, etc. In equipment manufacturing, the company sped up transformation to a service-oriented equipment manufacturer based on the "Manufacturing + Services" business mode. Our financial services continued to bolster the core business operations by integrating finance and production needs, promoting product and customer development, and deepening channel and service innovation.

**Reform and innovation stimulated vitality and corporate management effectively improved.** As the corporate reform continued to deepen, the company and its 151 subsidiaries underwent the transformation in

ownership; the reform of overseas operation systems progressed well; the specialized restructuring of our engineering service sector was basically completed; China Petroleum Engineering Co., Ltd. (CPEC) and CNPC Capital Co., Ltd. were publicly listed; the pilot programs for promoting autonomy in management advanced steadily; internal oil and gas product and service pricing mechanisms were further straightened out; and the first batch of internal mining right transfer was conducted successfully. The company's operating efficiency improved significantly as a result of optimizing investment structure, curbing non-productive expenditure, implementing rigidly production and operation plans, cutting costs and boosting efficiency.

**HSE management level was enhanced comprehensively and HSE situation was stable in general.**

The assessment of HSE management system continued to deepen; HSE standards were implemented across front-line sites and stations; risk management was stepped up for key areas and sensitive periods; inspections were conducted against HSE hazards, radioactive sources and hazardous chemicals; coal-fired boilers were phased out, gas-fired boilers were transformed and volatile organic compounds (VOCs) were effectively treated; and prevention and control on safety and security risks was heightened in overseas operations. HSE situation was stable in general. The company's full-year energy use was down by 880,000 tons of standard coal and water use down by 12.41 million cubic meters.

**Technological innovation and IT application bolstered core business development.**

Important achievements were made in the development and application of some core technologies, including the techniques for exploration, evaluation and development of lithologic reservoirs, technical solutions for extracting shale gas from reservoirs within 3,500 meters; high-value oil products and synthetic materials; and the SCADA system for long-distance pipeline transportation, all of which have provided strong support for our core business development. ERP application integration was completed across the board; cloud technology platform was applied further; data sharing and integrated application capabilities were enhanced; digitization and intelligentization construction advanced steadily; and the application of IT-enabled systems played an increasingly notable role on business.

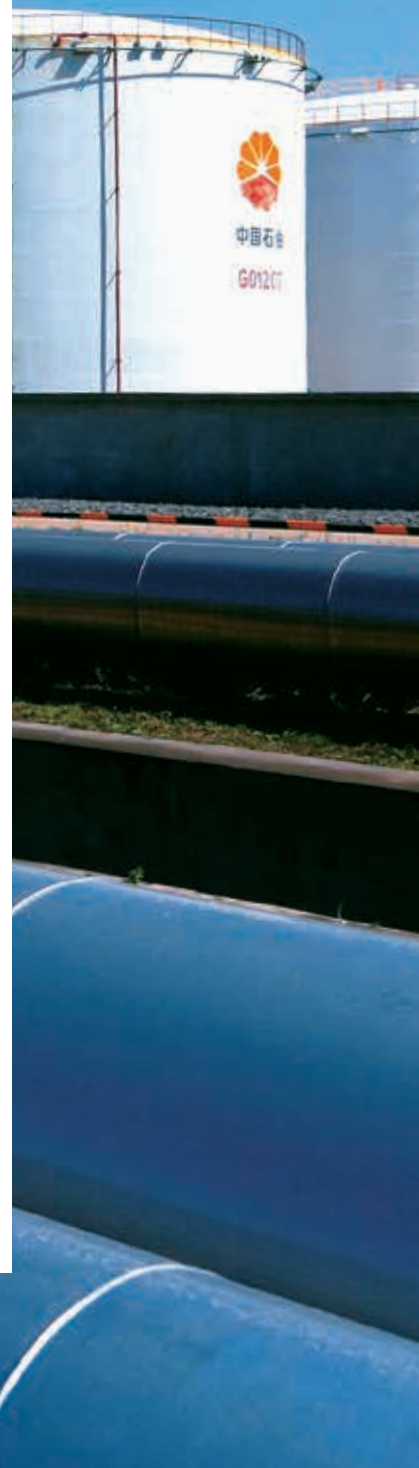
Looking ahead into 2018, we will implement the guideline of sound development across the board by further leveraging our integrated advantages, focusing more on the guiding role of market, resource allocation optimization and business risks prevention. With these efforts, we are confident to meet all our business objectives and score new achievements.

President



# Operation Highlights

	2015	2016	2017
<b>Financial Index</b>			
Total revenue from operations (billion RMB yuan)	2,016.8	1,871.9	2,340.3
Total profit (billion RMB yuan)	82.5	50.7	53.3
Net profit (billion RMB yuan)	56.2	26.8	17.6
Taxes and fees paid globally (billion RMB yuan)	375.7	349.7	377.4
<b>Oil and Gas Production</b>			
Oil production (mmt)	166.57	162.98	171.34
Domestic	111.43	105.45	102.54
Overseas (CNPC's share)	55.15	57.53	68.80
Gas production (bcm)	116.67	121.30	128.73
Domestic	95.48	98.11	103.27
Overseas (CNPC's share)	21.19	23.19	25.45
<b>Refining, Chemicals and Sales</b>			
Crude runs (mmt)	195.24	191.67	198.22
Domestic	151.32	147.09	152.45
Overseas	43.92	44.57	45.78
Domestic refined products output (mmt)	103.69	99.32	103.51
Domestic lube oil output (mmt)	1.21	1.16	1.64
Domestic ethylene output (mmt)	5.03	5.59	5.76
Domestic refined products sales (mmt)	116.25	113.03	114.16
Domestic service stations	20,714	20,895	21,399
<b>Pipeline</b>			
Domestic pipeline mileage (km)	79,936	81,191	85,582
Crude oil	18,917	18,897	20,359
Natural gas	50,928	51,734	53,834
Oil products	10,091	10,560	11,389
Overseas pipeline mileage (km)	14,507	14,507	16,500
Crude oil	6,604	6,604	8,597
Natural gas	7,903	7,903	7,903



## Board of Directors



Wang Yilin  
Chairman



Zhang Jianhua  
Director



Wang Jiuling  
Outside Director



Liu Guosheng  
Outside Director



Li Yuhua  
Outside Director



Huang Long  
Outside Director



Wang Shihong  
Employee Director

## Top Management



Zhang Jianhua  
President



Xu Wenrong  
Vice President



Yu Baocai  
Vice President



Liu Yuezhen  
Chief Financial Officer



Liu Hongbin  
Vice President



Xu Jiming  
Chief of Discipline  
& Inspection Group



Hou Qijun  
Vice President

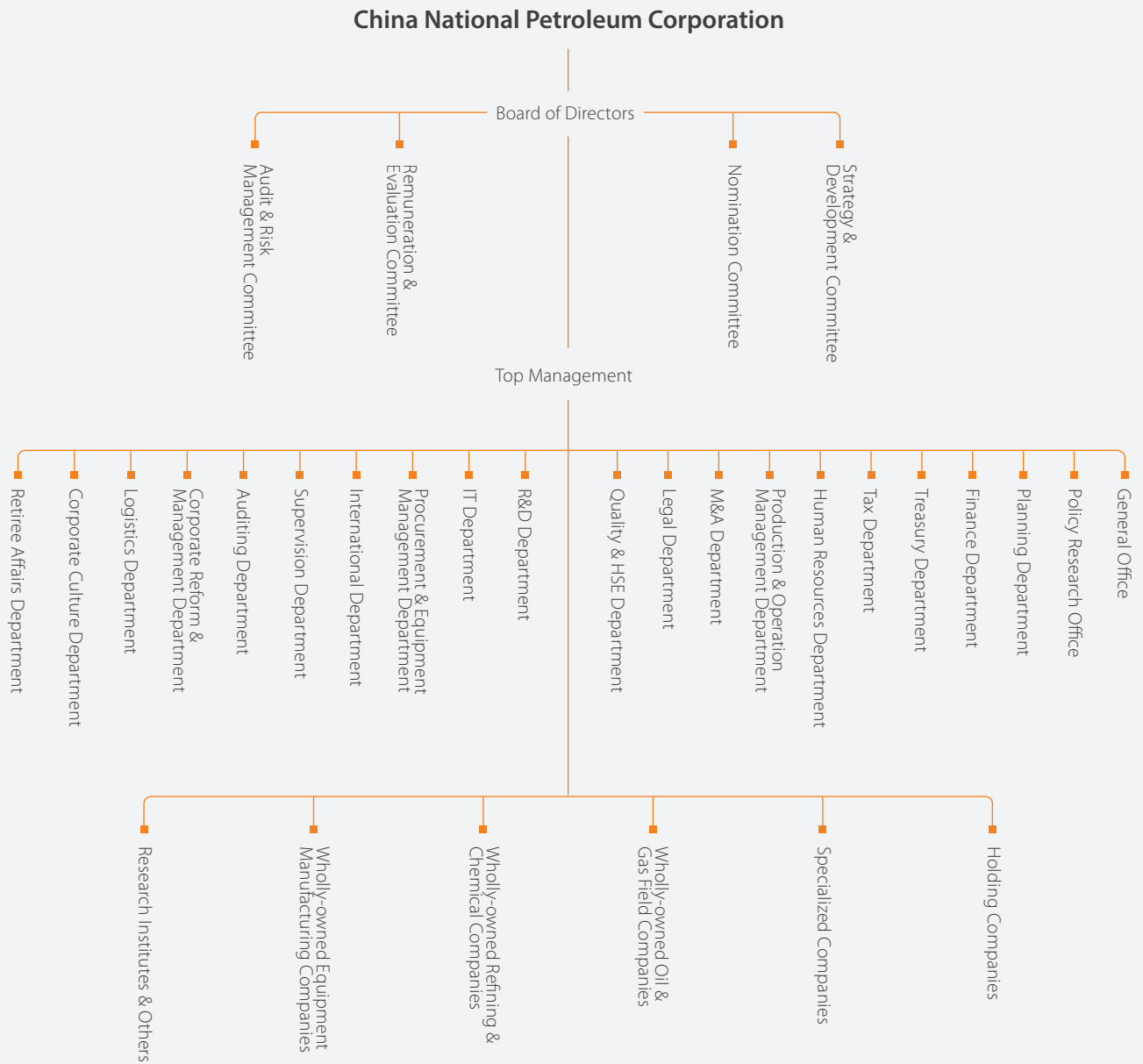


Duan Liangwei  
Vice President



Qin Weizhong  
Vice President

# Organization





## Comprehensively Deepen Corporate Reforms to Boost Steady and Sound Growth

Since the 18th CPC National Congress, CNPC has implemented comprehensively the decisions of the CPC Central Committee and the State Council on deepening the reforms of state-owned enterprises and the oil and gas systems. With a strong commitment to building an integrated international energy corporation, CNPC strictly followed the strategy-guided, market-oriented and CPC-led principle to deepen corporate reforms in launching a range of fundamental and guiding reform programs highlighting problem-orientation, top design, targeted measures and coordinated efforts. With a good momentum focusing on important aspects, these reform programs have been pushed forward actively and steadily and shown good results in improving modern enterprise systems, optimizing management models, promoting supply-side structural reforms and developing a mixed-ownership economy.

**Overall framework for the group-level reform set up.** The leading body and supporting mechanisms for corporate reforms were set up. We held 23 leading group meetings for comprehensively deepening reforms and meetings of the corporate CPC committee and the Board of Directors to discuss key issues and launch more than 160 reform tasks and measures. The company released the guidance for comprehensively deepening reforms and the “13th Five-Year” Reform Plan, specifying the goals, tasks and supporting measures of reform. Reform programs and guidelines for key areas such as corporate governance, marketization, employment and compensation, R&D, asset restructuring, mixed ownership, mining community services and CPC party building systems, etc. were implemented. The company’s top-level reform framework, together with the roadmap and action plans, was formed.

**Corporate governance structure and control mode kept optimizing.** Board procedures and CPC party building requirements were incorporated into the company’s articles of association, highlighting CPC’s leadership in all aspects of corporate governance. In accordance with the instructions of the CPC Central Committee and the State Council on ownership reform in state-owned enterprises, China National Petroleum Corporation was reorganized into a limited liability company wholly owned by the state, with its 151 subsidiaries undergoing the ownership transformation accordingly. Functions and management processes for the corporate hierarchy of “Headquarters – Business Segments – Regional Companies” were clearly defined and the streamlining of headquarters functions and organizational structure was completed. Necessary adjustments were made on the management systems for overseas operations, natural gas and pipelines, international cooperation, equipment manufacturing and engineering services to realize differentiated control, centralized decision-making and hierarchical delegation of power.

**Structural adjustment and business restructuring furthered.** The central government's guidelines on the supply-side structural reform were implemented. The company's resources allocation and operations were optimized by adjusting investment portfolio, business structure and product mix, reducing high-cost capacity and shutting down inefficient facilities. The company's engineering service and financial service arms were successfully restructured, leading to the public listing of China Petroleum Engineering Co., Ltd. (CPEC) and CNPC Capital Co., Ltd., marking a great move for CNPC's mixed-ownership reform. The company pushed ahead with the restructuring of its oilfield services sector steadily focusing on geophysical prospecting and well logging, in a bid to become a leading energy service provider in the international market. As part of the national oil and gas system reform, pipeline operation and natural gas sales were separated to enable fair access to pipelines. Mergers of Kunlun Energy and Kunlun Gas, and of China Huayou Group Corporation and Beijing Huayou Service Corporation were completed. The company worked with local governments and various forms of capital to set up 50 joint ventures and cooperation projects in exploration and production, refining and chemicals, as well as oil products marketing, etc. Equity transfer of West-East Gas Pipelines (I, II and III) and the Central Asia-China Gas Pipeline were completed. The milestone goals set by SASAC for overhauling loss-making enterprises, tackling "zombies" and financially stressed enterprises, as well as reducing legal-person hierarchy and the number of legal-entity enterprises were achieved. Disposal of hotels was largely completed and 82% of services on water, electricity and heat supply as well as property management was separated and handed over.

**Market-based reforms and operational mechanisms made progress.**

We improved the price pass-through mechanisms from upstream to downstream, incentives for market-based operation, and internal and external market link-up etc.. Management of "one account book" covering both production and operation was optimized and the coordination among business segments was strengthened to maximize overall efficiency. The company further streamlined administration in delegating approval power to lower levels on 95 items in four batches. The pilot program for promoting management autonomy was implemented in 12 subsidiaries. The "Five-Autonomy" reform was launched in five equipment manufacturing companies. All these efforts have stimulated enthusiasm in grassroots units. Cadre selection and appointment procedures were improved and performance-based remuneration practice was pushed forward further. Pilot program for payroll budgeting was launched. A flexible mechanism for recruitment, appointment and remuneration took shape. Pilot plans and measures for integrated reform, project management, technical position ranking and R&D incentives were carried out in R&D institutes to keep our scientists and engineers motivated. Innovative practices of optimizing organizational structure, improving operating mechanisms and streamlining business processes were encouraged across the company.

**CPC party governance systems improved.** Under the *Guidance on Comprehensively Implementing Strict Governance over the Party in Strengthening Party Building*, the accountability system for party building and the party affairs management body were strengthened. CPC secretaries were held responsible for reviewing party building reports. The party building framework led by the company's CPC committee came into shape, as efforts were stepped up in overseeing party building activities, streamlining party decision-making procedures, improving party building assessment systems, and creating the platform for party building research, communication and information sharing. The company's anti-corruption system was reinforced, comprising regional discipline inspection and supervision centers; discipline inspections led by the secretary of Discipline Inspection Commission; on-site discipline inspection teams; and joint monitoring programs combining discipline inspection and supervision, legal affairs, auditing and internal controls, etc. to enable comprehensive inspection and monitoring within the party. An anti-corruption landslide was achieved, resulting from a strong commitment to discipline and rules as well as the fight against political "smog".

The year 2018 marks a milestone for CNPC to push ahead with reforms.

**The general idea of deepening reforms** is to implement the decisions of the 19th CPC National Congress, follow Xi Jinping's thought on socialism with Chinese characteristics for a new era, implement the central government's reform schemes and requirements for deepening the supply-side structural reform, and adhere to the direction of the reform of socialist market economy. Under the goal of "improving modern enterprise system and pushing forward the modernization of corporate governance and control capabilities", a steady, targeted and problem-solving approach should be adopted to boost corporate value and development quality through "debottlenecking, rejuvenating, improving quality and efficiency, as well as reinforcing party building". Reforms on management systems, employment and remuneration systems, mining community services and party building systems will be pushed forward comprehensively. Reforms on market-based mechanisms, differentiated control, process streamlining and mixed ownership will be deepened continuously. The company will look into a range of issues such as business structure optimization, transformation and upgrading, regional coordination, integration of warehousing, transportation and logistics resources, and innovative mechanisms for unconventional resources and new energy business. To embrace the 40th anniversary of the Reform and Opening-up, we will boost in-depth and company-wide changes in quality, efficiency and driving force so as to inject new vitality into the company's sound growth.



## Deepening International Oil and Gas Cooperation Under the Belt and Road Initiative

In May 2017, CNPC successfully held the Belt and Road Roundtable for Oil and Gas Cooperation during the Belt and Road Forum for International Cooperation in Beijing. The event attracted over 20 participants including officials from China's energy authority and international energy agencies, as well as senior executives from oil companies and financial institutions home and abroad. Participants compared notes on new patterns and mechanisms for oil and gas cooperation under the Belt and Road Initiative. During the Roundtable, CNPC signed agreements with a number of oil companies on deepening and broadening partnership in project financing, pipeline transportation, gas storage, oil and gas supply, as well as natural gas power generation.

In the keynote speech given at the Roundtable, Wang Yilin, Chairman of CNPC, emphasized that deepening oil and gas cooperation is an integral part of the Belt and Road Initiative. Given new historic opportunities, CNPC is looking forward to working closely with domestic and international peers and partners to further expand oil and gas cooperation in the spirit of "achieving shared growth through discussion and collaboration". The partners would address major changes in the energy sector and create a win-win and mutually beneficial oil and gas community of common interest. With these efforts, we would supply more high-quality clean energy and facilitate the sustainable and healthy development of human society.

CNPC embarked oil and gas operations in Central Asia, Russia, Middle East and Southeast Asia in the 1990s. As of 2017, the company operated 49 oil and gas cooperation projects in 19 countries along the Belt and Road routes, involving more than 60% of the company's accumulative overseas investment and about 50% of the company's accumulative overseas equity production. Among our five overseas oil and gas cooperation regions, Central Asia-Russia, the Middle East and Asia Pacific are geographically important along the Belt and Road routes. Three of the company's four cross-border oil and gas channels, the Central Asia-China, Russia-China and Myanmar-China pipelines enable oil and gas import from the northwest, northeast, and southwest. As one of the company's three overseas oil and gas operation centers, the Asian Operation Center has become an influential supplier and trader in the Asia Pacific region.

The company has been actively and productively involving in the implementation of the Belt and Road Initiative which was presented by President Xi Jinping in 2013. In Central Asia-Russia region, a number of

key projects became operational, including the Yamal LNG Project Phase I in Russia, Karakul Gas Field Phase I in Uzbekistan, Saman-Depe Gas Field EGR Project Phase I in Amu Darya in Turkmenistan, Central Asia-China Gas Pipeline C, Russia-China Crude Pipeline II, and Kazakhstan-China Gas Pipeline Phase II (South Kazakhstan section). New projects were under construction, including the Eastern Route of the Russia-China Gas Pipeline, Asia Steel Pipe Corp in Kazakhstan, and the new Bokhara Control Center for the Uzbekistan-China Gas Pipeline. Our overseas projects in Kazakhstan and Turkmenistan celebrated the 20th and 10th anniversaries of oil and gas cooperation with these two countries respectively. In the Middle East, the North Azadegan Project in Iran and the Halfaya Project Phase II in Iraq went on stream successfully. We signed the contract for the development of South Pars Phase 11 (SP 11) with National Iranian Oil Company (NIOC) and Total. We acquired an 8% interest in the ADCO onshore concession under an agreement with Abu Dhabi National Oil Company (ADNOC). In the Asia Pacific region, the Myanmar-China Oil and Gas Pipelines was built and put into operation successively.

An important element of the Belt and Road Initiative is to build a community of shared interests and future growth with the rest of the world. Building an oil and gas community of common interest is of great significance to the economic prosperity and energy security of countries and regions along the Belt and Road routes, which is also a goal of CNPC to achieve through international oil and gas cooperation. Maintaining a strong commitment to a win-win, mutually-beneficial relationship with the host countries, the company has been actively participating in the local economic and social activities by creating jobs, funding public welfare programs such as education and healthcare, supporting local businesses, and purchasing products and services locally. Currently, local hiring accounts for more than 90% of CNPC's workforce on our oil and gas projects in key host countries along the Belt and Road routes, having created more than 80,000 jobs and benefited a population of more than 2 million locally.

Energy cooperation is the forerunner and main engine for the Belt and Road Initiative. Leveraging its expertise and experience in international operation over the past two decades, CNPC boasts a pioneer and earnest performer of the Initiative. The Belt and Road Initiative, likewise, offers new opportunities of overseas oil and gas cooperation and makes it possible for CNPC and its partners to explore new patterns and mechanisms for doing business across borders.



## Phase I of Yamal LNG Project Became Operational

On December 8, 2017, Phase I of the Yamal LNG Project, the world's largest and most complex one of its sort in the Arctic region, was put into operation. Yamal LNG is the largest overseas oil and gas cooperation project that CNPC has participated in under the Belt and Road Initiative. Being engaged in the full industry chain, CNPC is emerging as an important global player in the LNG sector.

Located in the Arctic region of Russia, Yamal LNG is an integrated project that covers the entire chain of natural gas exploration and production, processing, liquefaction, shipping and sales. South Tambey condensate gas field, the gas source of the project, harbors the proven reserves of approximately 1.3 trillion cubic meters for natural gas and 60.18 million tons for gas condensate. The project's LNG trains are planned to be built in three phases. Besides the Phase I which has already been operational, the Phase II and Phase III are expected to come on stream in 2018 and 2019 respectively. Upon full completion, the project will be capable of delivering 16.50 million tons of LNG and 1 million tons of gas condensate per year.

In 2013, CNPC signed an agreement with Novatek to acquire 20% share in the Yamal LNG Project to jointly develop and construct the project with Novatek and Total. In 2014, the project became cash-strapped after its kickoff. CNPC brought in Chinese lenders to meet the capital needs. In 2016, the Silk Road Fund bought 9.9% share of Yamal LNG from Novatek to be the fourth shareholder of the project. Currently, CNPC holds 20% share in the project, with Novatek (Russia), Total (France) and Silk Road Fund (China) owning 50.1%, 20% and 9.9% respectively.

Construction of the Yamal LNG project went into full swing in 2016. A dozen of CNPC subsidiaries, including CNPC International Russia Corp., CNPC Offshore Engineering Company Ltd. (CPOE), China Huanqiu Contracting & Engineering Company Ltd. (HQC), China Petroleum Technology & Development Corp. (CPTDC) and CNPC Global Solutions Ltd., were involved in the construction and operation of the project. In particular, CPOE and HQC jointly completed the construction of 16 modules for four work packages, i.e., FWP5, MWP4, MWP10A and FWP1D, and delivered the modules on schedule with high-quality.

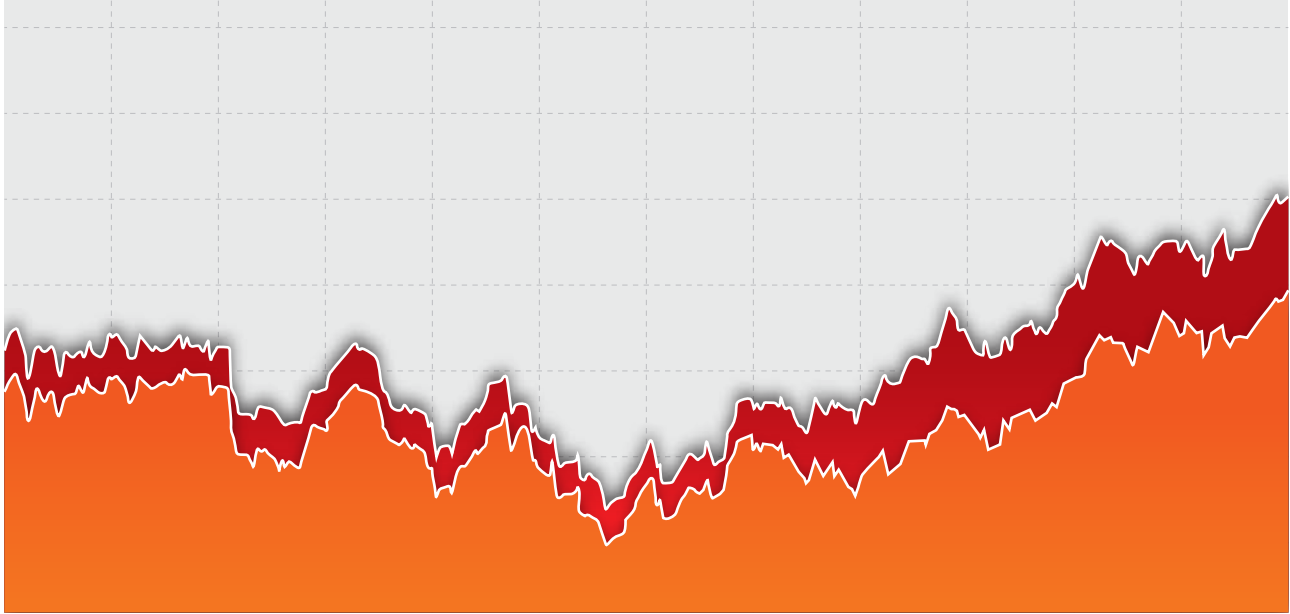
Following the example of CNPC, a number of Chinese companies were engaged in the project construction across the board, ranging from geological study, rig manufacturing, module construction, engineering

supervision, shipping & logistics, material supply to ship building and LNG procurement. Due to harsh environment in the Arctic region, 147 fabricated modules are assembled for main functional units. 120 modules, a number of ice-class LNG carriers and one polar drilling rig are sourced from Chinese companies. More than 100 products used in the project are supplied by 45 Chinese manufactures. In such a way, Yamal LNG has greatly facilitated technological innovation as well as industrial transformation and upgrading in many relevant sectors, and has successfully showcased and driven China's manufacturing industry ahead.

Yamal LNG has also opened up a more convenient alternative to the existing transport corridors, i.e., the Arctic Northeast Passage, or the Ice Silk Road. Since 2015, more than 60% of the modules for the project have been transported via the Arctic Northeast Passage through the Bering Strait, which is one-third shorter than traditional routes through the Suez Canal, reducing logistics costs significantly.

The Yamal LNG Project bolsters the win-win, mutually beneficial economic and trade ties between China and Russia. The project not only gives a strong boost to the development of Russia's energy industry and its remote regions, but also helps diversify China's clean energy sources and enable further optimization of China's energy mix. In November 2017, CNPC signed a strategic partnership agreement with Novatek to further expand bilateral cooperation in both upstream and downstream of the gas industry.

As the largest platform for Sino-Russia economic and trade cooperation and an important stronghold along the Ice Silk Road, Yamal LNG is now deemed as a model of international energy cooperation in the Arctic Region. CNPC, thereby, becomes a frontrunner in the resource development in the Arctic.



## 2017 Industry Review and Outlook

The world economy was buoyant as a whole in 2017 with a steady increase in energy consumption. The oil and gas industry showed a broad recovery as investment activities picked up and the global market and oil and gas prices continued to turn for the better. There was an accelerated shift in energy mix towards clean and low-carbon energies. The global energy transition progressed steadily amidst challenges.

**Oil market gained balance and oil prices picked up.** Global oil prices showed a V-shaped recovery in 2017, with Brent and WTI crude oil futures averaged at USD 54.7 per barrel and USD 50.9 per barrel, up 21.3% and 17.0% respectively year-on-year. As the world economy grew faster, the growth in global oil demand accelerated, increased by 1.6 million bbl/d from one year earlier. Due to OPEC production cuts, world oil supplies only increased slightly by 0.6 million bbl/d from one year earlier. In terms of oil market fundamentals, there was a shift from an oversupply of 0.7 million bbl/d to an undersupply of 0.3 million bbl/d for the first time in the past four years. As market rebalancing continued, global oil inventories seemed to shrink but still stood at a very high level, indicating a fragile balance. U.S. crude oil exports soared by as much as 65% from 2016 and expanded into new markets, resulting in the changing landscape of the global oil market.

**Growth in global natural gas consumption rose again and gas prices rebounded.** In 2017, global natural gas consumption rose 2.2% to 3.62 trillion cubic meters with an impressive leap in the Asia-Pacific area to offset the shrinking in North America for the first time in the past five years. Global natural gas production reached 3.7 trillion cubic meters, up 2.7%. Globally, natural gas prices bottomed out as US-HH, UK-NBP, NE Asia Import LNG and NE Asia Spot LNG posting large rises. Global natural gas trade rose 5.6% to 1.15 trillion cubic meters. In particular, the trade volume of LNG totaled 287 million tons, up 12.5% year-on-year, much faster than that of pipeline gas, i.e. 2.4%. Driven by soaring demand in China and South Korea, LNG imports surged in Asia.

**The global upstream sector was out of the woods with an increase in E&P investment.** In 2017, the world's remaining proven recoverable reserves stayed stable and natural gas reserves increased slightly. Globally, oil production was flat for the year at approx. 4.36 billion tons and gas production increased by 2.7 % to 3.7 trillion cubic meters. Global E&P investment totalled USD 382 billion, up 8% from 2016. Oilfield service market expanded to USD 233.5 billion, up 5% year-on-year. More deepwater projects were rapidly approved, indicating an important growth area for oil and gas production capacity in future.

**Oil refining capacities grew with higher utilization rates and refining margins.** In 2017, global refining capacity rose to 4.9 billion tons per year, an increase of 29 million tons compared to the previous year. Among the top trio of Asia-Pacific, North America and Western Europe, Asia-Pacific was accounting for an increasingly larger share. Daily crude runs of major refineries exceeded 80 million barrels for the first time, hitting a record high of 80.58 million barrels. Globally, utilization rate averaged at 85%, driven by disaster incidents and insufficient refining capabilities in some regions. There was a boom in refining margins, as Western Europe, Singapore and the Gulf of Mexico posting 44%, 22% and 49% in growth respectively.

**Oil and gas M&A was still in an important window period.** M&A in the upstream sector picked up noticeably. After a two-year downturn, a total of 360 merger and acquisition deals were completed in 2017 around the globe, amounting to approx. USD 170 billion, up 21% and 13% respectively year-on-year. However, prices for reserves remained low. 2P reserves were traded at USD 5.28 per barrel in 2017, which was about 60% of that for high oil prices, despite a 42% increase from 2016. International oil companies and financial institutions had a bigger presence in the capital market. Oil and gas cooperation was at a time of favorable policies. Most oil and gas producers were undergoing transformation, opening up for cooperation across the whole industrial chain and making timely adjustments to the terms and conditions of oil and gas cooperation.

China's economy showed clear signs of robust and healthy growth in 2017, with energy consumption picking up and energy mix getting cleaner. Government authorities launched a range of key initiatives on expanding market access, improving institutional framework and stepping up regulation under the *Guidance on Deepening Institutional Reform for the Oil and Gas Industry*.

#### **A rise in China's apparent oil consumption growth and sluggish growth in refined product consumption were seen.**

China's apparent oil consumption was 590 million tons in 2017, up 5.9% or 3 percentage points higher than the previous year, marking the highest level since 2011. Net oil imports rose 10.8% to 396 million tons, 1.2 percentage points higher than the previous year. China surpassed, for the first time, the United States as the world's largest crude oil importer in 2017, with its dependence on foreign oil rising to 67.4%. The upturn in industry, transportation, real estate and other sectors brought refined product consumption back on the path of growth. The full-year apparent refined product consumption was 325 million tons, up 3.4% or 3.9 percentage points higher than that of 2016, with an unusual retreat in gasoline and rise in diesel consumption growth though. Domestic refined products output reached 361 million tons, up 3.5% year-on-year. However, due to tight quotas, the refined products export growth fell sharply to 5.1% after staying in the fast lane for five years.

**China's natural gas consumption grew faster than expected, resulting in tight market supply and seasonal shortage.** Domestic natural gas consumption growth was much higher than expected in 2017, driven by favorable macroeconomic and policy factors. The full-year natural gas consumption was 235.2 billion cubic meters, up 17% or 10.6 percentage points higher than the previous year, accounting for 7% of primary energy consumption. Natural gas supplies amounted to 240.2 billion cubic meters for the full year, up 15% year-on-year. In particular, natural gas imports saw an impressive 24.4% increase, with dependence on foreign natural gas climbing to 39.4%. There was a rise in the average natural gas import price. Under the "2+26 Cities" Program, the use of natural gas or electricity as an alternative to coal was promoted in Beijing, Tianjin, Hebei and surrounding areas. Due to deviant execution, there arose a bunch of issues, such as temporary shortage of gas supply and LNG price hike.

**Steady progress was made in China's E&P activities and upstream investment picked up.** China's oil companies refocused their exploration efforts on mature blocks in a bid to ensure reserve producibility. These efforts resulted in a number of major discoveries in Mahu and Shunbei, etc. In 2017, domestic crude oil production dropped approx. 3% to 192 million tons, showing a smaller decline as compared with 7.1% in 2016. Natural gas production once again grew on a double-digit base, rising approx. 10% to 149 billion cubic meters. China's oil trios saw an upturn in upstream investment budget, indicating a recovery in the domestic E&P sector.

#### **China's refining sector saw fast capacity expansion and overcapacity worsened.**

After a two-year plateau, China's refining capacity reached 770 million tons per year, with a net increase of 17.6 million tons. Crude runs was approx. 568 million tons for the full year, up 5% year-on-year. Leveraging access to crude imports, teapot refineries were getting bigger and more competitive. Their refining capacity rose to 162 million tons per year and share of gasoline and diesel production continued to expand for five years in a row, accounting for 21.5% in 2017.

#### **Significant progress was made in international oil and gas cooperation with overseas equity crude production over 150 million tons.**

In 2017, overseas equity production of Chinese oil companies reached 190 million tons of oil equivalent, up 8.9% from 2016. In particular, equity productions of crude oil and natural gas were 150 million tons and 45 billion cubic meters respectively. The Belt and Road Initiative and the joint efforts between China and the U.S. produced breakthrough results. Private companies and local state-owned enterprises speeded up overseas investment and explored M&A opportunities actively, with their share of total equity production rising rapidly to 10%. A diversified mix of investors was observed in overseas investment.

Looking ahead into 2018, global oil market fundamentals will continue to improve, with median oil prices moving upward. Brent crude oil prices are expected to average between USD 60-65 per barrel and vary between USD 50-75 per barrel. Natural gas market will remain oversupplied. Natural gas demand and production are expected to rise to 3.67 trillion cubic meters and 3.78 trillion cubic meters respectively. Global refining capacity is expected to reach 4.95 billion tons per year. Based on refining facilities planned and under construction, China's refining capacity additions will account for more than half of the net increase in global refining capacity by 2020.

China's apparent oil demand is expected to exceed, for the first time, 600 million tons in 2018, with its dependence on foreign oil moving closer to 70%. Rapid growth in natural gas demand will continue. Natural gas consumption is expected to reach 258.7 billion cubic meters, up 10% year-on-year. Domestic E&P will stay buoyant with a sustained boom in upstream investment. As a result of structural transformation of the economy, adjustments in the real estate market, heightened efforts in environmental protection, and access to alternative energies, demand for refined products is expected to slow down. Refining capacity is back on the path of fast growth and expected to exceed 800 million tons per year for the first time. Teapot refineries will see a bigger share of the total refining capacity. Output of refined products will expand and the oversupply in market will stand above 45 million tons, with pressure continuing to mount over refined products export.

Source: 2017 Report on Oil & Gas Industry Development by CNPC ETRI

An aerial photograph of a construction site located on a small, green island in the middle of a wide river. The island is surrounded by lush green vegetation and trees. In the background, there are yellow fields and a line of trees. A white text box is overlaid on the upper part of the image, containing the text "Safety and Environmental Protection".

## Safety and Environmental Protection

The company is committed to harmonious development among energy, environment and business growth by promoting regulatory compliance under the *Production Safety Law* and the *Environmental Protection Law*, ecological civilization construction and green growth strategy.

We continue to improve our HSE system, reinforce safety management and quality control, enhance our HSE measures, protect the ecological environment and bolster the energy-efficient, low-pollution and low-emission practices for sustainable development.

## HSE Management

Upholding the HSE concept of “people-oriented, quality and safety-first and environment-priority”, the company has been pursuing “zero-accident, zero-injury and zero-pollution” in its business operations. Under our *HSE Management Plan for the “13th Five-Year Period”*, the company has strengthened HSE management system audit by adjusting the audit method, broadening the scope of audit and enhancing audit quality. Based on quantitative assessment of more than 110 major business units, HSE issues identified in the process of audit have been diagnosed and reviewed, with major risks and hidden hazards being monitored and rectified in a timely manner. All this helps bolster our HSE infrastructure.

We revised the measures and the program for HSE training and worked out the HSE training matrices and application manual for gas production and gas purification. We also introduced a demand-driven approach to grassroot HSE training and held HSE training workshops for safety managers and HSE auditors. Risk analysis has been implemented extensively in our overseas projects, enabling a tiered approach to risk management. A variety of training programs have been developed to build HSE awareness and competency, enabling emergency preparedness and response and ensuring a safe and smooth overseas operation as well as the protection of our employees.

## Operational Safety

Operational safety, as one of CNPC’s core values, was fully integrated into every aspect of our business activities. The company promoted a long-term mechanism for operational safety and continued to improve its safety management. In 2017, the situation of operation safety was generally under control.

Strengthened safety hazard prevention. A framework of preventative controls for management and correction of safety-related risks and hazards has been developed and a tiered approach to risk management has been adopted to create a stronger safety management system. We continued to adopt measures for high-risk activities and key procedures with a focus on site inspection and special safety supervision. Meanwhile, technical diagnosis and management review was conducted on HSE practices in key business units, projects and high-risk areas to make sure major risks were effectively controlled.

Strengthened comprehensive management of hazardous chemicals. CNPC released the *Guidelines for Safe and Comprehensive Management of Hazardous Chemicals*. Responsible persons of 67 hazardous chemicals subsidiaries participated a special training program. A hazardous chemical information system was launched on schedule after an overall survey which was designed to gather information of hazardous chemicals. A safety program against hidden risks in chemical tank farms was implemented to identify and address safety issues in a timely manner.

Strengthened safety management for suppliers and contractors. CNPC has fully pushed ahead with a contractor safety qualification system and released the *Guidance on Further Strengthening Contractor Safety Qualification Management*. Contractor prequalification was introduced into a number of business units, such as Liaoyang Petrochemical. Joint safety committees were set up for contractor projects as a project owner-led on-site safety management mechanism with the involvement of constructors and supervisors.

Strengthened the construction of emergency response system. Major emergency drills were conducted at Southwest Pipeline and Yunnan Petrochemical sites. Meanwhile, a national hazardous chemical emergency response and training center, together with the company’s emergency response facility, was under construction, enabling continuous improvement of our emergency response.

## Occupational Health

In accordance with the *Law on Prevention and Control of Occupational Diseases of P.R.C.*, CNPC has achieved better performance in occupational health by bolstering the organization's occupational health infrastructure and implementing standard occupational health procedures, with a focus on hazard prevention and control, workplace environment improvement, physical and mental health.

In 2017, we revised and released the *Procedures for Early Detection and Management of Occupational Risk Factors in the Workplace*, *Regulations for Occupational Health Surveillance Procedures* and *"Three Simultaneities" - Based Guidance on Occupational Disease Prevention and Control Facilities for Construction Projects*. We continued to strengthen countermeasures for occupational hazard from poison and dust. A thorough inspection on protection facilities was conducted at some of our laboratories and workplaces with poison or dust hazards. And hidden troubles identified were all rectified. Owing to the improvement in both occupational health infrastructure and management, our employees' occupational health was enhanced. In 2017, the hazard factor surveillance ratio was 98.5%, and 98.5% of our employees exposed to health hazards received occupational health checks.

Heightened measures against disease sources were adopted at our overseas sites to monitor, prevent and control key diseases and infectious diseases. Overseas employee assistance programs (EAP) were implemented in the spirit of humanistic care in a variety of forms to address work-related stress and improve mental health and wellbeing of our overseas employees, especially those working in harsh natural environments.

## Environmental Protection

Climate change is the major challenge of mankind. The company has been playing an active role in international cooperation on climate change. In 2017, the company made a firm commitment to effective control of methane emissions in the natural gas sector and joined fellow Oil and Gas Climate Initiative (OGCI) members and the international community in formulating the OGCI-2040 Low-Emission Roadmap. We also participated in the investigation of methane emissions and the formulation of evaluation standards for carbon dioxide capture and storage capacity in the oil and gas industry. In line with the state government's initiatives and actions plans for reducing methane emissions, the company has developed its low-carbon roadmap, specifying low-carbon development goals and key tasks. Meanwhile, greenhouse gas emissions calculations were conducted in accordance with the applicable national standards, including greenhouse emissions from combustion, flaring and venting, and refining processes.



In 2017, the company continued to step up control measures for reducing pollutant emissions. The upgraded version of the *Pollutant Emission Control Plan* was formulated, setting forth 12 key areas including various types of pollution i.e., air, water, noise, solid waste etc., and a full range of industrial chain, i.e., exploration and production, refining and chemicals, natural gas and pipelines and technical services, in an aim to enable life-cycle control of pollutant emissions in production activities. An integrated approach to reducing volatile organic compounds (VOCs) was adopted and a platform for VOC control was introduced to monitor and control VOC emissions in our refineries and chemical plants. In response to the state government's policy on transforming the energy mix, the company released the *Measures for 2017-2018 Air Pollution Control in Beijing, Tianjin and Hebei and Surrounding Areas during Autumn and Winter*, and unveiled programs for supervision of special projects and for standard-compliant treatment of pollution sources to deliver cleaner natural gas, gasoline and diesel products. 285 coal-fired boilers in this region were phased out or replaced by clean energy.

In line with the goal stated in the *2030 Agenda for Sustainable Development* to "protect, restore and promote sustainable utilization of ecosystems to halt the loss of biodiversity", the company has formulated the *Action Plan for Ecological Protection* and implemented six ecosystem protection projects to promote our business as well as the sustainable development in the host countries (regions).

## Energy Efficiency and Conservation

In 2017, the company stepped up its efforts in improving energy management and boosting energy efficiency by formulating the energy management standards and launching energy management demonstration projects at Changqing Oilfield and Jinzhou Petrochemical, etc. Energy conservation techniques were introduced, shared and promoted among subsidiaries. An energy system optimization demonstration project was launched at Daqing Oilfield and a number of pilot projects on furnace heating efficiency and heat transfer efficiency were completed. With respect to the treatment of associated gas and the recovery of gas flared, light hydrocarbon recovery projects were put into operation at Tarim, Xinjiang and Tuha oilfields. For water resource management, water application regulations were heightened and water-saving techniques were enhanced to reduce the use of fresh water and to use water more efficiently. To address land use issues in oil and gas production, the *Guidelines for Land Management* were formulated to promote land conservation, land reclamation and environmental restoration. In 2017, the company reduced energy consumption by 880,000 tons of standard coal and water consumption by 12.41 million cubic meters.



## Financing for environment projects to promote energy transition

In July 2017, Kunlun Financial Leasing made a RMB 60 million loan to State Power Investment Corporation in support of a MSW-fired power plant project in Bazhou, Hebei. As one of the key eco projects funded by the company, the power plant will receive RMB 200 million in total from Kunlun Financial Leasing to purchase eco-friendly generator sets. After its completion, the project is expected to handle 1,200 tons of municipal solid waste per day for the Beijing New Airport and the Xiong'an New Area in Hebei.

Under the green finance initiative unveiled by the "13th Five-Year Plan", the company has actively participated in clean energy and environmental protection projects ranging from hydropower, wind power, photovoltaic power generation, to waste power generation, with its green financing framework coming into shape. The company has invested in clean energy projects in Chongqing, Guiyang and Zhangpu, etc. to effectively ease the shortage of electricity in these cities, reduce coal-fired power generation as a percentage of the total energy mix and ensure energy security and environment protection for the development of the rural areas as well as the tourism industry. As of the end of 2017, the company has made loans to seven clean energy projects, which will reduce more than 1 million tons of CO<sub>2</sub> emissions per year.

In the future, the company will continue to explore the green finance opportunities in the clean energy market and promote the development of hydropower, nuclear power, wind power and photovoltaic power to accelerate energy transition, with oil and gas remaining as the priority. It is expected that by 2020, green finance will become one of the pillar businesses of the company.

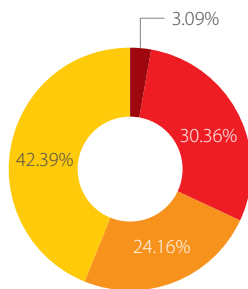
## Human Resources



The company actively pushed ahead reform of talent development system and strengthened talent pool building to develop an innovative and highly motivated workforce and provide an enabling environment for achieving self-worth.

#### Education background of employees

- Master's degree and higher
- Bachelor's degree
- Junior college
- Technical secondary school and below



The company has been maintaining a strong commitment to employees' rights and benefits, creating an inclusive, equal, trustful and collaborative workplace, providing platforms for career development and upward mobility, promoting local hiring, and aligning employee development with corporate growth.

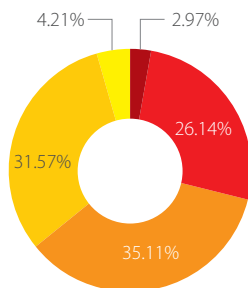
#### Employment Policy

The company pursues an equal and non-discriminatory employment policy in compliance with applicable laws, regulations and systems, and ensures equal employment and career development opportunities for employees of different nationalities, races, sexes, religious beliefs and cultural backgrounds. In 2017, the company pushed forward a reform of talent development system on attracting, training, retaining and motivating talented people effectively, in a bid to create an institutional environment for fostering innovation and creativity. The processes for recruitment, employment, performance review, and remuneration distribution were further improved, resulting in an optimized workforce structure.

In 2017, the company newly recruited 1,834 college graduates. In particular, graduates from leading universities and petroleum/petrochemical-related colleges accounted for 67% of new recruits. As of 2017, the company had approximately 1,355,000 employees, with 33.45% holding bachelor's degree or higher and 33.85% female.

#### Age groups of employees

- 25 and below
- 26-35
- 36-45
- 46-55
- 56 and above



#### Compensation and Welfare

As part of our ongoing effort to align performance appraisal with employee compensation, the company continued to improve performance-based compensation and welfare system focusing on value and feature of different posts. We ensured that employee compensation matched with our business growth and productivity. Compensation distribution was tilted towards R&D engineers, workers at front line and those on tough jobs. Under the *Social Insurance Law of P.R.C.*, the proportion of employees enrolled in social insurance reached 100%. Meanwhile, the supplementary medical insurance, corporate annuity and subsidies were improved to safeguard employee's wellbeing.



Participate in international communication and training

## Employee Training

In 2017, the company continued to expand its training infrastructure and e-learning platforms and developed the “Four Talent Training Schemes” on business management, professional expertise, technical skills and international operation, highlighting employee competency and urgently needed skills. The head office organized 165 training programs for more than 20,000 participants in 2017, having boosted workforce competence and quality effectively.

The company keeps improving employees’ occupational skills and competence by combining skill competitions with training programs. In 2017, we held four skill competitions on oil production, gas production, oil & gas gathering and transportation as well as electric welding, and hosted the SCO Worker Skill Competition and the National Petroleum and Petrochemical Industry Electric Welding Competition. We also participated in a range of international skill competitions and won the team championship for four times and the team second place once at five international and industry-wide competitions. Many employees were rewarded and commended for their professional skills.

### 2017 Key Training Programs Under “Four Talent Training Schemes”

Managerial personnel	Professional personnel	Technical personnel	International personnel
<ul style="list-style-type: none"> <li>• Thesis seminars for leading officials of subsidiary companies</li> <li>• Training sessions for division level officials at key positions</li> <li>• Training classes for young and middle-aged leading officials of the company</li> <li>• Party school training classes</li> <li>• Training sessions for personnel in charge of party building and secretary of discipline inspection commission</li> <li>• Visiting scholars project at Stanford University</li> <li>• Training sessions for senior executives at GE in the USA, and at Siemens in Germany</li> </ul>	<ul style="list-style-type: none"> <li>• Experts’ elective-course training at Tsinghua University</li> <li>• Training sessions for targeting senior technicians</li> <li>• Training sessions on upstream business for oil and gas plant managers</li> <li>• Training sessions on safety management for executives of enterprises dealing with hazardous chemicals</li> <li>• Training sessions at Tsinghua University, Beijing Institute of Technology and other universities</li> <li>• Experts’ training sessions in Russia and Germany</li> </ul>	<ul style="list-style-type: none"> <li>• Training sessions for various types of technical personnel</li> <li>• Petroleum Craftsman Development Program</li> <li>• Vocational skills competitions</li> </ul>	<ul style="list-style-type: none"> <li>• “Thousand People Training Project” targeting international talents</li> <li>• Training sessions for core youth employees at GE</li> <li>• Overseas training sessions on project management, finance management and IT</li> </ul>

## Career Development

CNPC pays high attention on career planning and development of employees, as part of its modern corporate philosophy. In 2017, we kept reforming and improving the environment and mechanisms for talent development and implemented a number of talent cultivation programs, in order to provide a more enabling environment and a broader platform for our managers, experts and technicians to increase their value.

In terms of succession planning, the company developed a leadership talent pool and provided training for young managers to bring young talents to important positions. A series of talent training initiatives were launched, including Petroleum Scientist Program and Technology Talent Program, etc., to develop A-list professionals in the process of implementing major technology programs and key projects. The technical post management reform for R&D staff saw some results with measures advancing steadily. The value of technical staff was fully recognized and their innovation vigor was further unleashed. Our talent fostering initiatives such as Operator Skill Development Program, Innovation & Efficiency Initiative, and Petroleum Craftsman Program, etc. were designed to identify and groom highly skilled professionals. The career path for operating workers was well prepared with a career development system in place from beginners all the way up to highly skilled technicians. Technicians and technical experts worked together to create collaborative studios and work stations, aiming to promote a talent development system bothway.

As of 2017, the company had 54 skill expert studios, including 16 national master studios, 456 senior technical experts, and 338 skilled technicians. Throughout the year, 149,900 employees participated in the verification of professional technical ability and 107,200 employees received certificates in recognition of their professional knowledge and skills.

## Local Hiring

In the spirit of “mutually beneficial and win-win development through cooperation” and in compliance with the labor laws in the host countries, the company has been maintaining a strong commitment to employee rights in non-discrimination and equal opportunity, paying high attention to employee’s health and safety, improving working and living conditions and creating a friendly, safe and harmonious workplace. A complete set of procedures for recruitment, retention, performance review and reward system were developed to provide a career development platform. In addition, the company actively created job opportunities, promoted local hiring and integrated training into every aspect of the local workforce development to enhance professional skills and competence. Training plans were developed to meet the career needs of our local employees, with an aim to nurture top talent in the oil industry for resource countries.

In 2017, the company hired and cultivated a number of local professionals in E&P, engineering and construction, international trade, finance, accounting, and business management. By the end of the year, CNODC, a subsidiary in charge of CNPC’s overseas oil and gas operations, had a total of 56,000 staff with local employees accounting for approx. 92%.



Iraqi employees in the "Road Safety Week" campaign

## Technology and Innovation



The company sticks to its business-driven innovation strategy by stepping up its R&D reform and talent development to push forward all-round innovation and foster the new engine for growth.

In 2017, the company saw positive progress in reforming its R&D system and tackling technical bottlenecks in its core operations. An update of key technologies facilitated industrial upgrade and led to new breakthroughs in major projects; cutting-edge and disruptive technologies helped give the company a head start and technology leadership in the industry; concrete outcomes from the key areas of R&D reform released the vitality of technological innovation. All this contributed to a stronger role of innovation in bolstering the company's business growth.

## Construction of Technological Innovation System

The reform of R&D system continues to move forward. The company set up a technical expert committee to oversee R&D programs, streamline the R&D management system, optimize resource allocation and promote information sharing. The company also introduced a fund in support of basic research and strategic research on emerging technologies, improved the policy on R&D incentives and introduced incentive measures for value-creating from R&D results, in an effort to provide a more open and inspiring environment throughout the company for our technical research people.

The company's R&D infrastructure was further reinforced. The existing R&D platforms were further improved, including the national engineering laboratory for exploration and development of low-permeability oil and gas reservoirs. The platform for research of information technology and soft science is under construction. And a number of research platforms such as the nanochemistry laboratory were rated as top level globally.

As the end of 2017, the company has 84 research facilities, 47 key laboratories and testing centers, and more than 33,000 scientists and researchers.

## Progress of R&D Achievements

In 2017, the company boosted technological R&D and made significant progress in increasing hydrocarbon discovery rate, enhancing producible rate of reserves and ultimate recovery, and promoting localization of sophisticated equipment, as well as in tackling technological challenges in crude oil processing, cost reduction of chemical raw materials and clean energy production.

### Exploration and Development

Challenges were addressed in glutenite exploration, resulting in a major discovery at the Mahu Sag in Xinjiang, with newly added 3P reserves of 1 billion tons. Horizontal well drilling was going smoothly, enabling large-scale production and opening up a new strategic reserve-replacement area.

The evaluation techniques for structural traps in the foreland thrust belts have solved technical problems such as anisotropic pre-stack depth migration and overthrust and superimposed structural belt modeling, resulting in a remarkable improvement in the quality of salt/subsalt imaging and leading to a breakthrough in exploration activities in the Tarim Basin of Xinjiang.

In view of the world-class problems such as micro- and nano-pore throat gas-water seepage in ultra-low permeability-tight sandstone gas reservoirs, a large physical simulation experiment system has been developed for improving productivity and recovery rate. As the state-of-the-art physical simulation system in terms of performance indicators and modeling system, it will greatly facilitate China's theoretical and experimental research in complex gas reservoirs.

Key technologies in residual oil simulation, profile control by polymer microspheres and lateral broadband fracturing were developed for waterflooding of low permeability and ultra-low permeability reservoirs, enhancing the recovery rate by 6-8 percent at two blocks in Changqing Oilfield.

Innovative exploration and development techniques for shale gas have contributed to a significant drop in the overall costs per well and an accelerated pace of shale gas development, with the yearly output soaring up from 200 million cubic meters to 3 billion cubic meters.

## Refining and Petrochemical

Clean gasoline tests under the National VI Standards have proved successful and clean diesel production experiments have seen major progress, promoting a new round of fuel quality improvement.

Catalysts with high gasoline yields and low carbon emissions have been successfully developed and widely used to enable a decrease in the company's diesel-gasoline ratio.

Leveraging major progress in high-value production of polyolefin products, the company has launched 20 polyolefin brands and developed all-round R&D capability for catalysts, comonomers and polymers.

A new phosphorus-free polymerization process for SBR production has been developed. Mass production was realized for nine synthetic rubber brands including e-SBR, EPR and Nd-BR.

## Oilfield Services

**Geophysical prospecting:** GeoEast-Diva, a proprietary velocity modeling solution, is developed to tackle a range of seismic exploration issues in relation to the complex surface conditions in domestic exploration areas, marking a leading position in velocity modeling for onshore complex surfaces and formations. The innovative method for controlled induction of strong perturbation has contributed to the development of the EV56 high-precision broadband vibroseis, which is put into use at Xinjiang, Qinghai and Liaohe oilfields to enable the shift from more stable low-frequency to broadband.

**Well logging:** An innovative azimuthal acoustic reflection imaging logging tool has been developed to support the acquisition of geological data and the discovery of complex reservoirs. Meanwhile, it provides technical parameters for oriented perforating, directional sidetracking and acid fracturing, playing an important role in stratigraphic evaluation.

**Drilling:** To address the potentially dangerous problem of sustained casing pressure and gas blow-by, a new set of cementing techniques focused on high-strength, low-elastic modulus cement and well integrity have been developed to facilitate the exploration and development of deep and unconventional natural gas reservoirs in a safe and efficient manner. A range of techniques for treatment and recycling of drilling wastes and fracturing fluids, including fine sorting, centrifugal separation and electrosorption, were used, increasing the recovery rate and reducing the costs significantly. Drilling and completion techniques for 5-1/2" sidetracks are used to reduce the average construction period from 100 days to 40 days, with the length of the horizontal section increased from 600 meters to 900 meters and the daily output increased from 5,000 cubic meters to 59,000 cubic meters per well.

**Offshore engineering:** China's first offshore gas hydrate production project has been successfully implemented, making breakthroughs in connection with silty reservoirs, shallow burial depths, low temperatures under deepwater, formation sand flows and hydrate formation, etc. to maximize the duration of gas production and output and solve flow assurance, environmental safety issues.



## Storage and Transportation

The third-generation, large-capacity natural gas pipeline technology has taken shape. The SCADA system for long-distance pipeline transportation has been tested successfully in the Dagang-Ji'nan-Zaozhuang Refined Product Pipeline and the Jining (Hebei-Jiangsu) Natural Gas Pipeline and will be used in the Eastern Route of Russia-China Natural Gas Pipeline.

## Frontier Research

In view of the world's growing demand for energy, fundamental research and technology pipeline in the frontier areas has been a priority for the company. In 2017, a series of research efforts in relation to recovery rates, refining processes and engineering techniques recorded positive results.

The reservoir-forming theories and evaluation technologies for ancient hydrocarbon system supported the strategic breakthroughs in Proterozoic exploration. The first-generation nano-displacement agent and heavy oil in-site upgrading catalyzer revealed a bright prospective for EOR in mature field and heavy oil production. New types of catalytic material and new catalytic cracking catalysts are going to widely applied in deep processing of inferior heavy oil. A preliminary solution has been found to reduce coking at high temperatures during the anaerobic process for producing olefins and aromatics from methane. The super-efficient techniques for acquiring and processing overlapping vibroseis data have been commercially used, greatly enhancing operation efficiency. The azimuthal electromagnetic wave resistivity LWD tool was proved effective in improving the recovery rate of subtle reservoirs. High-speed data transmission technology is expected to lead to a reform in measurement and control while drilling.

## Technological Cooperation

The company continues to deepen scientific and technological exchanges and cooperation with international oil companies, national oil companies, leading manufacturers, international academic organizations and domestic research institutes to promote the construction and development of high-end alliance of the company. By the end of 2017, the company has partnered with 17 companies and institutions at home and abroad, with important advances in international R&D activities: the pilot tests using new technologies for oily sludge treatment and recycling have shown positive outcomes and some of these technologies will be gradually deployed; a high-temperature, high-voltage azimuthal electromagnetic imaging logging tool has been developed, with state-of-the-art imaging capability and industry-leading detection depth, temperature and pressure indicators. The company is playing an increasingly important role as a powerhouse of international oil and gas cooperation, which in turn provides strong support to its exploration and development efforts in the Middle East and North Africa.

## S&T Awards and Intellectual Property Rights

In 2017, the company's five major S&T achievements won national awards. In particular, four research achievements won the second prize of the State Scientific and Technological Progress Award, i.e., "Commercial use of ASP flooding in boosting oil recovery", "Commercial use of FCC catalysts with high gasoline yields and low carbon emissions", "Key technologies for designing and manufacturing lightweight, heavy-duty pressure vessels" and "Key technologies and testing equipment for dynamic evaluation of coalbed methane reservoirs", and the "EOR technologies for diversion and multi-crack fracturing based on targeted temporary plugging in deep reservoirs" received the second prize of the State Technological Invention Award.

In 2017, the company submitted 5,050 patents applications at home and abroad, including 2,850 applications for invention patents, and won 4,879 patents, including 1,225 invention patents.



Patents applied

5,050



Patents granted

4,879


# Annual Business Overview




Highlighting market orientation and operational benefits, the company continued to optimize production organization and resource allocation, promote an integrated and coordinated approach to oil and gas production, refining, chemicals, marketing and trade activities, and improve internationalized business operation and service market competitiveness.

## Exploration and Production

In 2017, focused on economically producible reserves and effective output, our E&P sector achieved steady growth and better than expected operating results, through promoting technological innovation, scientifically organizing domestic exploration and production activities, furthering unconventional resource exploration and development, and deepening joint E&P in China.

 **659.45**  
Newly proven oil  
in place (Domestic) mmt

 **569.8**  
Newly proven gas  
in place (Domestic) bcm

### Exploration

With an emphasis on upgradeable and producible reserves, we reinforced preliminary and risk exploration, and rolled out fine exploration in mature areas, resulting in six 100 Mt grade uncompartmented oil zones and six 100bcm grade uncompartmented gas zones in six basins including Tarim, Sichuan and Qaidam. In 2017, we increased 659.45 million tons of proven oil in place and 569.8 billion cubic meters of proven gas in place in China, exceeding 1 billion tons of oil equivalent in total for the 11th consecutive year and sustaining a peak rate of reserve growth.

### Reserves and operating data (Domestic)

	2015	2016	2017
Newly proven oil in place (mmt)	728.17	649.29	659.45
Newly proven gas in place (bcm)	570.2	541.9	569.8
2D seismic (kilometers)	15,909	24,885	26,813
3D seismic (square kilometers)	9,095	8,764	7,843
Exploration wells	1,588	1,656	1,773
Preliminary prospecting wells	924	865	986
Appraisal wells	664	791	787

## Major Discoveries

### Oil exploration won new achievements

- Five oil-rich areas and two prolific blocks were discovered, and two 100 Mt grade oil zones, Huachi-Nanliang and Jiuyan, were identified in the Ordos Basin.
- Commercial oil and gas flows were obtained at multiple wells from upper Wuerhe Formation in the Junggar Basin, adding 200 million tons of probable and possible reserves and marking another strata series for reserve replacement in the Mahu area.
- Two 100 Mt grade oil zones were identified in the Songliao Basin, one of conventional oil reserves in the north and one of tight oil reserves in the south.
- A number of large-scale oil zones were discovered in Tarim, Qaidam and Bohai Bay Basins.

### Natural gas exploration achieved significant progress

- In the Tarim Basin, three new gas-bearing structures were discovered and proved at the Kuqa Depression, namely Keshen-24, Dabei-11, Bozi-3; high-yield oil and gas flows were obtained from the Tudong-2 well at the northern Kuqa tectonic belt, unveiling new opportunities to tap these Jurassic reservoirs.
- Three 100bcm grade gas zones were identified at Sulige South Block I, Shenmu and Lower Paleozoic of the eastern ancient uplift in the Ordos Basin.
- In the Sichuan Basin, high-yield gas flows were obtained from Xingtian-1 well of Leikoupo Formation in the southwestern part of the basin; new discoveries in Wei yuan and Zhaotong Blocks added 156.5 billion cubic meters of proved shale gas reserve.
- A new gas-bearing belt was discovered in the Altun Mountains in the Qaidam Basin.
- A number of exploration wells at Dinan uplift yielded commercial gas flows, opening up new areas of high-efficiency gas exploration in the Junggar Basin.



Crude production  
(Domestic)

102.54

mmt



Natural gas production  
(Domestic)

103.3

bcm

## Development and Production

Domestic oil and gas production saw balanced running in 2017. Thanks to heightened management and technological progress, the company was able to reduce costs and boost efficiency through overall planning, innovative production models and pad drilling. Throughout the year, our oil and gas production reached 184.82 million tons of oil equivalent.

### Crude Oil

In 2017, we stepped up production management in key oilfields and continued to optimize development program and output structure. We highlighted efficient capacity building, maintained a focus on reservoir fine description, waterflood optimization and redevelopment of mature fields, and major field experiment. In 2017, our newly installed capacity for crude oil was 11.61 million tons and the crude output was 102.54 million tons.

Daqing Oilfield continued to roll out tertiary recovery, achieving improved development efficiency and yielding 34 million tons of crude throughout the year. Changqing Oilfield achieved overall improvement in productivity and development efficiency through strengthening fine waterflood and deploying applicable technologies such as reservoir stimulation, horizontal well drilling and SRV fracturing. The yearly production of crude oil was 23.72 million tons. Liaohe Oilfield put over 1,300 new wells into production to boost production capacity. Daily output of new wells hit a ten-year high, thanks to wider adoption of SAGD technology.



## Annual output of Changqing exceeded 50 million tons of oil equivalent for the 5th consecutive year

Changqing Oilfield produced 53.16 million tons of oil equivalent in 2017, including 23.72 million tons of crude oil and 36.9 billion cubic meters of natural gas, marking the 5th consecutive year of achieving an annual output of above 50 million tons since 2013. Over the past five years, Changqing produced a total of 120 million tons of crude oil and 183.7 billion cubic meters of natural gas, i.e. 268 million tons of oil equivalent.

Changqing Oilfield, located in the Ordos Basin, became operational in 1970s, featuring hard-to-tap tight reservoirs with low permeability, low formation pressure and low hydrocarbon abundance. Over the years, we have developed a series of technologies and technical packages for large-scale highly efficient development of the tight reservoirs, making Changqing China's fastest-growing oilfield in recent 10 years in terms of reserves and production. Changqing yielded over 20 million tons of oil equivalent for the first time in 2007, and this figure soared to over 50 million tons in 2013. Now Changqing boasts China's largest oil and gas field.

In recent years, Changqing has been facing challenges caused by continuous decline in reservoir quality and increasing pressure of investment and cost control amidst lower oil prices. The oilfield has managed to address difficulties in stabilizing production by continuously adjusting and improving its exploration and development approaches. Leveraging an elaborate and efficient

approach to exploration, Changqing contributed 49% of CNPC's total newly proven oil in place in 2017. Annual crude output has been maintained at about 24 million tons for several years through deploying injection-extraction control and zonal injection, and improving tertiary recovery. The recovery factor of major gas fields has been enhanced, thanks to refined well management by optimizing intermittent production strategy and extensive use of dewatering gas recovery technology.

Changqing Oilfield's sustained and stable high production is underpinned by technological innovation. SRV fracturing of horizontal wells enabled efficient development of tight reservoirs. Pad drilling of large well group increased the average ROP by 50% and reduced the average drilling cycle by 27 days for horizontal wells. EOR techniques such as bridge-type concentric zonal water injection helped increase the recovery percentage of waterflooded reserves by 2.8%, reduce the rate of natural decline by 0.6% and increase the recovery by 5%. The use of a range of techniques, such as sidetracking of horizontal wells, stratum review and bridge-plug gas lift for dewatering gas recovery, increased the yearly gas output by more than 1.7 billion cubic meters. IT technology and tools are thoroughly utilized, building Changqing into a "digitalized oilfield" featuring unmanned workstations and intelligent production and management.



## Pilot Development

In 2017, we achieved positive progress in strategic succeeding technologies such as polymer-surfactant flooding, in situ combustion and CO<sub>2</sub> flooding, etc.

Polymer-surfactant flooding tests made significant headway in surfactants development, formulation optimization and study of emulsification mechanisms, as evidenced by an increase of approx. 19% in oil recovery at the Jin-16 Block of Liaohe Oilfield, marking the next-generation EOR technology after ASP flooding which has been proved successful in Daqing Oilfield. In-situ combustion tests at Du-66 Block of Liaohe Oilfield and Hongqian Block of Xinjiang Oilfield achieved favorable results in heavy oil recovery at mid-late development stage. Gas-assisted gravity drainage was tested at the Donghetang oilfield in the Tarim Basin, resulting in a drop of water cut growth rate from 4.5% to -0.4% and substantial rebound of production. CO<sub>2</sub> flooding, as an integrated process of CCS-EOR, is expected to enhance oil recovery by more than 10%.

## Natural Gas

In 2017, our four major gas zones, Changqing, Tarim, Southwest and Qinghai, reported sustained growth in natural gas output, thanks to flexible adjustment of production according to the production-sales dynamics and seasonal change as well as improvement in capacity building and production management pattern, featuring big well clusters, multiple layers, diversified well patterns, pad drilling and three dimensional development.

Throughout the year, CNPC built up new capacity of 13.4 billion cubic meters and produced 103.3 billion cubic meters, an increase of 5.2 billion cubic meters year-on-year.

Changqing Oilfield, China's largest natural gas production base and a reliable source for the Shaanxi-Beijing Gas Pipelines, yielded 36.9 billion cubic meters in 2017, over one-third of CNPC's total domestic production. Tarim Oilfield produced 25.3 billion cubic meters of natural gas in 2017, thanks to accelerated implementation of key projects in Kuqa area, such as high-efficiency development of natural gas, and efficient development of carbonate gas fields, and key capacity building programs in Keshen and Tazhong. Gas production of Southwest Oil and Gas field reached 21 billion cubic meters, standing above 20 billion cubic meters for the first time. Qinghai Oilfield managed to maintain steady production in mature blocks and ramp up production in new areas, as a result of synergy in enhanced gas recovery and capacity building measures. Progress was made in natural gas development in the Songliao Basin. Gas production grew steadily in the Daqing, Jilin and Huabei oilfields.



Gasi Oilfield in Qinghai Province

## Exploration and Development of Unconventional Oil and Gas

CNPC has made remarkable progress in the exploration and development of unconventional oil and gas in recent years. As a number of production blocks and pilot development bases put into operation, our unconventional oil and gas output continued to grow. The year 2017 saw new achievements in exploration of coalbed methane, shale oil/shale gas and tight oil/tight gas, accelerated capacity building and wider application of innovative key and supporting technologies.

### Shale Gas

Leveraging an integrated approach to exploration and development, we produced 3 billion cubic meters of shale gas in 2017, with production capacity expanding as planned. Our shale gas exploration activities in Edong area of Shaanxi province led to new breakthroughs, showing an attractive outlook in that area. Shale gas E&P in the southern part of the Sichuan Basin continued to roll out, with newly added proven reserve of 156.5 billion cubic meters. The demonstration projects in Changning-Weiyuan and Zhaotong speeded up, with a substantial increase in both premium reservoir discovery rate and output per well. The bottleneck projects of Ning-201 dehydration unit, link line of Ning201-209 blocks and Ning-209 central station became operational. A 110km-long shale gas trunk line became operational, which serves as an export channel to deliver a maximum of 4 billion cubic meters of shale gas annually from Changning Block in Sichuan and Zhaotong Block in Yunnan, playing a significant role in ensuring the supply of clean energy in Sichuan and Chongqing. Neijiang-Dazu and Rongchangbei shale gas projects made positive progress.

### CBM

Significant headway was made in CBM exploration and development with focus continuously on the Qinshui Basin in Shanxi and Edong Gas Field in Shaanxi, and expanding new areas. In Xinjiang, exploration of CBM made tangible progress. Tectonic pattern and coalbed distribution characteristics of the Houxia Block were basically clear; geological understanding of the Hoxtolgay Block was cleared upon the completion of two exploration wells; the Wucaiwan region showed a potential reserve of 1 trillion cubic meters, with five CBM-bearing areas being identified. A range of measures for revitalizing mature fields were effective, as evidenced by high production maintained at Baode Block and output decline controlled at Hancheng Block. The yield and efficiency of high-coal-rank wells in the Qinshui Basin were enhanced and the low-coal-rank beds in Changzhi, Linfen and Erlan areas were developed efficiently, thanks to innovations in CBM development theories and drainage and production techniques. Capacity building and pilot production activities were implemented steadily in new blocks, including Mabidong, Daning-Jixian, and Jiernalangtu. Joint projects

went on smoothly in Shilouxi, Sanjiao, Chengzhuang. We produced 1.79 billion cubic meters of coalbed methane in 2017.

### Tight Oil/ Gas

Large-scale development of tight oil and gas continued in the Ordos, Sichuan, Songliao, Qaidam and Santanghu basins. At Changqing Oilfield, main technologies for developing I-II+III strata have taken shape, and three horizontal well SRV fracturing test blocks and three pilot development areas for tight oil production have been in place and saw remarkable increase in the per-well output. At Xinjiang Oilfield, profitable development was promoted further in the Mahu Sag and progress was made in production capacity evaluation in the Jimsar Sag. At Daqing Oilfield, 10 of its 14 tight oil test blocks were completed and went on stream, capable of producing 200,000 tons per year. In Shanxi Province, tight gas exploration activities reported major breakthroughs at the Daning-Jixian Block, and high yield gas flows were obtained from a number of test wells in the Hedong and Hexi areas, especially DJ 5-6 Well block had a daily output above 1.7 million cubic meters. Additionally, we strengthened application of CO<sub>2</sub>/sand dry fracturing and large-displacement fissure control SRV fracturing, resulting in increased tight oil/gas production and profits.

## Joint E&P in China

In 2017, we continued to work with our partners to explore and develop oil and gas resources in China, with a focus on low-permeability reservoirs, heavy oil, shallow-water reservoirs, sour gas, high-temperature high-pressure gas reservoirs, coalbed methane and shale gas.

By the end of 2017, we had 35 joint E&P agreements in execution, producing 2.49 million tons of crude oil and 9.3 billion cubic meters of natural gas, totaling 9.86 million tons of oil equivalent.

### 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. In 2017, the project continued to maintain stable and safe operation, producing 480,000 tons of crude oil. Three new wells were completed and two yielded more than 300 tons per day during well testing.

## Changbei Natural Gas Project

Changbei block covers an area of 1,691 square kilometers in the Ordos Basin and operates under an agreement with Shell Group. In 2017, the project produced 3.7 billion cubic meters of natural gas, sustaining a stable production of over 3.3 billion cubic meters for nine consecutive years, and delivered 3.6 billion cubic meters to market, with its commercial gas sales totaling 40.8 billion cubic meters on a cumulative basis by the end of 2017. The phase II project has made important progress and is expected to deliver natural gas in wintertime in 2018.

## South Sulige Natural Gas Project

Located in the Ordos Basin, the South Sulige block covers an area of 2,392 square kilometers and operates under an agreement with French energy company Total S.A. In 2017, the project's natural gas production and commercial gas sales amounted to 2 billion and 1.9 billion cubic meters respectively, with a daily output soaring up to more than 6.4 million cubic meters.

## Chuangdongbei Natural Gas Project

Located in the Sichuan Basin, the project covers an area of 876 square kilometers and operates under an agreement with Chevron. In 2017, the project's natural gas production grew steadily, delivering 1.8 billion cubic meters of purified gas.

## Chuanzhong Natural Gas Project

Located in the Sichuan Basin, the project covers an area of 528 square kilometers and operates under an agreement with American EOG Resources. In 2017, the project produced 230 million cubic meters of natural gas, with daily output doubled from 0.5 million cubic meters at the beginning of year to 1 million cubic meters at the year end, thanks to continuous technological optimization and improvement. Meanwhile, measures were taken to streamline management and control drilling investment and lifting cost, facilitating the low-cost development of the project.

## Neijiang-Dazu and Rongchangbei Shale Gas Projects

The projects cover an area of 1,477 and 990 square kilometers in the Sichuan Basin respectively. BP is our partner and CNPC acts as the operator during the exploration period for the first time. In 2017, the two projects completed a total of 100 square kilometers of 3D seismic data processing and interpretation. Four exploration wells spudded successively and the first horizontal well was completed at the year end, with the reservoir discovery rate of 100% and maximum drilling depth of 3,500 meters.

In addition, the Da'an project in cooperation with MI Energy Corporation and Global Oil Corporation (GOC), Hainan-Yuedong project in cooperation with Tincy Group Energy and Zhoushisuan project with Hong Kong-based

Central Asia Petroleum achieved better development efficiency, dropping natural decline rate and water cut growth rate of mature wells and stable formation pressure, thanks to technical solutions such as fracture-network fracturing, waterflooding optimization and huff-and-puff steam stimulation. Joint CBM projects saw steady progress, with Sanjiao project in cooperation with Orion Energy and Chengzhuang project with Greka Energy producing 80 million and 90 million cubic meters of coalbed methane in 2017 respectively.



Crude output from  
joint E&P projects

2.49  
mmt



Natural gas output from  
joint E&P projects

9.3  
bcm



## Natural Gas and Pipelines

After separating its pipeline and sales units, the company's natural gas and pipeline business gained new momentum in 2017, with pipeline operation optimized, pipeline construction projects implemented smoothly and a double-digit increase in gas sales volume.

### Pipeline Network Operation

In 2017, we ensured safe, stable and efficient operation of our oil and gas pipeline network by improving resource allocation, optimizing centralized control and promoting an "Intelligent Pipeline" and "Smart Network" approach. A total of 22 compressor units were put into operation along the Third West-East Gas Pipeline, Zhongxian-Wuhan Pipeline and Shaanxi-Beijing Pipeline, etc., boosting gas delivery capacity significantly. In particular, the gas pipelining capacity in western China increased by 30% from the previous year. In 2017, the company's long-distance pipelines delivered more than 100 billion cubic meters of natural gas for the first time.

By the end of 2017, CNPC-operated oil and gas pipelines in China totaled 85,582 kilometers, including 20,359 kilometers for crude oil, 53,834 kilometers for natural gas and 11,389 kilometers for refined products, 68.9%, 76.2% and 43.2% of China's total respectively.

### New Storage and Transportation Facilities

The company's pipeline construction projects advanced steadily, adding 4,806 kilometers to the existing domestic network. The Zhongwei-Jingbian connecting line of the Third West-East Gas Pipeline, Fourth Shaanxi-Beijing Gas Pipeline, and Yunnan Refined Products Pipeline went on stream. The upgrading of the pipeline system in northeastern China was completed. The Jinzhou-Zhengzhou Refined Products Pipeline reached the final stage of construction.

#### Zhongwei-Jingbian Connecting Line of the Third West-East Gas Pipeline

The Zhongwei-Jingbian connecting line of the Third West-East Gas Pipeline runs from Zhongwei in Ningxia to Jingbian in Shaanxi, in parallel to the Zhongwei-Jingbian Line of the Second West-East Gas Pipeline, with a total length of 377 kilometers. Designed with a diameter of 1,219mm and operating pressure of 12 MPa, the pipeline has a capacity of 30 billion cubic meters per year.

The pipeline began to be constructed on May 21, 2016, and became operational on November 27, 2017, providing another important route linking the northwestern to the northern China and bolstering effectively the gas distribution capability in North China.



Crude pipeline mileage  
in the nation's total

68.9%



Natural gas pipeline mileage  
in the nation's total

76.2%

#### Fourth Shaanxi-Beijing Gas Pipeline

The Fourth Shaanxi-Beijing Gas Pipeline, comprising of one trunk and one branch, runs from Jingbian in Shaanxi through Inner Mongolia and Hebei to Beijing with a total length of 1,098 kilometers. Designed with a diameter of 1,219mm and operating pressure of 10-12 MPa, the pipeline has a capacity of 25 billion cubic meters per year.

The pipeline started to be constructed on July 30, 2016 and became operational on November 27, 2017 to meet the growing gas demand in North China, facilitate the transformation of the energy mix in the Beijing-Tianjin-Hebei Metropolitan Region and help improve air quality.

#### Yunnan Refined Products Pipeline

The pipeline, comprising of three trunks and one branch, has a total length of 950 kilometers and an annual delivery capacity of 7.21 million tons.

Construction of the pipeline started on May 18, 2012. The three trunks were put into operation on December 22, 2017 to facilitate the transportation of refined products in Yunnan and expand the company's refined products distribution network in southwestern China. The Kunming Branch has completed the construction for changing route and is expected to become operational in 2018.

## Natural Gas Sales

In 2017, the central government explicitly demanded an increase of natural gas share in the primary energy consumption and identified natural gas as one of the main sources of clean energy. As gas-fired power generation continued to gain traction, local governments promoted the coal to natural gas switch, and the "2+26 Cities" Clean Winter Heating Initiative was implemented actively in Beijing, Tianjin and Hebei etc., the demand for natural gas soared. The company seized the opportunity to work with our clients in optimizing sales planning and resources allocation and managed to increase the supply of pipeline gas and imported LNG in response to market demand and winter heating needs. Our gas sales rose significantly to 151.8 billion cubic meters in 2017, up 15.5% year-on-year.

We continued to develop the market and expand our marketing network. By the end of 2017, our gas distribution network covered 31 provinces, municipalities, autonomous regions, and special administrative regions, maintaining predominance in the northern, southwestern, western, central and northeastern parts of China and enlarged market size in the eastern and southern regions. We secured a total of 93 new clients adding gas sales of 2.46 billion cubic meters. In particular, we began to deliver natural gas to 12 gas-fired generators including Jiangsu CHD Yangzhou Power Plant and CDT Jiangyan Gas-Fired Cogeneration Project.

In 2017, our end-user markets of natural gas grew rapidly, registering gas sales of 23 billion cubic meters, up 5.26 billion cubic meters or 29.6% year-on-year. In particular, the sales of city gas, CNG and LNG reached 15.92 billion, 2.77 billion and 4.34 billion cubic meters respectively. By the end of 2017, we had 543 CNG stations and 615 LNG stations in operation, among the top in China.

## Liquefied Natural Gas (LNG)

In 2017, our three LNG terminals in Jiangsu, Dalian and Tangshan offloaded a total of 10.42 million tons of LNG, up 84.3% year-on-year, playing an increasingly important role in peak shaving. Our 24 LNG plants in Hubei, Sichuan, Shaanxi and other provinces are capable of liquefying 22.86 million cubic meters of natural gas per day, with annual LNG capacity accounting for about one-fifth of China's total.



The Fourth Shaanxi-Beijing Gas Pipeline under construction

## Refining and Chemicals

The company continued its good performance in refining and chemicals sector in 2017 by pushing ahead with a range of measures for business transformation and upgrading, production scheduling and optimization of processing plans and product portfolio. Production activities went on in a steady and balanced manner throughout the year and contributed significantly to the company's overall growth in profits.

We continued to optimize the allocation of resources in favor of revenue-generating refining facilities. By reasonably matching primary and secondary processing loads, ours integrated refining-petrochemical plants and efficient chemicals facilities operated at high utilization rate. In 2017, we processed 152.45 million tons of crude and produced 103.51 million tons of refined products and 5.76 million tons of ethylene domestically.

We continued to optimize product portfolio with output of high-value refined products accounting for more than 50%. High-grade gasoline production came close to 9 million tons; jet fuel production exceeded 10 million tons; the production of heavy-components oil products decreased by 225,000 tons; and the diesel/gasoline ratio was further reduced.



Crude runs (Domestic) mmt

152.45



Refined products output (Domestic) mmt

103.51

### Refining and chemicals operating data (Domestic)

	2015	2016	2017
Crude runs (mmt)	151.32	147.09	152.45
Utilization rate of refining units (%)	84.5	80.9	80.8
Refined products output (mmt)	103.69	99.32	103.51
Gasoline	36.47	33.97	40.98
Kerosene	8.34	9.32	10.18
Diesel	58.88	52.03	52.35
Lub oil output (mmt)	1.21	1.16	1.64
Ethylene output (mmt)	5.03	5.59	5.76
Synthetic resin output (mmt)	8.32	9.20	9.40
Synthetic fiber output (mmt)	0.07	0.06	0.06
Synthetic rubber output (mmt)	0.71	0.76	0.81
Urea output (mmt)	2.57	1.90	1.44
Synthetic ammonia output (mmt)	1.85	1.53	1.36



Sichuan Petrochemical

## Construction and Operation of Large Refining & Petrochemical Bases

In 2017, to achieve stable and efficient operation, we improved production management and reasonably arranged load of crude processing to minimize production fluctuation and improve long-term operation. Overall, 99.57% of our refining and petrochemical facilities operated at steady state, and 20 technical and economic indicators were improved significantly.

Major refining and petrochemical construction projects made headway smoothly. The 13 Mt/a refining facility at Yunnan Petrochemical was successfully put into commissioning and remained steady running for four months by the end of the year. Upgrading and expanding projects proceeded smoothly toward the tubing works at Huabei Petrochemical and Liaoyang Petrochemical. The integration project at Guangdong Petrochemical, reconfiguration project at Daqing Petrochemical and ethane, LNG and light hydrocarbon projects at Changqing and Tarim Oilfields advanced as planned.

## Upgrading of Refined Products

Refined products upgrading schemes gathered pace in a bid to improve air quality in polluted regions, especially Beijing, Tianjin and Hebei. According to the national regulations, i.e. motor fuels should meet National V Standard, starting from January 1, 2017 and motor fuels sold in "2+26 Cities" should meet National VI Standard before the end of September 2017, we took the initiative to boost output of high-grade gasoline and diesel by adjusting production plans, replacing and upgrading refining facilities.

## Development of New Chemicals

In response to changes in the market, we sped up R&D efforts of new chemical products, delivering 70 new brands of polyethylene, polypropylene and synthetic rubber and other products in 2017, with a total production of 1.14 million tons. Direct sales to key customers expanded, with the rate of direct sales increasing by 3 percentage points year-on-year. High-value products saw an 18% increase in sales volume. In total, we sold 27.98 million tons of chemical products throughout the year. A number of new products were successfully launched, including Dushanzi Petrochemical's metallocene linear polyethylene, Sichuan Petrochemical's low-melt anti-shock polypropylene, and Daqing Petrochemical's PERT pipe materials.

## Marketing and Sales

In 2017, we took a lean marketing approach to bolster profitability by upgrading sales network, deepening "Internet + Marketing" and promoting an integrated marketing framework for refined products, fuel cards, non-fuel business and lubricants.

### Sales of Refined Products

The year 2017 saw a sustained refined products glut in the overcrowded domestic market. We sold 114.16 million tons of refined products, up 1% year-on-year, by optimizing resource allocation, linking production and marketing closely, expanding gasoline sales and stabilizing diesel sales.

### Marketing Network

We continued to make headway in expanding and optimizing marketing network to enhance marketing capacity. In 2017, 463 of our newly built 623 service stations were completed and put into operation, adding 3.79 million tons to our retailing capacity. By the end of 2017, we had 21,399 service stations in operation across the country.

Under an integrated marketing framework for refined products, fuel cards, non-fuel business and lubricants, we further broadened the service offerings of our service stations with a focus on fuel card, and promoted cross-sector cooperation and joint marketing efforts. Centered on the promotional theme of "Four Seasons" and various brand campaigns,

we issued 22,420,000 Kunlun fuel cards and various products cards in 2017. Meanwhile, our online customer base and business volume expanded rapidly through our WeChat Official Account, third-party payment and retail APPs. Joint campaigns with SAIC Motor, China Bank of Communications, Alipay, JD.com and other partners continued to gain momentum. The "3+1" model (managed services, accountability, asset leasing + brand franchising) was adopted to address the issue of low-performing gas stations in terms of sales and profitability.

### Non-fuel Business

Non-fuel business, with convenience stores as the carrier, saw steady growth in both sales and earnings. In 2017, we newly opened 1,438 "uSmile" stores, bringing the total number to 19,338. Earnings of our "uSmile" stores were approx. 30% more than the previous year. There was a rapid growth in a range of activities, such as own-brand products, kitchen engineering, in-app purchase platform and auto service network, etc. Meanwhile, we explored business opportunities in fertilizer, advertising and fast food. We partnered with the Charoen Pokphand Group to launch the fast food brand "uSmile Chia Tai" and opened 30 new outlets. In 2017, our non-fuel business generated RMB 18.6 billion in revenue, up 29.2% year-on-year.

### Sales of Lube Oil

By integrating our channel resources, leveraging on technical and service strengths and targeted marketing, we sold 1.43 million tons of lubricants in 2017, an increase of 260,000 tons. Sales of high-value products such as automotive lubricants, automotive fluids and marine lubricants showed noticeable growth in both absolute and relative terms. In particular, automotive fluid sales soared up to 120,000 tons, up 188% year-on-year.

### Sales of Miscellaneous Refined Products

The sales of our miscellaneous refined products recorded a historical high of 33.90 million tons in 2017, an increase of 540,000 tons from the previous year. We sold 8.53 million tons of asphalt, 1.41 million tons more than the previous year and taking a 28% share in the domestic market, number one among the players. And the sales to end-users accounted for 59% of the total, up 42% year-on-year, marking a record high.



uSmile convenience store in service station

## Overseas Oil and Gas Operations

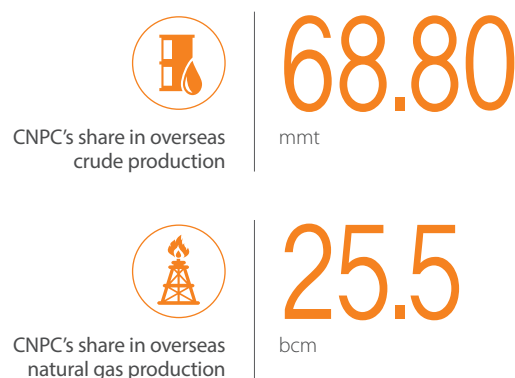
Leveraging the opportunities presented by the Belt and Road Initiative, our overseas oil and gas operations expanded steadily in 2017 and saw a number of new cooperation agreements signed. Our overseas investments were further optimized, bringing our international presence to the next level. Major discoveries were announced in main overseas exploration areas. Many key projects became operational. So far, we have oil and gas investments in 38 countries worldwide.

### Exploration

Pursuing a low cost strategy, our overseas exploration activities in 2017 proved very fruitful as we took steps to curb high-risk investment-intensive exploration, focus on readily producible quality reserves and guide exploration funds to key areas and key projects. These activities resulted in newly added recoverable reserves of 90.93 million tons of oil equivalent, including 62.80 million tons of crude oil and 35.3 billion cubic meters of natural gas.

Major discoveries in key areas led to greater than expected total amount of newly proved reserves. In Brazil, a world-class uncompartmented oil prospect was confirmed by deepwater exploration in Libra, identifying 1.56 billion tons of oil in place and 500 million tons of recoverable reserves in the Northwest. Extended well testing resulted in first oil. In Turkmenistan, exploration activities at the right bank of Amu Darya identified large-scale replacement areas and new breakthroughs were achieved in the central and eastern tectonic belts.

A number of high-quality, readily producible reserves were identified through progressive exploration. High yield oil flows were obtained from exploration wells from buried-hill basement and new discoveries were made in the P Formation in the Bongor Basin of Chad. Three new reservoirs were discovered in the Agadem oilfield in Niger. Exploration activities in the Andes Block T in Ecuador proved fruitful. Progressive exploration at the Daleel Oilfield in Oman led to an increase in reserves. High yield and oil enriched reservoirs were discovered at Block 6 in the Sufyan sag in Sudan. In Kazakhstan, detailed prospecting resulted in a number of discoveries in the South Turgai Basin and significant progress was made at the Precaspian Central Block and presalt of the Zhanazhol Oilfield. In Iraq, deep-zone exploration resulted in new breakthroughs in the Halfaya Oilfield.



### Production

In 2017, our overseas projects achieved steady growth in oil and gas production by aligning workload schedules with oil price trend and development benefits, optimizing waterflooding measures at matured fields, bringing in new wells and speeding up key projects. The full-year operating production reached 162.74 million tons of oil equivalent, of which equity production was 89.08 million tons, an increase of 17.2% year-on-year. The operating and equity production of crude oil were 136.18 million tons and 68.8 million tons respectively; and those of natural gas were 33.3 billion and 25.5 billion cubic meters respectively.

**Central Asia-Russia:** The Phase I of Yamal Project, which is the world's biggest Arctic LNG project and has CNPC's full participation in the operation, was completed and put into production with the first shipment launched successfully. In Kazakhstan, Aktobe project won the bids of two exploratory blocks of Teresken I and II, with a total area of approx. 4,500 square kilometers. In Turkmenistan, the Amu Darya natural gas project remained highly productive by bringing in new wells and well stimulation; four compressor units became operational at the Saman-Depe Gas Field as part of the first phase of the EGR Project; the second phase was under construction and expected to enhance the recovery ratio significantly after completion. In Uzbekistan, the first phase of Karakul Gas Field Project, including three fields, went on stream, with a designed capacity to deliver 1 billion cubic meters annually.

**Latin America:** CNPC Latin America's oil and gas operations remained safe and steady thanks to lean management, deployment of new wells and implementation of stimulation measures. The Libra Project in Brazil started production in November 2017, generating a return alongside investment. The consortium comprised of CNPC, Petrobras and BP won the Peroba exploration block in presalt, deepsea of Brazil, marking another huge deepwater prospect of CNPC following the Libra Project. In Venezuela, the construction of key projects advanced, with new progress achieved in surface engineering of the Phase I 165,000 bbl/d capacity expansion of the MPE3 project, thermal recovery pilot tests at the Junin-4 project, and the 15,000 bbl/d rapid ramp-up for the Zumano Project.

**Middle East:** CNPC signed a stock purchase agreement with Abu Dhabi National Oil Company to acquire an 8% stake in ADCO onshore concession. The Phase I of Abu Dhabi Al-Yasat project proceeded smoothly and is expected to achieve first oil in the first half of 2018. The Rumaila and West Qurna-1 fields in Iraq saw effective waterflooding and an improvement in production capacity and a continued drop in natural decline through injection-production well spacing optimization and balanced injection. The Phase III of Halfaya Project went on stream ahead of schedule, delivering crude oil at a rate of 250,000 bbl/d. The Rumaila power plant project began to send electricity to local grid. In Iran, the MIS Project restored operation. The consortium by CNPC, Total and a local company signed an agreement with National Iranian Oil Company to develop the South Pars Phase 11 (SP 11) Gas Field.

**Africa:** CNPC International Nile operated its oilfields in Sudan and South Sudan efficiently by stepping up measures for production management, bringing in new wells and promoting the use of low-cost, proven EOR techniques. In South Sudan, oil and gas production grew steadily in Block 3/7 as a result of dynamic reservoir assessment, optimized well siting and improved stimulation programs. De-bottleneck projects were completed with high quality, boosting fluid handling capacity to 29 Mt/a. New techniques such as gas injection, gas lift and MFCA viscosity reducer were adopted in Block 1/2/4 together with cost-saving drilling solutions. At Block 6 in Sudan, thermal recovery of heavy oil contributed 72% to the total output of FNE Oilfield. In Mozambique, the integrated ultra-deepwater gas E&P and LNG project in Coral Gas Field of Block 4 in the Rovuma Basin was launched. In Chad, the first Daniela CPF train for the Phase 2.2 oilfield surface engineering project went on stream successfully.

**Asia-Pacific:** In Indonesia, we kept production on schedule by bringing in new wells, tapping potential of old wells and optimizing production processes. In Canada, gas condensate development began at the Duvernay tight oil and gas field, thanks to continuous optimization of drilling and completion design and investment; the Phase I MacKay River oil sands project saw 42 pairs of horizontal wells in production using steam-assisted gravity drainage (SAGD), with daily production peaking at 11,000 bbl. In Australia, the Arrow PTL project saw the fuel gas system for compressors upgraded and put into operation.

## Pipeline Construction and Operation

In 2017, we maintained safe and stable operation of the long-distance cross-border pipelines, including the Central Asia-China Gas Pipeline, Myanmar-China Gas Pipeline, Russia-China Crude Pipeline and Kazakhstan-China Crude Pipeline. By the end of 2017, CNPC operated 16,500 kilometers of overseas oil and gas pipelines, including 8,597 kilometers for crude oil and 7,903 kilometers for natural gas, which transported 33.47 million tons of crude and 47.6 billion cubic meters of gas throughout the year.

Key overseas pipeline projects advanced steadily. The Myanmar-China Crude Pipeline and Second Russia-China Crude Pipeline became operational. The north section of the Eastern Route of Russia-China Gas Pipeline fully started construction. The Line D of Central Asia-China Gas Pipeline was kicked off. Two compressor stations along the Phase II Kazakhstan-China Gas Pipeline (the South Kazakhstan section) became operational, boosting the pipeline capacity to 10bcm/year. The Grand Rapids pipeline in Canada started oil transportation, delivering approx. 100,000 tons of crude oil per month.

## Myanmar-China Crude Pipeline

The Myanmar-China Crude Pipeline starts at Maday Island in Kyaukphyu in Myanmar, enters China at the border city of Ruili in Yunnan province and terminates at Yunnan Petrochemical in Kunming. The pipeline has a total length of 1,420 kilometers, including 771 kilometers in Myanmar and 649 kilometers in China, with a designed annual capacity of 13 million tons. The pipeline kicked off in June 2010 and became operational on April 10, 2017. Crossing big rivers for many times along the route, the pipeline construction is faced with tough operation and control challenges such as height difference, high operating pressure and multi U turns. In particular, the difference of height is up to 1,500 meters when crossing the Nujiang River, making the pipeline one of the most complicated liquid pipelines in the world. As China's fourth energy import channel following the Central Asia-China Pipelines, Russia-China Crude Pipeline and Maritime Route, the Myanmar-China Oil and Gas Pipelines represent an important achievement of energy cooperation between the two countries.

## Second Russia-China Crude Pipeline

The Second Russia-China Crude Pipeline starts at Mohe in Heilongjiang, crosses Inner Mongolia, and ends at Daqing in Heilongjiang. In parallel to the existing Russia-China Crude Pipeline, it has a total length of 932 kilometers, pipe diameter of 813mm, designed pressure of 9.5-11.5 MPa, and designed annual capacity of 15 million tons. The pipeline started to be constructed on July 20, 2016 and became commercially operational on January 1, 2018. Under the agreement between CNPC and Rosneft on the increase of oil supplies, Rosneft will deliver another 15 million tons of crude oil to China every year through the Second Russia-China Crude Pipeline.



Oil tanks under construction in Maday Island, Myanmar

## Refining and Chemicals

In 2017, our overseas refineries operated in a safe and steady manner and processed 45.78 million tons of crude throughout the year. In Kazakhstan, the Phase I upgrading project at the Shymkent Refinery went on stream. The refinery's sour oil processing capacity was significantly improved and it was able to produce vehicle fuels in compliance with the Euro IV and Euro V standards; the Phase II project was halfway through the construction plan and expected to start production in the second half of 2018. In Sudan, the takeover in the Khartoum Refinery was completed smoothly and a technical service agreement was signed. The N'Djamena Refinery in Chad and Zinder Refinery in Niger completed production plans successfully, and actively explored markets.

## Project Cooperation and Development

In 2017, CNPC's overseas oil and gas cooperation continued to deepen and expand. The cooperation between CNPC and many countries, especially those along the Belt and Road routes, was fruitful and a range of cooperation agreements were signed with the governments and energy companies of Russia, Kazakhstan, Uzbekistan, Azerbaijan, Mozambique, and Abu Dhabi, etc.

In Central Asia-Russia, CNPC and Gazprom signed a number of agreements, including the supplementary agreement to gas sales and purchase contract via the Eastern Route, the MOU on strategic cooperation between CNPC, CCCC, Gazprom and Russian Highways in using LNG as vehicle fuel for trunk road transport, the MOU between CNPC, Gazprom and China Huaneng Group on cooperation in gas-fired power generation. In addition, CNPC signed an agreement with Rosneft on establishing a joint coordinating committee, and an agreement with Novatek on strategic cooperation.

CNPC and KazMunayGas signed an agreement on promoting the renovation of the Shymkent Refinery and an MOU on the export of Kazakhstan gas to China. CNPC and the Energy Ministry of Kazakhstan signed an MOU on the extension of petroleum contracts.

CNPC and Uzbekneftegaz signed a supplementary agreement to the sales and purchase contract between the two companies, an MOU on underground gas storages in Gazli, and an agreement between CNPC, Bank of China and Uzbekneftegaz on financing loan for New Silk Road projects.

CNPC and the State Oil Company of the Azerbaijan (SOCAR) signed an MOU between CNPC, China Development Bank and SOCAR on cooperation in investment and financing for natural gas chemical projects in Azerbaijan, an MOU on oil and gas cooperation, and the FEED/OBCE contract for natural gas chemical projects in Azerbaijan.

In the Middle East, CNPC and Abu Dhabi National Oil Company (ADNOC) signed an agreement on equity purchase of Abu Dhabi's ADCO onshore oil concession. Under this agreement, CNPC is awarded an 8% interest in the project for a contract term of 40 years and an 8% stake in Abu Dhabi Company for Onshore Petroleum Operations (ADCO). In addition, the two sides signed an MOU on strengthening cooperation in oil and gas blocks, gas field development, and construction of oil storage facilities. CNPC, Total and an Iranian company formed a consortium and signed an agreement for gas development and production of Phase 11 of South Pars (SP11) with National Iranian Oil Company (NIOC).

In Africa, we deepened cooperation with ENH Mozambique. The two sides signed a range of cooperation agreements, covering oil and gas exploration and development, oilfield services, engineering construction, refining and chemicals, and logistics.

In Asia-Pacific, CNPC signed an agreement with Myanmar on crude oil pipeline transportation, and an MOU with Pertamina on deepening oil and gas cooperation outside China and Indonesia.

In addition, CNPC and Eni signed an agreement on cooperation in E&P, natural gas and LNG, trade and logistics, refining and chemicals areas. CNPC and Cheniere Energy signed an MOU on long-term LNG sales and purchase, to strengthen LNG cooperation in the Gulf of Mexico and facilitate long-term sales and purchase of LNG between the two countries.



Shymkent Refinery in Kazakhstan

## International Trade

In 2017, we continued to boost international trade and overseas futures business in crude oil, refined products, natural gas and petrochemicals while bolstering our three oil and gas operation hubs in Asia, Europe and the Americas. Our overseas marketing network grew steadily to reach more than 80 countries and regions around the globe, including basically all of the world's major oil and gas producers and consumers. In 2017, we reported trading volume of 470 million tons, worth USD 184.4 billion, up 4.4% and 30.6% year-on-year respectively.

We continued to optimize crude oil imports and sales of overseas equity oil by leveraging our trade resources globally. We pushed ahead with importing crude oil from western Kazakhstan and Russia to reduce the procurement costs of our refineries. We ensured the timely supply of crude oil to Yunnan Petrochemical for the start of production through the Myanmar-China Oil Pipeline. We promoted the sales of overseas equity oil and made positive progress in the Americas. We completed blended oil sales for the first time in Canada and moved forward with the presales of equity oil of the Libra Project in Brazil and the import of equity oil from the Americas.

We adapted agilely to adjustments in refined products export plans and traded on the Platts benchmark oil trading window, exporting 12.63 million tons of refined products in 2017. While working on traditional markets such as Myanmar, Sri Lanka, Vietnam, Indonesia, Malaysia, the Philippines and Pakistan, we made significant headway in exploring the Australian and Japanese markets.

Our natural gas business saw advances in the negotiations on major projects between Central Asia-China, Russia-China and Myanmar-China, and LNG import. We signed a one-year sales and purchase agreement and the long-term cross-border pipeline transmission agreement with Kazakh counterpart, and an MOU on long-term LNG sales and purchase with Cheniere Energy. In view of soaring gas demand during the winter, we bought LNG on the spot markets to increase the domestic supply.

As for chemicals, we actively developed overseas resource markets and increased methanol and ethane imports to provide "lighter" feedstock for domestic petrochemical enterprises. Leveraging basis trading, we expanded PTA spot sales and yielded good results.

Our marine shipping business gained relatively good returns by optimizing fleet routes and cargo allocation, despite the sagging freight rates. We expanded time chartering of LNG carriers and very large crude carriers (VLCC) and optimized structure of fleet capacity to enable coordinated development in both scale and quality. Furthermore, we stepped up vessel inspection and anti-piracy security measures to ensure safe transportation.

## Overseas Operation Hubs

Our three overseas operation hubs in Singapore, London and New York bring together trade, processing, transportation and warehousing capabilities to improve our capabilities in global resource optimization. In 2017, we continued to expand the marketing network and bolstered the three overseas operation hubs, with an emphasis on the Belt and Road markets.

The Singapore hub streamlined its trade and logistics processes and accomplished sales of equity oil from UAE, Iraq and Iran. As to marketing of refined products, our market share climbed to above 14% in Australia and 32% and 45% in Myanmar and Sri Lanka respectively. As the largest jet fuel supplier of the Hong Kong Airport, we took a 43% share in Hong Kong's retail market in 2017. For the first time, gasoline and aromatics from our joint venture refineries in Europe were sold to the Middle East and Singapore. Refined products, chemicals and LNG saw a growing market in Australia, Japan and the Taiwan region. Our investment project advanced smoothly. The clean gasoline and cogeneration project at Singapore Refining Company went on stream, the oil storage tanks in Myanmar were duly registered, and the sales network building projects in the Philippines and Australia progressed well.

The London hub managed to sell equity oil from Kazakhstan, Sudan and Chad to the Mediterranean region. We were awarded refined product sales contracts in the Baltic region, Lithuania and Ireland, enabling a bigger presence in Europe. Our joint venture refineries in UK and France remained steady with continuous improvement in profitability.

The New York hub introduced innovative trade mode, accomplishing the financing and oil sales for the MPE3 project in Venezuela. The hub successfully sold refined products from our refineries in the Americas to North America, South America and Europe, expanding its market share in these regions. In Brazil, the retail network project progressed well and we reached agreement with Total (Brazil) on the key terms for buying stake in its refined products retail network. When finalized, this deal will give CNPC a stake in nearly 2,000 filling stations selling gasoline, diesel and ethanol fuel in Brazil.

## Service Business

In 2017, by leveraging our advantages in integrated operation and specialized services, our service business continued to expand in terms of market share and operation performance. Competitiveness and profitability were brought to the next level as we actively explored market opportunities in oilfield services, engineering construction, equipment manufacturing, and financial services.

### Oilfield Services

In 2017, we saw a remarkable increase in the workload completed, market expansion at home and abroad and a growing market share, driven by streamlined business processes, new business models, buoyant EPC activities, innovative technologies and enhanced productivity and quality. By the end of 2017, we had 5,007 crews providing services in geophysical prospecting, drilling, well logging, mud logging, downhole operation and offshore engineering in 51 countries around the world.

### Geophysical Prospecting

In 2017, we deployed 150 seismic crews (71 2D and 79 3D) in 289 projects, acquiring data on 154,904 kilometers of 2D lines and 57,182 square kilometers of 3D profiles. With 100% acceptance for both on-site data acquisition profiles and final data processing profiles, the recorded shots per day of domestic onshore 3D surveys increased by 4.3%.

In view of the technology trends and the requirements in both domestic and international exploration markets, we stepped up R&D of core software and equipment and promoted the extensive use of our proprietary devices and packaged technologies, including the GeoEast and KLSeis II geophysical data processing solutions, EV56 high-precision vibroseis, LFV3 low-frequency vibroseis, G3i wired seismograph and eSeis node system, as well as "wide azimuth, broadband and high density" technology and high-productivity blended shooting acquisition techniques. As a result, we saw rapid productivity and competitiveness gains and steady progress in our geophysical prospecting service projects at home and abroad. In particular, the high-productivity blended shooting acquisition techniques proved successful at the PDO project in Oman, enabling more than 20,000 shots per day.

We refocused on overseas high-end markets and won a number of bids such as the integrated onshore 3D survey project in west Kuwait, a deepwater 3D survey project for BP, and a seismic survey project in the Sahara desert. In addition, we were awarded the contract to conduct the first-ever Z100 node system-enabled acquisition survey in Tomori, Indonesia. In data processing and interpretation, we won a five-year open contract from Kuwait National Petroleum Company and a contract for the Saudi Aramco's S78 Phase III (Farshah) project. Our deepwater fleet became the world's largest towed streamer 2D seismic service provider, claiming a 51% worldwide market share. After expanding into six new markets, i.e., Kyrgyzstan, Somaliland, Canada, Egypt, Cuba and Morocco, we made new progress in the United Arab Emirates, Ghana, Egypt, Indonesia and Morocco.

### Geophysical prospecting operations

	2015	2016	2017
Seismic crews in operation	166	165	<b>163</b>
Domestic	96	96	<b>94</b>
Overseas	70	69	<b>69</b>
2D seismic data acquired (kilometers)	132,714	162,684	<b>154,904</b>
Domestic	22,521	35,919	<b>30,644</b>
Overseas	110,193	126,765	<b>124,260</b>
3D seismic data acquired (square kilometers)	47,219	58,120	<b>57,182</b>
Domestic	10,722	10,844	<b>10,313</b>
Overseas	36,497	47,276	<b>46,869</b>

## Drilling

In 2017, our 1,183 drilling crews spudded 11,916 wells and completed 11,687 wells, registering a total footage of 25.79 million meters.

We boosted drilling efficiency through wide adoption of EPC services and pad drilling. R&D efforts were ramped up and new techniques were deployed to enhance operating performance and bolster market share and service capabilities. ROP speed-up for deep wells was fruitful, seeing 648 wells deeper than 4,000m drilled, an increase of 121 wells from one year earlier; average depth of 4,922m, up 0.65%; average well construction cycle and drilling cycle reduced by 8.38% and 7.34% respectively; and average penetration rate up to 1,449m per month for each rig, up 9.94%. Pad drilling for tight gas and share gas helped improve efficiency and reduce costs under a "3+3" factory management model. New techniques were developed and promoted, such as hydraulic rotary percussion drilling tools. Particularly, hydros oscillator, rotating hammers and other tools helped enhance average ROP by 60% at applied intervals. Geo-steering drilling was widely used in Tarim and Xinjiang Oilfields and achieved good results.

Overseas, we were awarded EPC contracts in Iraq, Kazakhstan and Uzbekistan, date rate-based drilling service contracts in Venezuela, Ecuador and Saudi Arabia, and an offshore drilling service contract from National Iranian Oil Company for the first time.

## Well Logging and Mud Logging

In 2017, CNPC deployed 813 well logging crews and completed 101,531 well-times of logging in 18 countries; and 1,436 mud logging crews on 13,187 wells.

In view of the service condition and logging needs in oilfield production, imaging logging was used to evaluate complex reservoirs and maximize production per well. A range of innovative techniques and processes were widely adopted to boost efficiency and reduce costs. EILog express and image logging solutions enabled a significant increase in logging workload; LEAP800 logging system saw wider application; memory express logging techniques were improved, increasing operating efficiency by more than 30%; coiled tubing and tractor conveyance techniques were effectively deployed to save the operation time by 16.7 hours per well; advancements in perforation methods, tools and equipment contributed to integrated solutions for well completion and EOR.

Progress was made in exploring the international markets, as evidenced by a number of important well logging contracts in Iraq, Iran and Sudan and debut in Kuwait.

### Drilling operations

	2015	2016	2017
Drilling crews in operation	1,230	1,205	<b>1,183</b>
Domestic	979	943	<b>921</b>
Overseas	251	262	<b>262</b>
Wells completed	9,387	9,328	<b>11,687</b>
Domestic	8,389	8,686	<b>10,807</b>
Overseas	998	642	<b>880</b>
Footage (million meters)	20.89	19.50	<b>25.79</b>
Domestic	18.38	17.96	<b>23.55</b>
Overseas	2.51	1.54	<b>2.24</b>

### Well logging operations

	2015	2016	2017
Logging crews in operation	803	797	<b>813</b>
Domestic	662	663	<b>677</b>
Overseas	141	134	<b>136</b>
Well logging operations (well-time)	88,926	79,231	<b>101,531</b>
Domestic	83,933	75,591	<b>96,588</b>
Overseas	4,993	3,640	<b>4,943</b>

## Downhole Operation

In 2017, our 1,845 crews completed 110,844 well-times of downhole operations and 9,237 layers of formation testing.

Our downhole operation performance was further improved through intensified R&D and wider application of innovative technologies. Multi-stage fracturing solutions featuring bridge plug, open-hole packer, hydraulic jet and slickwater fracturing proved successful in volume reconstruction. Pad drilling facilitated large-scale development of shale gas and tight oil and gas. Operation efficiency and reservoir stimulation effect were greatly enhanced, thanks to improved factory-like cross operation, zipper operation, continuous blending and continuous sand feed. Coiled tubing operations were used widely and the scale of snubbing operation was expanded. CO<sub>2</sub> dry fracturing techniques were polished through field tests for more than 10 well-times. Cluster-based subdivision fracturing with coiled tubing and bottom packer resulted in significant efficiency gains. Breakthroughs were made for wireless transmission of downhole formation test parameters, enabling a working depth up to 5,000 meters.

### Downhole operations

	2015	2016	2017
Downhole operation crews	2,153	1,914	<b>1,845</b>
Domestic	1,929	1,676	<b>1,592</b>
Overseas	224	238	<b>253</b>
Downhole operations (well-time)	128,879	112,643	<b>110,844</b>
Domestic	126,062	110,818	<b>109,006</b>
Overseas	2,817	1,825	<b>1,838</b>
Formation test (layers)	7,782	8,515	<b>9,237</b>
Domestic	5,051	5,555	<b>6,227</b>
Overseas	2,731	2,960	<b>3,010</b>

## Offshore Engineering

In 2017, we provided services in offshore drilling, well completion, well cementing, formation test & production test, downhole operation, offshore engineering design and construction in various sea areas including the South China Sea, Bohai Sea and the Persian Gulf. Throughout the year, our six offshore drilling and operating platforms completed a total drilling footage of 18,500 meters, and our 20 vessels travelled 122,756 nautical miles in total.

In particular, as the general contractor of the natural gas hydrate pilot production project in the South China Sea, we addressed world-class difficulties in extracting shallow free gas and sand control for silty-sand reservoirs, ensuring the success of the project. In addition, we won a shallow water drilling project from Iranian Offshore Oil Company.

## Engineering and Construction

In 2017, China Petroleum Engineering Co., Ltd. (CPEC), a specialized subsidiary in charge of CNPC's engineering and construction business was publicly listed after restructuring. Leveraging its advantages in specialized services and integrated management, CPEC adopts a work flow featuring standardized design, factory prefabrication, modular engineering, mechanized operation and IT-enabled management. While continuing to build competence in offering intelligent engineering and construction solutions, CPEC is speeding up the shift from an EPC contractor to an integrated service provider.

Tapping into domestic and overseas markets, CPEC was awarded the contracts for the non-proprietary facilities at the Amur Gas Processing Plant in Russia, AKK Gas Pipeline in Nigeria, a single point mooring system and pipeline installation at the Eastern Refinery in Bangladesh, Haradh Gas Pipeline in Saudi Arabia and EPC for integrated facilities at the Bab oilfield in Abu Dhabi. In 2017, CPEC executed 43 projects in surface engineering, storage and transportation, refining and chemicals and environmental engineering.

## Surface Engineering of Oil and Gas Fields

In 2017, our surface engineering projects progressed well in key oil and gas fields at home and abroad. A light hydrocarbon recovery unit for condensate gas production was put into operation at the Tarim Oilfield. Modules for the Phase II and Phase III Yamal LNG project were completed, A de-bottleneck project was delivered at Block 3/7 in South Sudan. The Phase I pressure boosting project at the Saman-Depe Gas Field in Turkmenistan and the Phase I Karakul project in Uzbekistan became operational. The renovation project at the Basra Natural Gas Plant in Iraq and the oil field surface engineering project at the Phase 2.2 development in Chad advanced steadily. The Amur Gas Processing Plant in Russia and the Central Processing Facility of Phase III Halfaya Project (CPF3) were kicked off.



## Successful pilot production of gas hydrates in the South China Sea

On May 18, 2017, China announced the success of its first attempt to tap gas hydrates in the Shenhu area of South China Sea, a historic breakthrough in extracting gas hydrates.

CNPC has played an important role in the project as CNPC Offshore Engineering Company Ltd. (CPOE) worked as the general contractor of the gas hydrate pilot production project. Leveraging advantages in integrated technical solutions and based on CNPC's expertise in oilfield development, CPOE has tackled challenges such as silty-sand reservoirs, shallow burial depth, low temperature under deepwater, sand producing and secondary hydrate generating, etc., greatly facilitating the smooth construction of the project. Eventually, the project maintained a steady gas output for 60 days straight and produced a total of 309,000 cubic meters, world's records in terms of producing period and yield amount. During project execution, excellent HSE performance was achieved and the marine ecological

environment well protected, with 100% wastes regulatory compliant discharged and without any safety, occupational hazard or environmental accident. The successful pilot production marks a solid step forward of CNPC in deepwater operation and demonstrates our technical capabilities in deepwater drilling, well completion and pilot production.

On August 24, 2017, CNPC signed a strategic cooperation agreement with the Ministry of Land and Resources and the government of Guangdong Province on promoting the building of a pilot site for exploring and exploiting gas hydrates in the Shenhu area of the South China Sea. Under this agreement, we will carry out field tests for extracting gas hydrates in a bid to increase output per well, reduce costs, protect the environment and facilitate the commercial production of gas hydrates.

### Construction of Pipeline and Storage

In 2017, we made important progress in storage and transportation projects. A number of pipelines became operational, including the Zhongwei-Jingbian connecting line of the Third West-East Gas Pipeline, Fourth Shaanxi-Beijing Gas Pipeline, Yunnan Refined Products Pipeline, Myanmar-China Crude Pipeline, Second Russia-China Crude Pipeline and Majnoon Pipeline in Iraq. The north section of the Russia-China Gas Pipeline (Eastern Route) was under construction. A refined products pipeline was kicked off in northern Thailand. The Haradh Gas Pipeline in Saudi Arabia moved forward as planned. The AKK Gas Pipeline project in Nigeria was implemented. As to storage tank engineering, the refined oil tank farm expansion project at the Fishing Port Terminal in Angola became operational.

### Construction of Refining and Chemical Facilities

In 2017, we pushed ahead with refining and chemicals projects steadily. The 13 Mt/a refining plant was successfully put into operation at Yunnan Petrochemical. A number of projects made steady headway, including the 10 Mt/a upgrading project at Huabei Petrochemical, Russian crude processing productivity project at Liaoyang Petrochemical and alkylation project for gasoline upgrading under the National VI standards. Phase I of

the Shymkent Refinery upgrading project in Kazakhstan was successfully completed and the Phase II project was under construction. The phosphate project in Saudi Arabia went on stream and the refinery expansion project in Algeria was fully launched.

### Environmental Engineering

In 2017, a number of environmental engineering projects were ready for commissioning, including wastewater treatment at Ningxia Petrochemical, emission-reduction at Liaoyang Petrochemical, and flue gas purification at Guangxi Petrochemical. The off-gas treatment at Daqing Petrochemical and VOCs project at Sichuan Petrochemical advanced steadily.



## Petroleum Equipment Manufacturing

In 2017, our equipment manufacturing business saw an accelerated shift to the “Manufacturing + Services” model. We continued to promote capacity transfer and international cooperation on capacity building, propel product innovation and industrial upgrading, and improve marketing network. As at the end of the year, CNPC-manufactured equipment and materials were sold to more than 80 countries and regions worldwide.

CNPC’s equipment manufacturing business segment is transforming from an equipment manufacturer to an integrated service provider. So far, we have launched the Version 2.0 for ten standardized service packages, i.e. “Electric pump leasing + Integrated services,” “Steel pipe sales + Service guarantee,” “Drilling rig sales + Integrated services” etc. We achieved a significant increase in the value of service contracts signed throughout the year, which included the contracts on maintenance of power generating units and compressor units in Peru, inspection and overhaul services for refining facilities in Niger, and “Electric pump leasing + Integrated services” in Sudan, South Sudan, Chad, Kazakhstan and Ecuador, etc.

We continued to promote product innovation and technology upgrading to push our products to middle-high end of the value chain. We stepped up R&D and application of new drilling equipment, such as the offshore jack-up drilling system, 4,000m low-temperature rig, 9,000m onshore four single-rod rig, and BHDH high-torque drill rods. Milestones were achieved in the development of X90/X100 high-grade, large-caliber, large-wall-thickness steel pipes. The development of low-temperature pipe materials progressed well. X80 Φ1,422mm SSAW and LSAW steel pipes were used in the Eastern Route of the Russia-China Gas Pipeline. In addition, we continued to promote the use of a range of proprietary equipment, including the 2300-type fracturing vehicles, GX/S dual-track vibrating screens, SEW collapse-resistance casings, and BJC-1 special casings, etc.

International cooperation on capacity building and technology made headway. As one of CNPC’s overseas investments, the first large-diameter steel pipe manufacturing facility in Kazakhstan – Asia Steel Pipe Co., Ltd. – was under construction in Almaty and expected to be operational in 2018 with a designed capacity of 100,000 tons per year. We also signed JV cooperation agreements with Schlumberger, Caterpillar and Parker Hannifin on equipment manufacturing, including drilling bits, fracturing pumps, and hydraulic line, etc.

## Financial Services

In 2017, our financial service arm CNPC Capital was publicly listed after restructuring. The restructured company holds the most extensive set of financial licenses in the A-share market among central enterprises under SASAC, with business covering in-house banking, banking, financial leasing, trust, insurance, insurance brokerage and securities.

Leveraging an integrated platform, CNPC Capital continued to expand its product offering and customer base, deepen channel and service innovations and mitigate financial risks effectively to bring operating excellence to the next level.

Based on its expertise and strengths, CNPC Capital maintained a healthy level of profitability by aligning financial services with oil and gas business, promoting collaboration between financial institutions, creating an information sharing platform for products, customers and channels, and improving service quality, in order to boost the development of CNPC’s core businesses.



# Financial Statements

## Consolidated Balance Sheet

million RMB yuan

	2015	2016	2017
<b>Current assets</b>			
Cash and cash equivalent	342,772.93	384,370.93	402,825.97
Funds lent	3,463.90	2,535.00	20,625.50
Financial assets at fair value through profit or loss	8,386.01	9,249.11	17,995.07
Derivative financial assets	708.88	843.09	453.01
Notes receivable	10,181.47	12,940.35	20,834.00
Accounts receivable	122,464.89	118,138.55	115,773.81
Prepayments	252,184.67	262,372.58	220,613.45
Premium receivable	83.15	93.75	101.64
Reinsurance accounts receivable	208.18	274.07	332.73
Reinsurance reserves receivable	591.67	697.62	877.31
Interest receivable	3,090.63	3,512.85	4,811.62
Dividends receivable	559.49	301.37	314.65
Other receivables	21,331.55	16,773.97	21,072.30
Financial assets purchased under resale agreements	27,306.75	5,844.25	30,717.84
Inventories	228,310.10	228,758.02	231,570.07
Non-current assets maturing within one year	681.26	142,302.86	207,152.29
Other current assets	69,910.52	63,872.24	61,717.83
<b>Total current assets</b>	<b>1,092,236.05</b>	<b>1,252,880.61</b>	<b>1,357,789.09</b>
<b>Non-current assets</b>			
Loans and advances issued	113,833.13	68,758.77	70,887.60
Available-for-sale financial assets	105,723.80	47,290.02	60,467.86
Held-to-maturity investments	109,347.69	82,602.47	50,541.17
Long-term accounts receivable	76,425.41	92,447.77	91,486.28
Long-term equity investments	93,055.99	107,612.58	108,663.90
Investment properties	1,522.27	2,258.24	2,325.00
Original value of fixed assets	1,656,345.50	1,725,184.01	1,821,632.80
Less: Accumulated depreciation	700,441.33	767,420.70	826,793.82
Net value of fixed assets	955,904.17	957,763.31	994,838.98
Less: Impairment of fixed assets	64,892.27	81,696.51	100,434.13

## Consolidated Balance Sheet (continued)

million RMB yuan

	2015	2016	2017
Fixed assets-net value	891,011.90	876,066.80	894,404.85
Construction-in-progress	340,766.92	283,904.13	241,456.52
Project materials	7,865.15	8,141.70	6,453.21
Disposal of fixed assets	633.44	674.27	710.08
Productive biological assets	0.72	0.67	0.23
Oil and gas assets	957,299.20	958,466.58	935,508.24
Intangible assets	86,054.09	88,474.58	89,218.53
Development expenditure	1,480.82	1,299.82	1,654.67
Goodwill	46,258.07	46,699.93	42,029.89
Long-term deferred expenses	37,822.48	35,874.99	34,646.65
Deferred tax assets	24,618.22	29,078.09	35,070.20
Other non-current assets	48,142.44	87,227.22	75,407.14
<b>Total non-current assets</b>	<b>2,941,861.74</b>	<b>2,816,878.63</b>	<b>2,740,932.02</b>
<b>Total Assets</b>	<b>4,034,097.79</b>	<b>4,069,759.24</b>	<b>4,098,721.11</b>
<b>Current liabilities</b>			
Short-term loans	55,361.49	86,917.37	114,062.05
Borrowings from central bank	603.12	661.42	418.45
Deposits from customers and interbank	205,737.15	195,183.34	188,029.86
Borrowing funds	60,878.57	73,016.02	78,762.86
Derivative financial liabilities	793.64	561.18	750.00
Notes payable	18,544.14	23,067.58	25,933.99
Accounts payable	302,057.78	290,932.91	337,960.05
Receipts in advance	80,306.50	89,127.37	98,645.24
Funds from sales of financial assets with repurchase agreement	13,147.37	7,180.54	21,559.98
Handling charges and commissions payable	18.21	25.36	13.22
Staff remuneration payable	21,311.56	24,047.74	25,391.84
Taxes payable	48,134.39	56,976.06	69,252.86
Interest payable	12,416.15	13,921.36	13,380.01
Dividends payable	1,563.13	6,678.27	1,975.21
Other payables	88,431.51	64,374.87	66,365.30

## Consolidated Balance Sheet (continued)

million RMB yuan

	2015	2016	2017
Reinsurance accounts payable	177.30	288.98	430.86
Reserve for insurance contracts	1,532.18	1,928.84	2,483.54
Funds arising from acting trading of securities	0.01	0.01	0.01
Non-current liabilities due within one year	148,144.36	84,869.42	118,664.49
Other current liabilities	5,110.85	6,932.95	16,053.16
<b>Total current liabilities</b>	<b>1,064,269.41</b>	<b>1,026,691.59</b>	<b>1,180,132.98</b>
<b>Non-current liabilities</b>			
Long-term loan	17,266.61	20,583.12	18,542.25
Bonds payable	378,765.86	393,853.21	305,544.58
Long-term payables	8,163.61	6,849.00	4,125.43
Long-term employee remuneration payable	123.36	1,489.51	1,712.80
Specific payables	1,314.39	1,271.46	1,218.80
Accrued liabilities	124,243.92	132,281.72	139,505.72
Deferred income	12,790.39	13,675.89	15,597.93
Deferred tax liabilities	23,621.25	25,998.21	25,735.80
Other non-current liabilities	5,250.34	2,169.49	2,962.74
<b>Total non-current liabilities</b>	<b>571,539.73</b>	<b>598,171.61</b>	<b>514,946.05</b>
<b>Total liabilities</b>	<b>1,635,809.14</b>	<b>1,624,863.20</b>	<b>1,695,079.03</b>
<b>Owners' equity</b>			
Paid-up capital (or share capital)	486,855.00	486,855.00	486,855.00
Other equity instruments	209,511.78	209,511.78	186,075.98
Capital reserve	275,212.89	289,747.45	295,063.03
Other comprehensive income	-44,117.41	-17,190.83	-33,092.57
Special reserve	30,961.72	32,365.52	32,665.47
Surplus reserve	1,105,198.51	1,085,777.17	1,085,777.17
General risk provisions	7,752.71	8,706.33	10,534.12
Undistributed profit	8,020.88	2,233.19	-21,299.49
<b>Total owner's equity attributable to parent company</b>	<b>2,079,396.08</b>	<b>2,098,005.61</b>	<b>2,042,578.71</b>
Minority interest	318,892.57	346,890.43	361,063.37
<b>Total owners' equity</b>	<b>2,398,288.65</b>	<b>2,444,896.04</b>	<b>2,403,642.08</b>
<b>Total liabilities and owners' equity</b>	<b>4,034,097.79</b>	<b>4,069,759.24</b>	<b>4,098,721.11</b>

## Consolidated Profit Statement

million RMB yuan

	2015	2016	2017
<b>Total revenue from operations</b>	2,016,756.66	1,871,902.90	2,340,316.13
Including: Operating income	1,998,581.26	1,855,283.73	2,319,349.96
Interest income	16,263.99	14,272.62	18,804.22
Premiums earned	95.59	333.04	277.40
Handling charges and commission income	1,815.82	2,013.51	1,884.55
<b>Total cost of operations</b>	1,967,309.67	1,851,542.17	2,294,970.86
Including: Operating cost	1,505,437.21	1,418,917.78	1,797,414.33
Interest expenses	7,576.47	6,789.72	7,604.12
Handling charges and commission expenses	187.35	114.52	153.74
Net expenditure for compensation payments	119.04	193.99	268.24
Net amount of provision for insurance contract	200.51	240.71	347.92
Reinsurance costs	-89.04	-57.09	-82.61
Tax and surcharges	207,785.05	197,241.56	210,271.11
Selling expenses	73,581.19	74,407.67	75,764.03
Administrative expenses	107,646.79	102,538.88	102,788.47
Finance expenses	4,166.32	-10,479.22	29,305.16
Impairments loss of assets	40,875.23	42,512.47	45,969.00
Others	19,823.55	19,121.18	25,167.35
Add: Gains from change in fair value (Loss is represented by "-")	-15.94	1.47	-18.16
Gain from investment (Loss is represented by "-")	33,034.59	34,072.87	12,914.02
Exchange gain (Loss is represented by "-")	543.30	364.06	323.60
Other gains	-	-	9,291.52
<b>Operating profit (Loss is represented by "-")</b>	83,008.94	54,799.13	67,856.25
Add: Non-operating income	15,440.45	15,437.55	8,219.31
Less: Non-operating expenditure	15,980.55	19,505.39	22,731.93
<b>Total profit (Total loss is represented by "-")</b>	82,468.84	50,731.29	53,343.63
Less: Income tax expenses	26,226.96	23,937.41	35,777.15
<b>Net profit (Net loss is represented by "-")</b>	56,241.88	26,793.88	17,566.48
Net profit attributable to owners of the parent company	44,560.43	12,406.62	-4,667.02
Minority interest income	11,681.45	14,387.26	22,233.50
Profit and loss from continuing operations	-	26,793.88	17,566.48
<b>Net amount of other comprehensive income after tax</b>	-9,295.46	27,876.33	-21,369.66
<b>Total comprehensive income</b>	46,946.42	54,670.21	-3,803.18
Total comprehensive income attributable to owners of the parent company	34,080.68	39,247.16	-20,568.76
Total comprehensive income attributable to minority interests	12,865.74	15,423.05	16,765.58

# Notes to the Financial Statements

## A. Description of Principal Accounting Policies and Estimates

### 1. Accounting standard and 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 consolidated 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 translation 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) Translation 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 generally 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 translation 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 equity instrument.

#### (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-year 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 noncash asset being transferred or a new financial liability being assumed) should be recorded in profits or losses of the current period.

**(5) Offsetting between financial assets and financial liabilities**

When both parties to a transaction have a legally enforceable right to set off the financial asset and financial liability and intend to settle the financial asset and financial liability on a net basis or simultaneously, the net amount after offsetting should be presented in the balance sheet.

**(6) Difference between financial liabilities and equity instruments as well as related treatment**

An equity instrument is any contract that evidences residual interest in the assets of an entity after deducting all of its liabilities. A financial liability is any liability that is a contractual obligation to deliver cash or other financial assets to another entity.

Interest, dividends, gains, and losses relating to a financial instrument classified as a financial liability, as well as gains or losses arising from redemption or refinancing, should be included in the current profit and loss.

The issuance, repurchase, sale and cancellation of a financial instrument classified as an equity instrument should be treated as a change in equity instead of being recognized as a change in the fair value of such equity instrument. Distributions to equity holders should be classified as profit distribution.

**(7) Impairment of financial assets and write-off principles**

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.

**i. Impairment of available-for-sale financial assets**

An impairment occurs when there is a substantial decrease in the fair value of an available-for-sale financial asset at the end of the period or the downward trend is expected to continue, after taking into account all the relevant factors. In this case, the cumulative loss on the decrease of fair value that was previously recorded in owner's equity should be recognized as impairment loss.

With respect to an available-for-sale debt instrument with recognized impairment loss, if the fair value has increased in a subsequent period and the increase can be related objectively to an event occurring after the impairment was recognized, the previously recognized loss on impairment should be reversed and recognized in the current profit and loss.

For available-for-sale equity instruments, impairment loss should not be reversed through profit and loss.

**ii. Impairment of held-to-maturity investments**

Impairment loss on held-to-maturity investments should be measured in the same way as impairment loss on account receivables.

When there is no reasonable expectation of recovering a financial asset, the provision for impairment should be written off and the book value of the financial asset should be written down accordingly. The Company will write off the financial asset, either in whole or in part as it may deem fit.

**iii. Impairment of account receivables****A. Reserve for bad debts**

The allowance method is used to calculate bad debts and the provision for bad debts is made at the end of every accounting period and included in the current profit and loss. In the event of conclusive evidence of an account receivable being uncollectible, a loss for the debt in question will be determined and the amount of bad debt written off to the profit and loss account.

**B. Recognition standard of bad debts**

- a. The debtor is declared legally bankrupt or dissolved, with remaining property unable to pay up the account receivable;
- b. The debtor is dead or declared legally missing or deceased, with property or heritage unable to pay up the account receivable;
- c. In the event of receivables involved in the litigation, there is a court judgment/ruling against the Company, or although such judgment/ruling is in the Company's favor, the execution, as being unenforceable, is suspended and resumption is unlikely;
- d. The debtor suffers from huge losses due to the major natural disasters or accidents, with property (including insurance indemnity) unable to pay up the account receivable.

**(8) 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 year. 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 be 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, which 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 deferred income which is taken into gains/losses of the current period appropriately and

systematically during the lifespan of related asset, i.e., recognized as other gains if related to the company's daily activities; otherwise, recognized as non-operating income.

Income-related governmental subsidies used to recover relevant costs, expenses or losses in the subsequent period are recognized upon receiving as deferred income which is taken into gains/losses of the current period during the verification of related costs, expenses or losses, i.e., recognized as other gains if related to the company's daily activities; otherwise, recognized as non-operating income, or used to write down relevant costs, expenses or losses; those used to recover relevant costs, expenses and losses incurred by the Group are directly recognized as the gains/losses of the current period, i.e., recognized as other gains if related to the company's daily activities; otherwise, recognized as non-operating income, or used to write down relevant costs, expenses or losses.

(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* (CS[2011]-58) 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 11% for natural gas and LNG. The tax rate for tangible movable property leasing is 17%; the tax rate for transportation services and real estate sales is 11%. In accordance with the *Notice Regarding Changes to Value Added Tax Rates* (CS[2018]-32) made by the Ministry of Finance and State Administration of Taxation, for taxable sales or imports to which the rates of 17% and 11% were respectively applicable, new rates of 16% and 10% will become effective since May 1, 2018.

### 3. Surtaxes and surcharges

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

### 4. Excise tax

The per unit excise tax is RMB 1.52 per liter for gasoline, naphtha, solvent oils and lubricants, and 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 excise tax since January 1, 2009 on self-provided refined oils used as fuel, power and raw materials to produce oil products.

### 5. Resources tax

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

### 6. 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%.

### 7. Personal income tax

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

# Major Events

## February

**February 10** The company's subsidiary in financial management, CNPC Capital Co., Ltd. (CNPC Capital) went public on the Shenzhen Stock Exchange.

**February 17** The company's subsidiary in petroleum engineering sector, China Petroleum Engineering Co., Ltd. (CPEC) went public on the Shanghai Stock Exchange.

**February 19** A stock purchase agreement was signed between CNPC and Abu Dhabi National Oil Company (ADNOC) to award CNPC an 8% stake in the onshore oilfield concession of Abu Dhabi Company for Onshore Petroleum Operations (ADCO) with a contract term of 40 years. CNPC also acquired an 8% stake in ADCO.

**February 28** CNPC and China Aerospace Science & Industry Corporation (CASIC) signed an agreement to deepen strategic cooperation in Internet+, intelligent manufacturing, petroleum equipment and services, and supply of petroleum and petrochemical products.

## April

**April 10** Upon the signing of the Myanmar-China Crude Pipeline transmission agreement, the pipeline was officially put into operation on the Madaya Island in Myanmar.

**April 12** Construction of CNPC-invested Asia Steel Pipe Company, the first large-diameter steel pipe manufacturing facility in Kazakhstan, started in Almaty.

**April 25** CNPC and China Huadian Corporation (CHD) signed a strategic cooperation framework agreement to further strengthen joint efforts in clean energy, and promote gas-fired power generation as well as distributed energy resource development.

## May

**May 13** CNPC and Uzbekneftegaz signed a supplementary agreement to the sales and purchase contract between CNPC and Uzbekneftegaz, an MOU on Gas Storage in Gazli, and an agreement between CNPC, Bank of China and Uzbekneftegaz on financing loan for the New Silk Road Project.

**May 14** CNPC, China Development Bank and the State Oil Company of the Azerbaijan (SOCAR) signed an MOU on cooperation in investment and financing of gas chemical projects in Azerbaijan.

**May 15** CNPC and the State Oil Company of Azerbaijan (SOCAR) signed an FEED/OBCE contract on gas chemical projects in Azerbaijan.

**May 15** CNPC, Gazprom, CCCC and Russian Highways signed an MOU on strategic cooperation in using LNG as vehicle fuel for trunk road transport. CNPC, Gazprom and China Huaneng Group signed an MOU on cooperation in gas-fired power generation.

**May 16** CNPC hosted the Belt and Road Roundtable for Oil and Gas Cooperation.

**May 18** China announced the success of its first attempt to extract gas hydrates in the Shenhu area of South China Sea. CNPC Offshore Engineering Company Limited (CPOE) was the general contractor of the pilot production.

**May 23** CNPC and Aluminum Corporation of China Limited (CHALCO) signed a framework agreement on strategic cooperation. Under this agreement, the two sides will launch strategic partnership in a wide range of areas.

## June

**June 6** CNPC and KazMunayGas signed an agreement on promoting the renovation of the Shymkent Refinery and an MOU on the export of Kazakhstan gas to China.

**June 7** CNPC and the Energy Ministry of Kazakhstan signed an MOU on the extension of oil contract.

**June 30** Phase I renovation project of Kazakhstan's Shymkent Refinery became operational.

## July

**July 3** CNPC, Total and an Iranian company formed a consortium and signed an agreement with National Iranian Oil Company (NIOC) for the development of Phase 11 of South Pars (SP11).

**July 4** CNPC and Gazprom signed a supplementary agreement to the sales and purchase for Russian Gas to be supplied via the Eastern Route.

## August

**August 24** The Ministry of Land and Resources, the government of Guangdong province and CNPC signed a strategic cooperation agreement on promoting the building of a pilot site for exploring and exploiting gas hydrates in the Shenhua area of the South China Sea.

**August 28** A 13 Mt/a refining facility was successfully put into operation at Yunnan Petrochemical.

## September

**September 13** CNPC and Eni signed an agreement on joint efforts in E&P, natural gas and LNG, trade and logistics, refining and chemicals.

## October

**October 23** CNPC and Empresa Nacional de Hidrocarbonetos (ENH) entered into a number of cooperation agreements, covering exploration and development, oilfield services, engineering and construction, refining and chemicals, and logistics support, etc.

## November

**November 1** CNPC and Novatek signed a strategic cooperation agreement. Under this agreement, the two sides will continue to work together closely on the Yamal LNG project.

**November 8** CNPC and Pertamina signed an MOU on deepening oil and gas cooperation outside China and Indonesia.

**November 9** CNPC and Cheniere Energy signed an MOU on long-term LNG sales and purchase. According to the MOU, the two sides will strengthen cooperation in regards to the LNG project in the Gulf of Mexico and facilitate long-term sales and purchase of LNG between the two countries.

**November 12** The Second Russia-China Crude Pipeline became fully operational.

**November 12** CNPC and Abu Dhabi National Oil Company (ADNOC) signed an MOU on strengthening cooperation in oil and gas blocks, gas field development, construction of oil storage facilities, etc.

**November 27** The Zhongwei-Jingbian connecting line of the Third West-East Gas Pipeline was put into operation.

**November 27** The Fourth Shaanxi-Beijing Gas Pipeline went on stream.

## December

**December 4** The first phase of Karakul Gas Field project became operational in Uzbekistan.

**December 8** The first phase of the Yamal LNG Project was put into operation in Russia.

**December 15** CNPC signed an MOU with Korea Gas Corporation (KOGAS) on strengthening cooperation in global natural gas and LNG business.

**December 19** As approved by the State-owned Assets Supervision and Administration Commission (SASAC) of the State Council, CNPC is reorganized from an enterprise owned by the whole people to a limited liability company (wholly owned by the State). All business activities, assets, credentials, creditor's rights, debts, etc., as of the date of reorganization will survive and be inherited by the reorganized company, with the company's shareholders, place of business, legal representative, scope of business, etc. remaining unchanged.

**December 22** Three trunks of the Yunnan Refined Products Pipeline became operational.

# 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%.

## 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.

## 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.

## 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 70 Pa 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 10 Pa 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.

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