



# 2021

## Annual Report

China National Petroleum Corporation

# About Us

China National Petroleum Corporation (CNPC) is an integrated international energy company with businesses covering oil and gas E&P, new energies, refining & chemicals and marketing, new materials, support & services, as well as capital & finance etc.

## ■ Our Vision

To become a world-class integrated international energy company built to last

## ■ Our Strategies

Innovation. Resources. Market.

Internationalization. Green & Low Carbon.

## ■ Our Values

Pursuing green development and supplying reliable energy to fuel our customers' growth and power people's happy life.

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## Message from the Chairman

2021 marks the beginning of the 14<sup>th</sup> Five-Year Plan period. With the pandemic and dramatic changes both unseen in a century, we witnessed the rising oil prices and steady recovery of the Chinese economy. In the year, CNPC stayed with its strategies and plans, worked to achieve stable growth, adjust structure, improve quality and efficiency, and guard against risks. A number of pioneering measures were introduced and a series of historic breakthroughs and landmark accomplishments were made. The Company is proud to deliver exceptional performance in a year that marks a milestone for the country.

President Xi Jinping and the Chinese government attach great importance to energy security, and call for more efforts to advance energy revolution and to build strength in energy at a faster pace. Bearing in mind the importance of “securing energy in China’s own hands”, CNPC stayed focused on its primary responsibilities and core businesses, and ensured reliable energy supply with our utmost efforts. In 2021, the Company’s major performance indicators hit record high, including oil and gas equivalent production and supply volume, newly added proven oil and gas in place at home and abroad, gas output and sales in China, as well as ethylene production. Both domestic crude output and overseas oil and gas equivalent equity production of CNPC have sustained growth momentum on top of a 100-million-ton basis. Gas production in China rose by 5.5% year-on-year. Five major strategic breakthroughs and fifteen major discoveries were made in crude exploration while two gas reserves with one trillion cubic meters respectively were confirmed. With its overseas oil and gas operation centers and global trading network, the Company continued to boost its resource allocation capacity, and registered 490 million tons of international trade volume.

Green and low-carbon growth has become a prevailing trend of our times. To deliver on China’s carbon peak and carbon neutrality agenda, CNPC accelerated green transition and devoted itself to supplying clean energy and conserving lucid waters and lush mountains. We drafted and acted on the new energies & new businesses development program as well as the green and low carbon action plan, put forward a timetable and roadmap to peak carbon emissions and achieve carbon neutrality, and mapped out a three-step approach of “clean alternative, strategic replacement and green transition”. Substantial progress has been made in CNPC’s green and low carbon endeavor as the Company is pressing ahead with its green development blueprint with the six new energies demonstration bases and five key projects at the core. In 2021, natural gas took up a bigger share in the production mix and a batch of new energies projects on wind, solar, geothermal, power and hydrogen were in full swing, fostering a low-carbon ecosphere where fossil fuels and new energies are developed in a coordinated way. CNPC took an active part in addressing climate change and led the effort in establishing the China Oil and Gas Methane Alliance. Energy efficiency has been improving,



and the greenhouse gas emissions and the intensity of methane emissions decreased simultaneously.

The sound development of the Company is underpinned by a science-based and well-functioned governance system. CNPC continued to deepen corporate reform with guidelines formulated and implemented to modernize the governance system and capacity, and deepen institutional reform. Corporate governance made headway on many fronts, including the governance structure, organization, operation, institutional framework, supervision mechanism and Party construction. We have made achievement in the top-level design and development of a modern enterprise system with Chinese characteristics and CNPC features. The organizational structure at headquarters level was optimized in a smooth and orderly fashion and the business portfolio of the Company was reorganized into four business segments, including Oil, Gas & New Energies, Refining, Chemicals, Marketing & New Materials, Support & Services, and Capital & Finance, which all function properly. The three-year reform of state-owned enterprises was carried out in depth, and new breakthroughs and achievements were made in various key areas to deliver the early-stage benefits of the reform.

Science and technology constitute the primary productive force. Putting innovation as our primary strategy, CNPC took stronger steps to improve self-reliance in top-notch technologies, foster science and technology capabilities of national importance and strive for a competitive edge in energy and chemical innovation. To this end, research institutes in Dubai, Shanghai and Shenzhen were inaugurated, CNPC-Peking University Innovation Consortium was set up, and some major platforms for new energies business are being built. At the same time, key steps were taken in science and technology reform with further optimized institutions and mechanisms. A number of major science and technology projects were initiated and R&D breakthroughs were made on core technologies. Pilot projects on digital transformation and smart development across the Company were launched in an effort to speed up the building of a Digital CNPC.

Our greatest asset is our people. We invest in people and put employees' health and safety on our top priority. Guided by China's new *Work Safety Law*, the Company advanced its three-year drive in promoting workplace safety and QHSE system review, and provided tailor-made health package including checkup, assessment and intervention for the most vulnerable employees throughout the Company. We continued our efforts in the ongoing COVID-19 response with a focus on pandemic control inspection on key regions and operations, and mounted prompt response against the flare-ups of the virus. Overseas pandemic control as well as employees' health and safety are held on CNPC's top agenda and there was no COVID-induced death in overseas employees in 2021.

Our success is inextricably linked to social support. Giving back to society speaks volumes for our value. As a major SOE, CNPC actively fulfilled its corporate social responsibilities. In 2021, approximately 600 social assistance programs were carried out and around RMB 300 million was earmarked for rural revitalization and paired support programs, which consolidated poverty alleviation achievements and rolled out rural revitalization efforts. In the face of tight energy supply in China in the second half of last year, CNPC made every effort to secure resources and ensured a stable and reliable supply of natural gas and diesel. CNPC joined the rush rescue for flood fighting in Henan Province and drought relief in eastern Gansu and northern Shaanxi provinces. The Changqing Rescue Team of CNPC was commended by the National Work Safety Emergency Rescue Center in recognition of its outstanding performance. As an official oil & gas partner of the Olympic and Paralympic Winter Games Beijing 2022, CNPC spared no efforts to ensure clean and reliable energy supply and provided logistic services in the Olympic Village, playing our part in presenting the world with simple, safe, and splendid Olympic Games.

These, and many other achievements did not come easily. On behalf of the Board of Directors and top management team of CNPC, I would like to express my heartfelt gratitude to the whole society for supporting the Company's development.

2022 will see the opening of the 20<sup>th</sup> National Party Congress. It is also an important year for CNPC to deliver on our 14<sup>th</sup> Five Year Plan and advance on our way of becoming a world-class enterprise built to last. As the international environment for businesses continues to display complexities, green and low carbon transition, and a new round of technological revolution pick up pace, CNPC will remain steadfast to implement our new development philosophy in full, in the right way, and in all fields of endeavor, service and integrate into the new development paradigm of the country. We will continue our focus on core businesses, improve corporate management, advance reform and innovation, boost quality and efficiency, propel green and digital transition and at the same time guard against risks, in an effort to open up a new chapter of high-quality growth, and continue to underpin China's energy security and energy strength, steady macroeconomic performance, and overall social stability.

Chairman



Dai Houliang



## President's Report

2021 witnessed economic recovery and rising international oil prices. CNPC acted upon the guidelines set by the Board of Directors and pressed ahead with our work on various fronts, including business development, reform and innovation, improving quality and efficiency, HSE efforts, as well as COVID response. Oil and gas operations remain stable across the value chain. Main production indices grew steadily, and major financial indicators reached new highs. The Company achieved RMB 2,807.3 billion in turnover, RMB 166.5 billion in earnings before taxes and RMB 100.3 billion in net profit, delivering the best performance since the round of industry cycle in 2014 and marking a good beginning for the 14<sup>th</sup> Five-Year-Plan period.

During the past year, we worked on reserves and production ramp-up as well as green and low-carbon transition, achieving new milestones and new breakthroughs on oil, gas and new energies business. We strengthened domestic E&P and discovered eleven 100-million-ton oil reserves and twelve 100-BCM gas provinces. Newly added proven recoverable oil and gas reserves totaled 147 million tons and 365.8 BCM respectively. Crude production registered 103.11 million tons and gas output reached 137.8 BCM, setting a new record in BOE terms. Overseas oil and gas cooperation maintained steady progress and made several 100-million-ton discoveries. Throughout the year, overseas equity production amounted to 101.39 million tons of oil equivalent, exceeding 100 million tons for the third consecutive year. Natural gas marketing business gained ground in both volume and profit, with sales within China reaching 205.6 BCM, surpassing 200 BCM for the first time. Solid progress was made in new energies business. 39 new energies projects were constructed and operated, including the 200,000-kilowatt photovoltaic power plant in Yumen, Gansu Province. The Beijing-Tianjin-Hebei geothermal heating demonstration base, together with a number of wind and solar power generation and CCUS projects in Jilin, Heilongjiang (Daqing), and Qinghai were all well underway. Oilfield technical service business continued to debottleneck on key technologies and further improved service quality and market competitiveness.

During the past year, we promoted transformation and upgrading as well as production-marketing synergy, achieving steady improvement in quality and profitability of refining, chemicals, marketing and new materials business. We remain committed to cutting oil products while adding more chemical products. In 2021, the Company processed 166.74 million tons of crude in China and produced 108.92 million tons of refined products, with a yield down by 1.7 percentage points year-on-year. Chemical plants were operated at high capacity producing 6.713 million tons of ethylene, up by 5.8%. Production growth was also achieved on lucrative products like synthetic resin, up by 6%, and synthetic rubber, up by 4.3%. We worked to speed up new materials development and realized a significant year-on-year surge in new materials output. As for the marketing business, we improved quality on retail and increased volume on wholesale and direct sales. Domestic sales of refined oil products stood at 111.26 million tons, with the market

share rising by 0.1 percentage points. The marketing network layout for chemical products was optimized, and product lines management strengthened. Chemicals sales of the year reached 37.16 million tons, picking up in both volume and profitability. Based on resources and markets in China and beyond, we devoted greater efforts to sell oil and gas of overseas equity, and explored markets abroad for refining and chemical products, playing a notably stronger role in ensuring supply and reaping profits in global trade.

During the past year, we endeavored to improve service and competence, bringing the role of support and service business into more effective play. Engineering and construction companies pursued lean management and advanced key projects with high quality. Two projects won the National Quality Engineering Gold Award. Equipment manufacturing subsidiaries deepened R&D and the application of core technologies, and promoted the models of “manufacturing + service” and “product + service”, seeing an ever-improving production efficiency and product quality. Research institutes and consulting agencies carried out profound research, consulting services, as well as economic and technical evaluation on macroeconomic, industry and market trends, providing valuable support for decision-making.

During the past year, we employed “dual drivers” of market service and industry-finance integration, making new headway in capital and finance business. CNPC Capital took initiative to tap into businesses such as green finance and new energies, and consolidated its compliance and risk alarm system. Its service and marketing capabilities were further strengthened and asset quality reinforced, delivering a net profit of RMB 11.56 billion. China Petroleum Finance Company and Generali China Life Insurance Company were awarded the Golden Dragon Prize as the best in-house finance company and the best joint venture in life insurance respectively at the Chinese Financial Institutions Gold Medal List. Kunlun Capital, with the founding investment of RMB 10 billion, set up its first green and low-carbon innovation fund in the market, kicking off with good momentum.

We doubled down on reform, innovation as well as quality and efficiency improvement, further fortifying the foundation for quality development. CNPC followed thoroughly on the three-year action plan for SOE reform, and carried out a series of major reform measures in the “oil company” model, and in labor, HR and remuneration management etc., all gaining substantial progress. We optimized the organizational structure at headquarters level, and reorganized the Company into four business segments (subgroups) which all function properly. We worked on an “upgraded version” of quality and efficiency improvement, adding RMB 12.8 billion to the annual earnings. Strenuous efforts were exerted to straighten up loss-making companies. As a result, losses across the Company declined significantly, with the amount of loss and the count of loss-making operations and entities all falling to a 10-year low. We took stronger steps to improve self-reliance in top-notch technologies, deployed a number of major science and technology projects as well as

debottlenecking tasks on key technologies, and achieved landmark results and breakthroughs. We also went all out to push digital transformation and smart development. Our intelligent operation center was set up and brought on stream. The pilot program of digital transformation was launched across the board. The Kunlun ERP system, which we hold proprietary IPR, filled the gap in China and measured up to the world-leading level.

We strengthened accountability and rigorous management, enjoying a stable and improving HSE performance. We took concrete steps to advance the three-year drive in promoting workplace safety, carried out staff education under the new Work Safety Law, employed an integrated, differentiated and targeted approach to QHSE review, strengthened major hazard prevention measures on well control and oil & gas leakage etc., and continued to tighten contractor management. Throughout the year, no major or above production accidents were recorded. The number of general Class-A industrial accidents and the death tolls went down to single digit for the second consecutive year. We formulated and acted upon the guidelines on building a green enterprise, promoted clean, low-carbon and recycle-enabling development across the value chain, improved coordinated control of GHGs and VOCs, and completed the removal of all remaining oily sludge from previous operations. The year 2021 saw no major environmental pollution or ecological incidents. Moreover, energy conservation totaled 740,000 tons of coal equivalent, and water conservation 10.49 million m<sup>3</sup>. CNPC was awarded “China's Low-carbon Model” and “Carbon Neutrality Model Enterprise in 2021”.

In 2022, CNPC faces even more intricate environment for its production and operation. “Black swan” and “grey rhino” incidents kept rolling in. Prices of commodities fluctuated at high levels. The spread of new COVID variants caused uncertainties for future economic growth. China's economy remains stable while seeking growth and shows sound and long-term prospect, but it still bears the triple pressure from demand contraction, supply shock and weakening expectations. The Chinese government is promoting the implementation of “1+N” policy portfolio on carbon peak and carbon neutrality, presenting greater opportunities yet higher demands for CNPC to accelerate the development of oil and gas together with new energies and new materials. In light of the new circumstances, new dynamics and new requirements, CNPC will maintain strategically focused, make sound analysis and well-grounded judgment, seize development opportunities and effectively address challenges. We will ride on the tide of the times to deliver on the tasks of the year through continuous production and profit growth, in an effort to achieve high quality development and advance on our way to become a world-class enterprise built to last.

President



Hou Qijun

# Operation Highlights

	2019	2020	2021
<b>Financial Index</b>			
Revenue (billion RMB yuan)	2,771.4	2,087.1	2,807.3
Earnings before taxes (billion RMB yuan)	120.4	87.5	166.5
Net income (billion RMB yuan)	59.6	50.3	100.3
Taxes and fees paid globally (billion RMB yuan)	404.5	315.8	398.0
<b>Oil and Gas Production</b>			
Oil production (mmt)	181.03	178.64	179.44
Domestic	101.77	102.25	103.11
Overseas (Equity)	79.26	76.39	76.33
Gas production (bcm)	150.30	160.35	169.24
Domestic	118.80	130.60	137.79
Overseas (Equity)	31.51	29.75	31.45
<b>Refining and Chemicals</b>			
Crude runs (mmt)	207.97	191.83	200.81
Domestic	168.44	160.02	166.74
Overseas	39.53	31.81	34.07
Domestic refined products output (mmt)	119.13	107.23	108.92
Domestic lube oil output (mmt)	1.63	1.58	1.89
Domestic ethylene output (mmt)	5.86	6.35	6.71
<b>Marketing and Sales</b>			
Domestic refined products sales (mmt)	119.59	106.51	111.26
Domestic service stations	22,365	22,612	22,684
Domestic natural gas sales (bcm)	181.29	184.66	205.55



# Corporate Governance

CNPC is a solely state-owned enterprise. According to the provisions of laws and regulations such as the *Company Law of the People's Republic of China*, the *Law of the People's Republic of China on State-owned Assets in Enterprises*, as well as arrangements made by the State-owned Assets Supervision and Administration Commission of the State Council, CNPC has built and continuously improved the corporate governance structure with statutory and transparent rights and responsibilities of the Board of Directors and the top management, and for them to function in a coordinated and balanced way.

## Board of Directors

The Board of Directors as the governing body of the Company is entrusted with the power to formulate strategy, oversee risk management and make decisions on the Company's major issues in accordance with legal procedures and the Articles of Association.

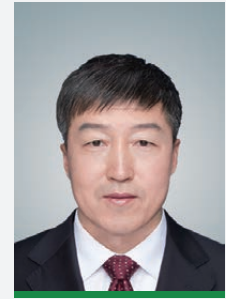
The Board of Directors as the decision-making body of the Company has four affiliated committees, the Strategy & Development Committee, the Nomination Committee, the Remuneration & Evaluation Committee and the Audit & Risk Management Committee, which serve to provide advice and suggestions to support the decision-making of the Board.



**Dai Houliang**  
Chairman



**Hou Qijun**  
Director



**Duan Liangwei**  
Director



**Li Jianhong**  
External Director



**Shi Yan**  
External Director



**Yang Ya**  
External Director



**Gao Yunhu**  
External Director



**Yang Hua**  
Employee Director

## Top Management



**Dai Houliang**  
Chairman



**Hou Qijun**  
Director & President



**Duan Liangwei**  
Director



**Jiao Fangzheng**  
Vice President



**Cai Anhui**  
Chief Financial Officer



**Huang Yongzhang**  
Vice President &  
Chief HSE Supervisor



**Qian Chaoyang**  
Chief of Discipline &  
Inspection Group

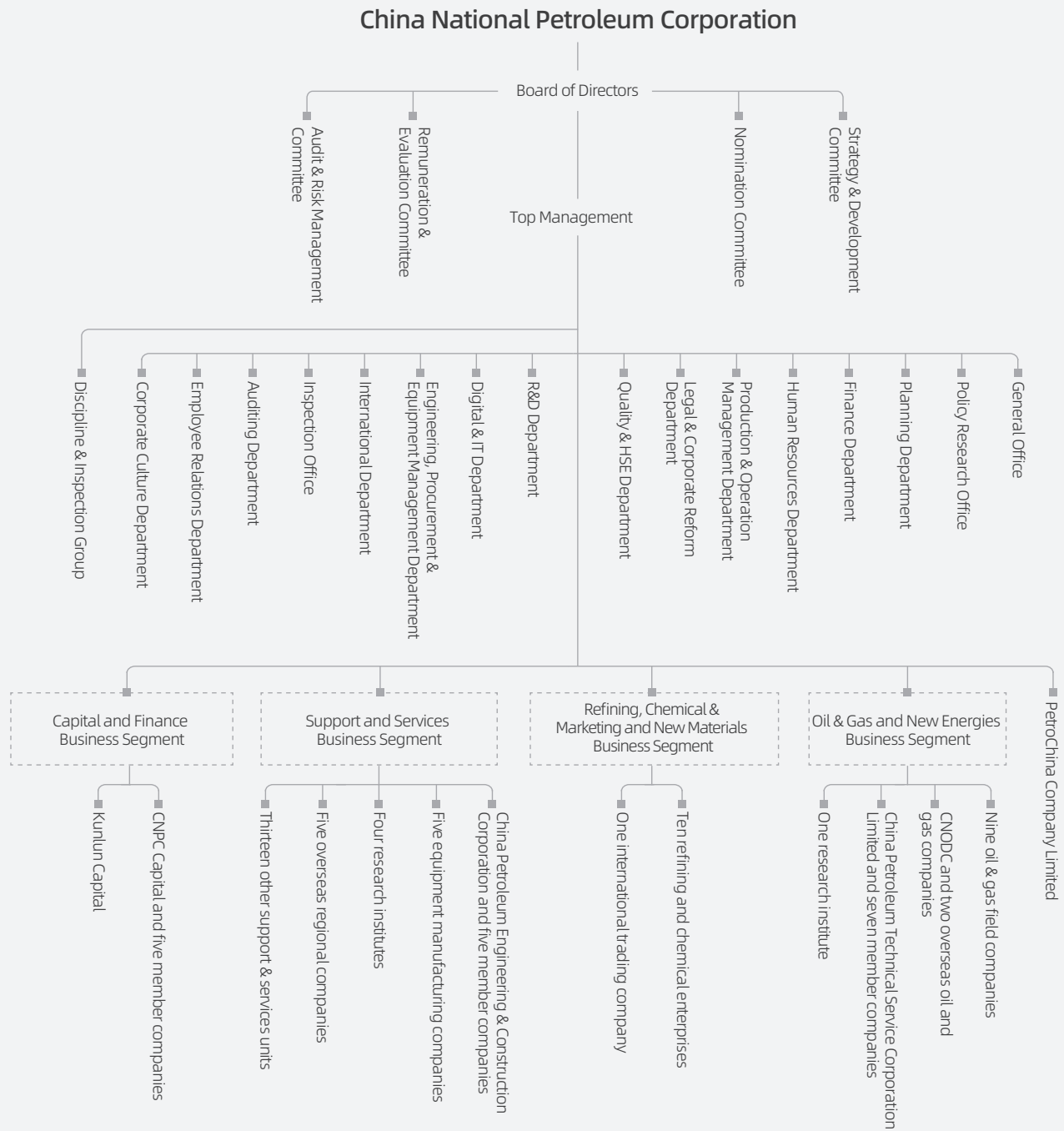


**Ren Lixin**  
Vice President



**Xie Jun**  
Vice President

# Organizational Structure (As of December 31, 2021)



## Key Topic

# Green Development towards Carbon Peak & Carbon Neutrality

Global climate change, mainly characterized by global warming, has become an imminent crisis and tough challenge facing the human race in the 21st century, and reducing carbon emissions to cope with climate change has become a global consensus. In 2020, China made a pledge to the international community that it would strive to peak its carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060. The *Working Guidance for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy* released by the Chinese government made it clear that a clean, low-carbon, safe and efficient energy system should be built at a faster pace. Cleaner and more efficient energy production and consumption is an irreversible trend with a faster shift to green energy.

As the largest oil and gas supplier in China, CNPC has been committed to pursuing green development, supplying reliable energy to fuel our customers' growth and power people's happy life. We will continue to step up efforts in clean energy production and supply, energy conservation and emissions reduction, and aim to become a "leader" in energy efficiency and achieve the goal of carbon peak & carbon neutrality while ensuring energy security of our country.

## Top-level Design for Green Development

CNPC has included low-carbon and green development into its corporate strategies, mapped out a three-step approach of "clean alternative, strategic replacement and green development", and set out the timetable and roadmap for carbon peak and carbon neutrality. We aim to peak carbon dioxide emissions by 2025, supply more zero-carbon energy than fossil energy consumed by 2035, strive for near-zero emissions by 2050 and achieve carbon neutrality by 2060.

Focusing on the shift to the low-carbon and green development model, the Company has restructured its business operations and reformed its organizational structure. In management, the Company has formed a leading group for new energies and new materials business to oversee the Company's development strategy and planning in new energies. In the reform of business segments, the Oil, Gas & New Energies Business Segment was established to promote the clean energy business.

### CNPC's Green and Low-carbon Development Actions

#### Green Business Leader Action

- ◆ Energy Saving and Carbon Reduction Project
- ◆ Methane Emissions Reduction Project
- ◆ Ecological Conservation Project
- ◆ Green Culture Project

#### Clean and Low-Carbon Energy Contributor Action

- ◆ "Natural Gas+" Clean Energy Development Project
- ◆ "Hydrogen+" Zero-Carbon Fuel Supply Chain Upgrade Project
- ◆ Modern Integrated Energy Service System Restructuring Project

#### Circular Carbon Economy Pioneer Action

- ◆ Deep Electrification Reform Project
- ◆ CCUS Industrial Chain Construction Project
- ◆ Zero-Carbon Production and Operation Reengineering Project

## Adjusting business structure to increase the supply of clean energy

As a bridge fuel from fossil energy to clean energy, natural gas is becoming an important solution to China's energy transformation towards the "3060" goal. In recent years, the Company has made great efforts to ensure supply and adjust business structure in line with the principle of Carbon Reduction, Carbon Utilization, Carbon Substitution and Carbon Sequestration, seeking for sustained clean energy supply and driving the growth in natural gas production.

In 2020, the Company's domestic natural gas production accounted for more than 50% of the oil and gas mix for the first time, and the domestic natural gas output reached 137.8 bcm in 2021, accounting for 51.6%. The Company aims to increase the proportion of natural gas to about 55% by 2025.

## Actively exploring new energies business to create a low-carbon energy ecosystem

In addition to boosting its natural gas output, the Company expands actively the new energies business as a green growth engine to foster a low-carbon energy ecosystem where fossil fuels and new energies are developed in a coordinated way, with oil and gas as the mainstay.

In 2021, the Company continued to press ahead with its green development blueprint in six new energies demonstration bases and five key projects, and breakthroughs were achieved in geothermal, wind and solar power generation, hydrogen refueling stations etc. Throughout the year, 39 new energy projects were put into operation, adding 3.50 million TCE to the Company's new energy capacity and increasing the total new energy capacity to seven million TCE. The Company received a 1.2 million-kilowatt quota for wind and solar power generation and added 0.24 million kilowatts to the existing installed wind and solar capacity; the geothermal heating area increased by 9.6 million square meters; 1,500 t/a high purity hydrogen capacity became operational and 8 hydrogen refueling stations (integrated service stations) were completed, including four hydrogen refueling stations (integrated service stations), e.g. the Taizicheng station in Chongli District, Zhangjiakou, to support about 1,000 hydrogen fuel cell vehicles serving the Beijing Winter Olympic Games.

### Photo Story



The technicians were connecting the cable for photovoltaic power generation panels in the photovoltaic demonstration project in Yumen Oilfield. In December, 2021, a 200,000 KW photovoltaic power plant in Yumen Oilfield was connected to the grid. When operating at full capacity, the photovoltaic power plant will generate approx. 400 million kWh per year, equivalent to saving 110,000 TCE and reducing sulfur dioxide and carbon dioxide emissions by 97 tons and 280,000 tons respectively.



Located in Chongli, Hebei province, a competition site for the 2022 Winter Olympics, the hydrogen refueling station at the Taizicheng service center is the Company's first hydrogen refueling demonstration station with a designed hydrogen storage capacity of 1,000 kg. The station delivered hydrogen to serve transportation vehicles in the core area of Zhangjiakou competition zone during the Olympic Games.



## Pushing ahead with technological innovation to facilitate green and low-carbon development

Putting great emphasis on science and technology, the Company has integrated innovation into its industrial chain and made headway in implementing key national science and technology projects and building a Digital CNPC, with new achievements

in energy conservation, energy consumption reduction, new energies and CCS/CCUS etc.

In August 2021, the Company's two proprietary ethane-to-ethylene projects were put into operation and recognized as national green and low-carbon development demonstration projects for world-leading energy consumption and carbon dioxide emission.

### CCS/CCUS in Low-Carbon Development

The Company has stepped up efforts in R&D and commercialization in CCUS to take carbon capture and utilization to the next level, and help to reach the carbon peak & carbon neutrality goals.

Jilin Oilfield continued to improve its capabilities for enhanced oil recovery with carbon capture, utilization and storage (CCUS-EOR) and completed China's first full-process CCUS-EOR demonstration project. The project includes five demonstration areas for carbon dioxide flooding and storage, covering 11.83 million tons of geological reserves and over two million tons of carbon dioxide in 88 injection well groups in total, providing an annual storage capacity of 350,000 tons. The first low-cost carbon dioxide recycling and injection station in China was completed to reinject

200,000 cubic meters of carbon dioxide per day, injecting all the associated gas and reaching zero emission of carbon dioxide.

In the CCS/CCUS demonstration project of Changqing Oilfield in Dingbian, Shaanxi Province, a 100,000-ton injection station for comprehensive testing has been completed to provide a holistic technical approach to carbon capture, oil displacement and storage.

Tarim Oilfield leveraged CCUS-EOR to optimize its energy consumption structure and used carbon dioxide flooding to enhance oil recovery and achieve carbon emission reduction. The first carbon dioxide flooding project in the Donghe 6 block showed initial success.



Jilin Oilfield CCUS-EOR Full-Process Demonstration Project

## Strengthening exchange and cooperation towards green development goals

In 2021, the Company took the lead in setting up China Oil and Gas Methane Alliance to provide a high-quality and open platform for information sharing and collaboration on improved control of methane emissions.

The Company continued to strengthen its involvement in the Oil & Gas Climate Initiative (OGCI). The Company and other OGCI member companies signed the OGCI's Strategy Refresh Document, pledging to achieve carbon neutrality (net-zero emissions) in operations under their control within the time frame specified in the *Paris Agreement* and speed up efforts to accomplish the temperature control target; the Company worked with Saudi Aramco in leading the research on emission reduction technologies in key areas of transportation.

## Participating in carbon trading and using market mechanisms to reduce carbon emissions

The Company issued Measures on Carbon Trading Management and Measures on the Management of Voluntary Greenhouse Gas Emission Reduction Projects and worked to build a management system for trading of carbon emission rights to regulate trading activities, oversee carbon allowance compliance in member companies, and encourage member companies to launch their own voluntary emission reduction projects. In 2021, the Company ensured full compliance with its annual carbon allowance.

The Company also played an active role in building China's carbon trading market. On July 16, the Company participated in the first-day trading of the Shanghai Environment and Energy Exchange, and became one of the 10 companies receiving the National Carbon Market First-day Trading Certificate, which was highly recognized by the Ministry of Ecology and Environment.

## Developing forestry carbon sinks to promote harmony with nature

The Company has been advancing toward its carbon neutrality goal by expanding forestry carbon sinks through voluntary tree planting, cooperation programs with localities and centralized forestation. In 2021, the Company's participation in the voluntary

tree planting reached 414,000 person-times, planting 1,994,500 trees and increasing the existing afforestation area to a total of 289.4 million square meters; the Company also participated in or provided funds for local forestation programs covering 791.32 hectares with 1,631,800 trees. The Company's first carbon-neutral forest, Ma'an Shan Carbon-Neutral Forest - Phase 2 in Daqing Oilfield, was completed, covering an area of 510 mu. Remarkable progress was made in planting carbon sink forests in Xinjiang Oilfield and Jiyuan (Changqing Oilfield).

In the future, CNPC will endeavor to build it into a green enterprise, push ahead with the shift from an oil and gas supplier to an integrated energy service provider and make greater contributions to achieving the strategic goal of carbon peak by 2030 and carbon neutrality by 2060.

### Photo Story



On July 6, 2021, the first 66,000 tons of carbon-neutral liquefied natural gas (LNG) supplied by Shell Eastern Trading to PetroChina International unloaded at Dalian Port. The LNG cargo is able to meet the demand of 3.6 million households for a month, if based on the average gas consumption of a 3-person urban household. This marks the world's first carbon-neutral LNG transaction under a long-term contract.

## 2021 Industry Review

The theme of the oil and gas industry in 2021 was recovery and transition. The global energy industry walked out of recession with a significant rebound in oil and gas demand, a sharp rise in their prices driven by structural demand and supply imbalances, and an industry-wide recovery. As governments put forward their carbon neutrality goals and commitments, the transition of the oil and gas industry picked up the pace, seeing shifts from oil to gas in the upstream sector and from fuels to petrochemicals in downstream. The large-scale deployment of low-carbon energy businesses became a mega trend in the industry.

### Global Oil and Gas Industry

**With a noticeable structural disequilibrium in the demand-supply relations, energy transition had a long way to go.** The global energy consumption picked up gradually, but the issue of structural demand and supply imbalances was prominent, as energy supplies ran tight in many places. In the process of reshaping the value chain and the supply chain in the energy industry, countries around the world were faced with many uncertainties such as extreme weather and geopolitical issues. Periodic structural supply-demand imbalances and irrationally wild price swings were then resulted, posing more risks and challenges to energy transition.

**The oil market was on the mend as international oil prices surged.** Globally, oil prices trended downward after rocketing in turbulence. Brent crude futures averaged at USD 70.95 per barrel in 2021, up by 64.18% from the previous year. Oil demand recovered significantly, turning a massive surplus in the previous year into shortage. The commercial oil inventories of the Organization for Economic Cooperation and Development (OECD) fell below the five-year average as the market saw tight balance with the supply of oil under control.

**Gas prices soared to record highs with an increasingly tight demand and supply balance.** In 2021, with the ongoing recovery in the global economy and the faster shift to a green, low-carbon energy mix, the global demand for natural gas remained strong as natural gas output resumed growing. International gas prices hit all-time highs due to serious structural and regional supply-demand disequilibrium in the market.

**E&P investments picked up as oil and gas production both increased.** The global E&P investments bottomed out and rebounded, although at a lower-than-expected pace due to the impact of ongoing COVID-19 and energy transition. The world's total growth of oil and gas reserves dropped slightly. Globally, the

number of newly proven oil and gas discoveries was basically the same as last year, with major discoveries mainly in Latin America. Both oil and gas production increased throughout the year with the growth rate of natural gas significantly higher than that of oil.

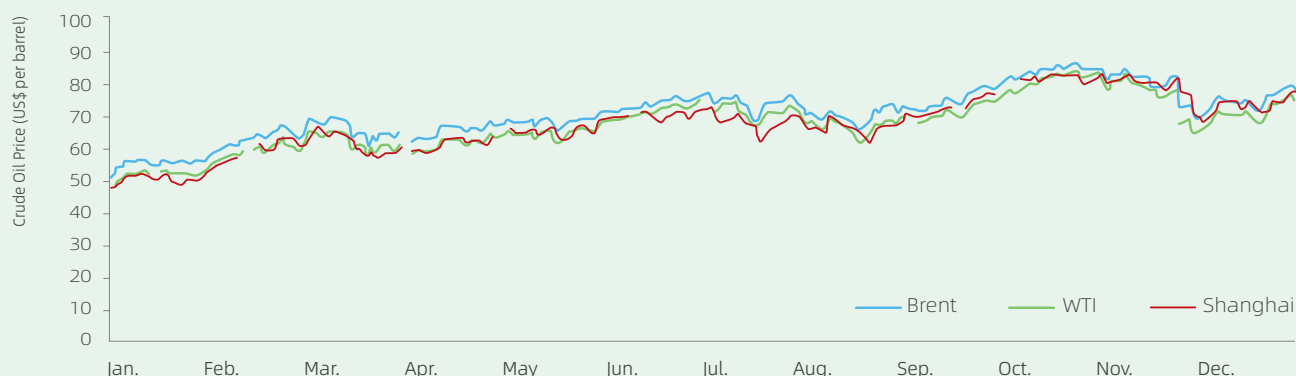
**The refining capacity saw a net decrease for the first time in more than three decades while the ethylene capacity grew substantially.** The total global refining capacity decreased by 45.3 Mt/a, the first net reduction since 1988. The global oil refining industry was booming with overall operating performance remarkably better than the previous year. The total crude runs bottomed out, but remained below the 2019 levels. In 2021, the global ethylene capacity reached 210 Mt/a, a sharp increase by 6.2%. Driven by high oil prices, ethylene prices fluctuated upward. There was a broad rebound in ethylene plant utilization as its global average rose from 80% in the previous year to about 85%.

**Transactions of oil and gas assets restored as M&As in the U.S. shale oil sector continued.** The global upstream transactions came out of the slump and began to recover as the annual transaction amount increased by 25% year-on-year. Amid the surge in international oil prices, the prices of reserves deals jumped sharply, up by 78% year-on-year. In 2021, most of the asset transactions were big deals featuring package deals or M&As. Increasingly fierce competition in pursuing economies of scale was driving the M&As in the shale oil industry in the U.S.

### China's Oil and Gas Industry

**Energy consumption was growing fast as the shift to a green and low-carbon economy continued.** In 2021, China's economy grew by 8.1%, marking a good start for the 14<sup>th</sup> Five-Year Plan period. Domestic energy consumption increased rapidly, up by 5.2%. The proportion of coal in the country's primary energy consumption continued to head downwards as the share of clean energy (natural

Price Movements of International Crude Oil Futures in 2021



gas and non-fossil fuels) in the primary energy consumption increased by 1.1 percentage points from a year earlier. The shift to a green, low-carbon energy mix continued to make headway. Power generation from non-fossil fuels grew by 9.6% year-on-year and the total installed capacity of power generation from renewable energies exceeded 1 billion kilowatts.

**The domestic oil market returned to normal with a noticeable improvement in market order.** The domestic oil market gradually returned to normal as the pandemic subsided. China's crude oil production was up by 2.1% year-on-year as oil dependency on external supply saw a drop for the first time. The consumption of refined products rebounded generally to the pre-pandemic levels. Net exports declined for the first time in nearly a decade. Oil supply surplus eased as inventories fell. Domestic refineries actively adjusted their product mix and the refined products yield dropped further. The unprecedented rectification efforts on the domestic oil market resulted in a big improvement in market order.

**Natural gas consumption grew faster than expected and demand and supply conditions remained tight throughout the year.** The demand and supply balance of natural gas was tight, as the economic growth shrugged off the pandemic and the carbon peak and carbon neutrality goals as well as related policies on energy transition encouraged a hike in natural gas consumption which was increased by 12.0% year-on-year in 2021. The growth of natural gas import was significantly higher. In particular, LNG imports jumped by 17.6%, making China the world's largest LNG importer.

**Domestic oil and gas outputs and reserves grew sharply as important progress was made in hydrocarbon management reform.** Newly proven recoverable oil and gas reserves hit a record high respectively. Outputs of oil and natural gas rose. Domestic upstream investment in oil and gas picked up. Theoretical and technological breakthroughs were achieved in unconventional E&P

activities. Shale oil production enjoyed economies of scale. An ultra-deep water gas field became operational in the South China Sea. The reform of oil and gas resources management made significant headway in promoting competition in granting exploration rights, the exit from blocks, the paid use of resources, and the orderly opening-up of upstream sectors.

**Refining capacity and ethylene output surged as cutting fuels while adding chemicals achieved tangible results.** The domestic refining capacity continued to grow rapidly, with the new ethylene capacity hitting new high. Structural optimization and adjustment picked up pace in the refining industry to effectively cut fuels and increase chemicals. The yields of gasoline, diesel and kerosene all fell from a year earlier, the output of naphtha jumped by 17% year-on-year. The output of ethylene jumped by 30% year-on-year, boosting the self-sufficiency rate (on an oil equivalent basis) significantly to 65.9%. Technological innovation in ethylene production made remarkable headway. The industrial technological competitiveness and international influence improved significantly. Meanwhile, the market opened widely at a faster pace as diversified-ownership projects continued to emerge.

**Overseas operations progressed steadily amid an accelerated green and low-carbon transition.** China's overseas equity production of oil and gas grew slightly compared with the previous year. A number of important discoveries were made in key overseas exploration areas to provide a solid resource base for overseas development. Chinese companies showed greater rationality when investing overseas, with a focus on new projects in key strategic areas. Meanwhile, with a commitment to green and low-carbon development, increased efforts were made to acquire new high-quality natural gas projects and new energies business were expanded in solar power and onshore/offshore wind power, etc.

Source: 2021 Report on Oil and Gas Industry Development by CNPC ETRI



## Environment and Society

The Company has been committed to the principle of “people-oriented, quality utmost, safety first, and environment prioritized” to achieve the goal of “zero defect, zero pollution and zero injury”. We pay attention to people's livelihood and social progress, and strive for harmonious relationship between energy and the environment, as well as enterprises and the community.





## Safe Operation

At CNPC, we promote the building of a long-acting safety system and strengthen the control of safety risks to enhance our work safety management. In 2021, the Company maintained a safe momentum in production.

### Management System

Safety management rules and regulations were formulated, including the Rules on Accountability for Work Safety and Environmental Protection, underscoring the safety responsibilities of all employees.

### Risk Management

A dual-prevention mechanism covering risk prevention and control as well as hazard identification and treatment was put in place to ensure production safety. Safety supervision was conducted for key construction projects and risk-related construction projects. A grid-based approach to safety monitoring was widely used in high-risk work sites.

### Emergency Response Capabilities

The headquarters' emergency plan was revised to respond to emergencies more effectively. Emergency drills were held as part of the continuous improvement efforts for emergency preparedness.

### Supply Chain Safety Management

The Company provided trainings for key personnel related to contractors and implemented a "zero tolerance" policy against incompetent contractors.

### Overseas Security Risk Management

At CNPC, we constantly reinforce the implementation of our social security management system, strengthen prevention and control on overseas social security risks, and enhance our emergency response capabilities.

## Environmental Protection

At CNPC, we make great efforts to reduce adverse effects on the environment and climate. By improving resource utilization, fighting the battle against pollution, and promoting energy conservation and emission reduction, we strive to achieve harmony between energy and the environment.



Guangxi Petrochemical conducting emergency drills together with relevant local departments at the 100,000-ton crude oil terminal

### Environmental Risk Prevention and Control

Measures were taken to identify and assess environmental risks and treat ecological and environmental hazards effectively. Efforts were stepped up to strictly control environmental risks as the three-tiered prevention and control facilities continued to improve. In 2021, no major environmental pollution incidents were reported.

### Management of Air Pollutant Emissions

Emissions from sulfur dioxide and nitrogen oxides (including emissions from flaring) were 13,600 tons and 108,000 tons respectively. Emissions from volatile organic compounds (VOCs) in the refining and chemicals operations were 7.4% lower than a year earlier.

### Sustainable Use of Resources

Great importance was attached to the protection and rational utilization of resources to minimize resource consumption. In 2021, we saved energy of 740,000 tons of standard coal and reduced water use by 10.49 million cubic meters.

### Conservation of Biodiversity

A holistic approach to pollution source control and lifecycle management across the value chain was adopted, and pollution and ecological damage issues were investigated and addressed effectively. Noise and emission reduction measures were taken to minimize our footprint in the ecological environment. In 2021, no events of damage to biodiversity were reported.

## Climate Change

Actions were taken in line with the Paris Agreement and the Chinese government's goals for carbon peak and carbon neutrality. Our involvement in the collaborative effort of the global oil and gas industry for addressing climate change continued to deepen and we played an active role in promoting the green and low-carbon transition.

### Carbon Emission Management

In 2021, the Company pushed ahead with the building of carbon emission management system, formulated the Guidance for Strengthening Greenhouse Gas Emission Management, Measures for Carbon Trading Management, Measures for the Management of Statistical Assessment of Greenhouse Gas Emissions and Measures for the Management of Voluntary Greenhouse Gas Emission Reduction Projects, and established a "1+3" management system for carbon emissions. The Greenhouse Gas Emission Verification Center was set up to bolster GHG emissions verification comprehensively. The Company stepped up efforts to implement the measures set forth in the Action Plan for Methane Emission Control and took the lead in setting up China Oil and Gas Methane Alliance to reduce the methane emission intensity effectively.

The Company has supported and participated in a number of reduction and control plans and initiatives on GHG emissions.

- *The Paris Agreement*
- *United Nations Framework Convention on Climate Change*
- *China's National Climate Change Program*
- *Action Plan for Carbon Dioxide Peaking Before 2030*
- *China Technology Strategic Alliance for CO<sub>2</sub> Capture, Utilization and Storage (CTSA-CCUS)*
- *Oil & Gas Climate Initiative (OGCI)*
- *China Oil and Gas Methane Alliance*
- *China Petroleum and Chemical Industry "Carbon Peak" and "Carbon Neutrality" Pledges*



A fox keeping company with the inspection staff patrolling at the Karamaili gas operation area of Xinjiang Oilfield

### The Company's key measures for carbon emission management

- Upgrading industrial structure, phasing out obsolete capacity, and promoting energy conservation and emission reduction
- Optimization of energy mix (clean energy replacement)
- Monitoring/Verification/Reporting of greenhouse gas emissions
- Recycling of greenhouse gases (carbon dioxide utilization, and methane recovery from oil and gas fields)
- Formulation of management regulations on carbon emissions compliance for enterprises

### International Cooperation

As the only Chinese member in OGCI, CNPC has been actively involved in international cooperation to address climate change. In 2021, the Company's Chairman Dai Houliang and the Chairmen/CEOs of other OGCI member companies jointly signed the OGCI's Strategy Refresh Document, pledging to speed up efforts to limit the global temperature rise; the Company worked with Saudi Aramco in leading the research on emission reduction technologies in key areas of transportation; the Company also hosted the OGCI Forum on Low-Carbon Technologies in Transportation to explore the emission reduction potential and technological innovation in transportation; the Company fully participated in the research on carbon capture, utilization and storage (CCUS), and published the OGCI White Paper on CCUS Commercialization in China to share expertise and knowhow on the low-carbon transition for the oil and gas industry.

### Carbon Emission Reduction during Production

The Company endeavors to minimize the use of fossil fuels, accelerate the shift towards cleaner alternatives and reduce energy consumption intensity. In Huabei Oilfield, Tarim Oilfield and other areas where the conditions permit, renewable energy resources such as geothermal energy and solar energy are used to reduce carbon emissions during production.

### Market-based Mechanism for Carbon Saving

As one of the first 10 companies trading on the National Carbon Market, the Company played an active role in building China's

national carbon market. Member companies were encouraged to launch their own voluntary emission reduction projects. In 2021, the Company ensured full compliance with its annual carbon allowance.

## Social Responsibilities

At CNPC, we maintain a strong commitment to aligning our business growth with the sustainable development of the local communities where we operate by boosting people's livelihood and social progress, fulfilling our corporate social responsibilities in a variety of ways, and sharing our achievements with the society.

### Rural Revitalization

In response to the national rural revitalization strategy and the United Nations' *2030 Agenda for Sustainable Development*, the Company combined its resources with local needs and conditions in the assisted areas to facilitate and consolidate poverty alleviation achievements and rural revitalization efforts. In 2021, the Company invested approx. RMB 300 million in nearly 600 rural revitalization and paired support programs.



6-year-old Yusup Talipti and his family studying at the Farmer Night School



## CNPC's contribution to rural revitalization

In 2021, China achieved a sweeping victory in the fight against poverty. However, getting rid of poverty is not the end. Instead, it's the beginning of a new life and a new journey. To rejuvenate the nation, the countryside must be revitalized.

At CNPC, we implemented the national rural revitalization strategy diligently to consolidate and broaden our achievements in poverty alleviation. Aligning our strength with the demands and actual conditions of the assisted areas, we pushed rural revitalization forward by deepening industrial, consumption and educational assistance.

### Rural Revitalization through Industries Development

With a focus on strengthening the independent ability in rural development, the Company took targeted measures to support local special industries and promote the diversified and sustainable development.

In 2021, the Company invested RMB 77.4 million in six counties in Xinjiang, i.e. Nilka, Toli, Qapqal, Qinghe, Jeminay, Barkol, to develop nine industrial projects, including ancient desert poplar wetlands and national reserve forests, and six livelihood projects such as water-saving irrigation, providing industrial support for local development.

### Market Exploration

At CNPC, we make full use of our own channel and platform advantages to develop markets for local specialty products.

We maintain an up-to-date CNPC Recommended Products Catalogue of Assistance Program. So far, we have recommended more than 4,000 kinds of products from over 300 counties that have just been lifted out of poverty. More than 10,000 uSmile convenience stores across the country offered agricultural products from rural areas and a range of high-quality products sold well nationwide, contributing to both brand image and economic benefits.

### uSmile provides marketing channels for rural products

From June 17 to 18, the 2021 CNPC Assistance Products Exhibit & the 1st uSmile Shopping Festival was held in Chengdu, Sichuan. With the theme of "Rural Revitalization for a Better Life", the event attracted more than 2,000 kinds of products from 150 counties across the country and boosted the sales of rural specialty products effectively.

The Company has set assistance products section in more than 10,000 uSmile convenience stores across the country, leveraging its nationwide network to provide a marketing platform for rural specialty products.

### Personnel Training

At CNPC, training programs on rural revitalization, new business models of agriculture and animal husbandry, digitalized agriculture and industrialized operations are delivered through multiple means such as online classrooms, video teaching and rural education programs to train local people into “experts and scholars” in the field and support the endogenous development in the areas that have just shaken off poverty. In 2021, a total of 70,500 people received training, including 24,400 officials at county, township and village levels, 23,700 entrepreneurial individuals in rural revitalization and 22,400 technical personnel, providing human capital needed for the rural revitalization. In addition, CNPC continued to push forward training programs for teachers and healthcare professionals by sending teachers and health workers to rural areas on a regular basis.

### Cultural Inheritance

At CNPC, we promote respectable social civility, family culture and folk customs, with a focus on passing on fine traditional culture in rural areas. With respect to the development of local economy, we emphasize the integration with the local culture to carry forward and boost our traditions. For example, in Taiqian County and Fan County, Henan Province, the brands of “Jiang Ziya's Ferry” and

“North Henan Lotus Fragrance” were created, highlighting the folk culture about Jiang Ziya in ancient villages and the tradition of lotus farming in northern Henan. In addition, CNPC Libraries opened in many local communities to make newly published books available, share information on economic policies and farming skills, and enrich the cultural life in local communities.

### Ecological Conservation

At CNPC, we follow the notion of “lucid waters and lush mountains are invaluable assets” in improving the ecological environment in the assisted areas. In accordance with the requirements of the Five-Year Action Plan for Improvement of Rural Living Environment, we continued to promote “toilet revolution” and sewage treatment. The Company invested RMB 45.21 million in introducing household garbage and sewage treatment into nine villages in Qinghe and other counties in Xinjiang and improved rural toilets for 286 households.

Rural revitalization is embarking on a new journey as poverty alleviation has succeeded with great achievements. With a stronger sense of responsibility and mission, the Company will take targeted measures to promote the comprehensive rural revitalization covering rural industries, personnel, culture and ecology.



CNPC actively promoting rural tourism development in Xishui, Guizhou



## Education

At CNPC, we continue to help young people access equal opportunities for education and realize their dreams and values through various student aid programs. In 2021, the number of universities eligible for CNPC Scholarships increased from 13 to 17, and an amount of RMB 4.47 million was given to 685 candidates throughout the year. We actively explored new models and worked in partnership with China Foundation for Poverty Alleviation, Beijing Normal University Education Group and Tencent Charity Foundation to promote commonweal projects such as Xuhang Scholarship Program and the Teacher Training Program, and helped more and more children in accessing education in poverty-stricken areas.

## Promoting Local Development

At CNPC, we adhere to the principle of opening-up and cooperation for mutual benefit, and keep expanding our joint-venture cooperation with local capital in the upstream, midstream and downstream sectors. During the process of developing and running our projects, we help nurture local suppliers and contractors, thereby creating jobs, driving related business growth, and achieving win-win results between businesses and localities.

## Contributions to the Development of Overseas Communities

At CNPC, we respect the cultures and conventions of the host countries, and are committed to establishing long-term and stable cooperative relationship with them. As a good corporate citizen, we incorporate our development into local socioeconomic growth and actively create socioeconomic value to promote the development and prosperity of local communities.

## Managing Community Impact

At CNPC, we strive to have a positive influence in community development through responsible operations. This influence is not only reflected in creating jobs, paying taxes, and providing business opportunities for local suppliers, but also in protecting the environment, safeguarding human rights of local residents and fulfilling our CSR.

## Enhancing Communication with Local Communities

At CNPC, we set up coordinating bodies for environmental protection and community relations in many overseas areas to strengthen communication and coordination with local governments, NGOs and community representatives in a variety of forms.

### Xuhang Scholarship Program

In 2021, the Program provided RMB 11 million to support 3,397 students from 20 schools in eight provinces.

### Teacher Training Program

In September 2021, the Teacher Training Program was launched as part of the educational assistance efforts for rural revitalization. Supported by the education platform of Beijing Normal University, the program offered e-learning courses to rural teachers in 10 counties and districts in Xinjiang Uygur Autonomous Region, Jiangxi, Guizhou and Henan province. More than 2,000 teachers from primary and secondary schools in these areas participated in the training program.

### A small “desk” solves a big problem

Andes Oil Company, a subsidiary of PetroChina International (Ecuador), worked with two local communities in the north and south of the oil field to set up a Community Association comprising seven “desks”, i.e. Employment, Wages, Bidding, Material Supply, Dispute Settlement, Environmental Protection and Health and Safety. Each “desk” was composed of community workers from the EHS Department of Andes Oil Company, social workers from the local government and community representatives. All matters involving the relationship between Andes Oil Company and these communities were addressed through negotiation by the three parties participating in the “desks”.

## Participating in Community Welfare Activities

At CNPC, we play an active role in helping local people improve the living conditions by donating in education, healthcare and other public welfare programs to improve the level of education and prepare the local communities for sustainable development.

### Indonesia

- ◆ Every year, special funds were provided to improve education, health, sanitation, infrastructure and living conditions
- ◆ The Suku Anak Dalam Aboriginal Kids Support Project received the Outstanding Community Development Award from the Department of Social Services of the Republic of Indonesia
- ◆ The Traditional Batik Women's Support Project received the Gold Prize of the Sustainable Development Goals Award (ISDA) issued by the Indonesia Corporate Social Responsibility Development Association

### Chad

- ◆ The “Sweet Community” program was implemented to dig water wells and address drinking water issues in surrounding communities
- ◆ In recent years, we participated in and supported several public events such as the Peace Cup Half Marathon, National Women's Day Celebration, “Chinese Bridge” Chinese Language Proficiency Competition for Foreign College Students in Chad, and National Anti-Malaria Campaign
- ◆ We also provided assistance to sickle cell anemia hospitals, orphanages and other institutions

## Promoting Localization

CNPC is earnest in promoting localization. We place priority on purchasing local products and services, and offer opportunities for local contractors, suppliers and service providers to participate in our projects. We also support the development of local SMEs and community-based startups, and create job opportunities.

### Job creation for local residents

Andes Oil Company, a subsidiary of PetroChina International (Ecuador), assisted the local government in developing an employment database, compiling employment files for community residents, providing trainings on employment skills, with priority given to local employees, and creating more than 700 jobs.



Creating jobs for the local community by the Indonesian project

## Human Resources

At CNPC, we regard innovation as the key growth driver and talent as the greatest asset. We build up a strong talent pool to support business growth by deepening the reform of talent development system, implementing the talent-driven corporate development program, and maximizing the value of talents. Upholding the people-first concept, employees' all-round development is one of our top priorities. We strive to safeguard employees' legal rights and interests, build an effective platform for career development of our employees, pay close attention to their physical and mental health and ensure all employees can grow along with the Company while benefiting from the Company's development and innovation.





## Employees' Rights and Interests

Strictly complying with international conventions on labor and human rights, we respect and safeguard employees' legal rights and interests, and advocate an employment policy focused on equality and non-discrimination. We continue to perfect the compensation and benefits system, and improve workplace democracy, so as to create a fair and harmonious working environment for employees.

### Employment Policies

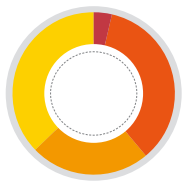
We always value and safeguard the lawful rights and interests of our employees in line with the "people come first" principle. We strictly comply with the *Labor Law of the People's Republic of China*, the *Labor Contract Law of the People's Republic of China* and the *Trade Union Law of the People's Republic of China*, relevant international conventions approved by the Chinese Government, and relevant laws and regulations of the host countries. We promote the employment policies of equality and non-discrimination, and provide equal opportunities and fair treatment to all employees regardless of nationality, race,

gender, religion or cultural background. We resolutely prohibit child labor and forced labor. We endeavor to create jobs in minority areas and poverty-stricken areas. We uphold the rights and interests of women and ensure that female employees have equal remuneration, benefits and career development opportunities. A hundred percent of our employees are covered by labor contracts and social security programs in accordance with the *Social Insurance Law of the People's Republic of China*.

### Remuneration and Incentives

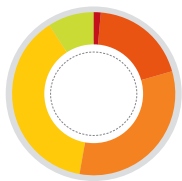
In 2021, in line with the theme of high-quality growth, the Company continued to improve the institutional system and the market-oriented remuneration mechanism with a focus on boosting quality and efficiency, advancing scientific and technological innovation, and talent-driven corporate development program. Incentives measures for performance excellence were optimized and the competitive and profit/efficiency-focused salary distribution system was perfected. Meanwhile, the salary structure was optimized to improve internal distribution, with priorities given to front-line workers, key and demanding positions and technical professionals. Medium- and long-term incentives were studied and formulated for implementation in an orderly manner to keep core staff motivated. The human capital management program advanced with improvements in talent-oriented incentives, market-based salary distribution and salary differentials to increase incentives for personnel of high-level management skills, experts in R&D of key technologies, and top talents with much-needed expertise.

#### Educational background of employees



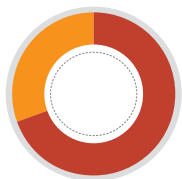
● Master's degree and higher	3.86%
● Bachelor's degree	35.14%
● Junior college	23.83%
● Technical secondary school and below	37.17%

#### Age groups of employees



● 25 or under	1.55%
● 26-35	19.26%
● 36-45	32.16%
● 46-55	38.07%
● 56 or above	8.96%

#### Gender groups of employees



● Male	69.57%
● Female	30.43%

### Employee Engagement

At CNPC, we value the role of our employees in democratic management, democratic participation and democratic supervision. A democratic management system and an open bulletin system based on workers' congress and the labor union are in place to ensure employees' right to know, participation, and supervision. A variety of channels for internal communication are available and democratic procedures are followed to encourage employees to offer their opinions and advices regarding the Company's development through meetings with employee representatives and online interactions etc.

## Career Development Platform

To accommodate the needs for career development of our employees at different stages, we stress the importance of career planning, promote innovation in the environment and mechanism for talent development and provide the necessary resources to support talent development. All this provides a great platform for employees in self-realization.

### Education and Training

At CNPC, we unleash the potential of human resources through “Internet + Training”, based on the modern practices of corporate training and the fast-paced transition towards e-training. A differentiated and diversified approach to vocational training is developed, leveraging needs analysis and innovative forms of training. In 2021, the Company started formulating the *14th Five-Year Plan for Employee Education and Training* to provide a multi-category, multi-tier standardized training system, focusing on encouraging innovativeness, professional competence, and value-creating capabilities. Job-related training standards and curriculum

structure were developed to ensure a comprehensive improvement in standard-based, systematic and disciplined training activities. In 2021, the Company spent RMB 1.52 billion on trainings, and of the number of people receiving training from the Company’s face-to-face and online training programs totaled 318,000 and 14.36 million person-times respectively.

### Career Development

At CNPC, we attach great importance to the career planning of employees and support the career development of employees to realize their value. Upholding the principle that “a talent shall possess both integrity and ability and the former takes precedence”, the Company strives to create a positive atmosphere for all kinds of talents to stand out and excel, based on a democratic, open, competitive and merit-based mechanism for talent selection. In 2021, the Company moved forward with the top tech talent program and the leadership succession planning. Meanwhile, the Company improved the mechanisms for job rotation, evaluation, selection/



New employees' training at Dushanzi Petrochemical



appointment, and remuneration incentives to provide employees with a barrier-free and well-paced career path.

As of the end of 2021, the Company has established 92 Skilled Expert Workshops, including 28 National Skilled Expert Workshops, which serves as an effective platform for career development.

## Localization and Diversity

At CNPC, we embrace a culture of respect, openness and inclusiveness and take a profession-based and market-driven approach to local employment. In line with the *Local Hiring Guidelines for Overseas Projects*, we continue to improve our HR procedures for recruitment, employment, performance review and reward/punishment under the applicable laws and regulations of the host country. Meanwhile, we encourage innovation and best practices in the management of locally hired employees, and attract and retain top talents from the local community by providing them with a career development platform.

### Promoting local employment

At CNPC, we create job opportunities, employ and train local people, and promote local employees to management positions. Our overseas operations are hiring professional talents in E&P, engineering and construction, international trade, finance, accounting and human resources management in more than 80 countries and regions. In 2021, international employees and local employees accounted for 86.67% of the Company's overseas employees.

### Respecting Cultural Diversity

At CNPC, we give full accommodation to the personality, ability and background of employees, and cherish their varied talents. We make every effort to eliminate the employment and occupational discrimination, create a relaxing and inclusive working environment, and promote the mutual respect and understanding among employees from different ethnic groups, nationalities and cultural backgrounds.

## Overseas talent development through international work skill competition

In June 2021, the Company held the first work skill competition for overseas employees. The competition was held online simultaneously in China, Kazakhstan, Uzbekistan and Myanmar. More than 3,000 local employees from the Company's overseas projects participated in the competition, and 16 individuals and 8 groups were recognized with a prize. As a platform for overseas employees to demonstrate their talent in work skills, the work skill competition encourages personal development and helps improve the overall level of work skills in the host country.



The employees of Oman project sharing ideas with each other

## Employee Health

At CNPC, we treasure employees' life and attach great importance to employees' health. We have rolled out a series of policies and measures to provide a favorable working environment for the physical and mental health of our employees and ensure that they can work in good physical conditions with positive attitudes.

### Occupational Health

At CNPC, we give priority to improving occupational health of our employees. In 2021, under the *Healthy China 2030 Initiative*, the company issued the *Measures for Occupational Health and Employee Health Management* and the *Measures for Employee Physical Examination Management*, held the Occupational Disease Prevention Law Awareness Week and implemented organization-wide occupational health monitoring. In 2021, 100% of our employees received occupational physical examinations, the screening rate of workplace occupational hazard was 99.92%, and occupational health records were prepared for 100% of our employees.

Occupational health examination (% of employees)

100%



Occupational health records (% of employees)

100%



Screening rate of workplace occupational hazard

99.92%



## Mental Health

At CNPC, we take measures to continuously improve the employee recuperation and vacation system. We offer various forms of training on mental well-being to promote positive and healthy attitudes among our employees. In 2021, the company continued to provide overseas employees with consulting services under the employee assistance program (EAP) to relieve stress, ensure good health at work, and improve quality of life.

### Overseas Employee Assistance Program

- ◆ The help-lines for overseas employees provided 1,228 hours of counseling service in 2021
- ◆ Overseas employees and their family members were invited to join the “Love on the Cloud” online lectures on mental health
- ◆ The IAP for employees was upgraded to provide consulting services in different ways and forms

### The first overseas “Hearty Hut”

In 2021, CNPC's first Hearty Hut, an employee mental health center integrating knowledge with fun, opened in N'Djamena, the capital of Chad. Equipped with a variety of devices for emotion measurement and stress management, the Hearty Hut is designed to support employees in properly evaluating their sleep, anxiety and depression conditions. At the same time, the results are used in designing targeted training on concentration, meditation and emotional management to help employees deal with stress and emotions. In addition, the Hearty Hut has also developed an online and offline emotion management training system for family members of overseas employees to enhance family coherence and sense of companionship.

## Implementing the talent-driven corporate development program to invigorate the industry and serve the nation

Talent is indispensable for a nation as well as a business. President Xi Jinping pointed out that talent is a strategic resource for realizing national rejuvenation and seizing the initiative in international competition. As the timeframes of the Two Centenary Goals converge, amid the opportunities and challenges coming with the green and low-carbon development in the energy industry, the Company has formulated the talent-driven corporate development program, aiming to create a dynamic human capital ecosystem and an outstanding talent pool to serve our high-quality growth.

### Setting goals for talent-driven corporate development

In 2021, the Company issued the *Action Plan for Talent-Driven Corporate Development*, setting out the guidelines, goals and major tasks for the program.

**In the first stage**, the Company will make new breakthroughs in institutional innovation, high-level talent acquisition and structural optimization to form balanced and coordinated talent strength by 2025.

**In the second stage**, the Company will build up the capabilities in unleashing talent vitality, empowering talent-led innovation and manifesting value creation to form a high-quality talent pool and rank top among SOEs in terms of talent strength by 2030.

**In the third stage**, the Company will tailor the size, quality, structure and succession planning of its talent pool to the strategic goal of building a world-class company and enjoy a world-leading position in terms of value contributed by talent and talent strength by 2035.

### Improving the institutional system for talent

After intensive studies on the measures for talent-driven corporate development, the Company has formulated the work program and supporting documents centered on ten talent schemes and the mechanism to train & groom, attract & pool, appraise & motivate, and use & develop talents, including the *Action Plan for Talent-Driven Corporate Development*, the *Human Resource Value Evaluation Method (Trial)* and the *Talent Development Scheme for New Energies, New Materials and New Businesses, etc.*, to create an integrated policy system for the orderly implementation of the talent-driven corporate development program.

## Creating a coordinated and efficient mechanism

In alignment with the 14th Five-Year Plan and the medium and long-term strategic goals, the Company has developed the *2021-2025 Roadmap for Talent-Driven Corporate Development Program* and the *2022 Schedule of Talent-Driven Corporate Development Program* and formulated the *100 Q&As for CNPC Talent-Driven Corporate Development Program*. Talent review methods are developed by category and the results of work are included in the review of the management in order to push ahead with the talent-driven corporate development program step by step.

### Ten talent schemes

Serving the innovation, resources, market, internationalization, green and low carbon strategies, the overall development of talent pool is based on the optimization of organizational system, guided by talent-driven value creation and powered by the key talent schemes.

- ◆ Organizational System Optimization Scheme
- ◆ Talent-Driven Value Creation Scheme
- ◆ Scheme to forge cadres with firm stand, complete competence and strong will
- ◆ Management Team Function Enhancement Scheme
- ◆ High-level Tech Talent Scheme
- ◆ Talent Pooling Scheme for Scientific and Technological Innovation
- ◆ Skilled Talent Training and Development Scheme
- ◆ International Talent Acquisition Scheme
- ◆ Talent Succession Scheme
- ◆ Talent Development Scheme for New Energies, New Materials and New Businesses

## Facilitating talent pool development

At CNPC, we implement and improve the mechanism to train & groom, attract & pool, appraise & motivate, and use & develop talents, press ahead with the ten talent schemes, and step up efforts to provide the ladder, platform and favorable environment for talent with management, R&D and technical expertise to encourage entrepreneurship, scientific spirit, craftsmanship and hard work, continue to inject momentum into our talent pool and boost value contribution by talent.

### To train and groom talent

The Company kept adapting its talent training to the needs of talent at different levels, i.e., key training schemes for top tech talents and “petroleum masters” and training programs for new employees. Based on the “Internet + Training” model, CNPC E-Learning offered online training sessions to 500,000 people in 2021, totaling more than 10 million hours.

### Apprenticeship programs for skill training

During July 4th to 13th, 2021, the ILO (International Labor Organization) Capacity Building Workshops on Quality Apprenticeship & CNPC Top Skilled Talent Development Week was held at Daqing Oilfield. In 2021, the Company was selected by the Ministry of Human Resources and Social Security as the only SOE to work with ILO on an international pilot program on quality apprenticeship.





## To attract and pool talent

The top-level framework designed for talent acquisition was strengthened to attract international talents with strong expertise in key technologies based on specified job requirements via a global recruitment platform. In 2021, the Company recruited 6,599 graduates through on-campus recruitment events, with 40.5% of new recruits holding a master degree or above.

## To appraise and motivate talent

The talent evaluation mechanism continued to improve. The *CNPC Rules for Professional Skill Level Certification* were revised to facilitate the transformation and upgrading in skilled talent evaluation practices. A standardized technical title assessment system was put in place to promote the alignment between talent pool development and business growth.

## To use and develop talent

At CNPC, we respect the basic principles of talent development and technological innovation. An innovation platform for technical experts was developed to facilitate innovation and value creation activities of high-level skilled talents. The first innovation fund for skilled talents in China was set up. As part of the efforts to improve quality and efficiency, top skilled talents were dispatched to provide assistance to member companies. In 2021, 531 technical problems were tackled and 53 national invention patents were granted.

In 2021, the Company's talent-driven corporate development program made solid progress. Under this program, one CNPC employee was elected as an academician of the Chinese Academy of Engineering; one was named as Craftsmen of the Nation; two received the China Skills Award; two were elected fellow of the China Chemical Industry Association; three received the 4th National Outstanding Engineer Award; 14 were awarded the title of National Technical Expert; a total of 28 gold medals, 34 silver medals, and 47 bronze medals were awarded to CNPC employees in national skill competitions, the best results over the past years. At CNPC, talents are marching ahead into the new era with high morale to make new achievements.

The Company has decided to dedicate the year of 2022 to pushing ahead with the talent-driven corporate development program. With a strong commitment to the talent-driven growth strategy and focusing on building a strategic talent force, we strive to provide competent human resources and intellectual support for a world-class enterprise built to last.



### In 2021

#### ■ New Employee Training Program

- ◆ The *Guidance on Strengthening the Training for New Employees* was issued, aiming to create a step-by-step framework for onboarding, follow-up training and further education of new employees
- ◆ The Chairman of the Board of Directors gave nearly 120,000 young employees online their first lecture at the Company

#### ■ Employee Competency Enhancement Plan

- ◆ Training courses were developed for nurturing professional talents in five key areas, i.e., upstream business, refining and chemicals business, oilfield services, engineering and construction, as well as marketing
- ◆ More than 21,000 employees were trained from the headquarters of the Company

#### ■ International Thousand Talents Program

- ◆ More than 140 young employees received training in IT, international business and foreign language skills under the succession plan

## CNPC set up China's first innovation fund for skilled talents

On May 13, the CNPC Skilled Talents Innovation Fund was launched in Beijing as China's first innovation fund for skilled talents. As a measure to implement the innovation strategy on the production front lines, the fund will encourage the innovation activities of front-line technical talents and provide financial support for their efforts in technical upgrading and technological research, facilitating technological commercialization and further enhancing quality and efficiency.

## Technology and Innovation

Focusing on self-reliance in top-notch technologies, we embrace innovation as the key driving force for development and promote comprehensive innovation centered on technological advances. The Company has deployed the innovation chain throughout the industrial chain, leveraged the innovation chain to improve the value chain, built up innovative capacity on all fronts, created the new growth engine and achieved high-quality development.



## Technological Innovation System

In 2021, the Company continued to deepen the reform of its framework for innovation governance and improved the technological innovation decision-making system. Progress was made in technological commercialization and breakthroughs were achieved in the integrated reform of “demonstration enterprises in R&D reform”. As of the end of 2021, the Company has set up a total of 93 research institutes, 55 key laboratories and testing centers, and 21 national R&D platforms. We have 29,803 researchers, including 24 CAS and CAE academicians.

### Capacity building on Independent Innovation

Our independent innovation capacity was further boosted. Innovation is a top priority for the Company. We have identified the directions and key areas of our R&D activities on core businesses, aiming to build up our own innovative capacity. A number of landmark innovations in theory and technology, core technologies, and equipment and software products have been achieved, highlighting our leading position in China’s oil and gas innovation system.

The R&D team enjoys a stronger momentum. The Company has made headway in building world-class research institutes and a world-class innovative enterprise in an all-round way and improving our opening-up, collaboration and sharing mechanism, the mechanism to train & groom, attract & pool, appraise & motivate, and use & develop talents, R&D talents evaluation system, as well as R&D incentives to create a stronger innovation momentum for R&D personnel.

### Progress in Technology Platforms and Innovation

We saw overall progress in technology platforms. The Big Data Security Research Center of Petroleum and Petrochemical Industry, as part of the National Engineering Big Data Security Lab, was set



Researchers tackling technical problems

up in CNPC. The Laboratory of Internet of Things was approved by the Ministry of Industry and Information Technology as a major large-scale intelligent instrumentation maintenance platform for oil and gas production. The Natural Gas Quality Control & Energy Measurement Laboratory and the Oil Pipeline & Equipment Quality and Safety Laboratory were approved to be key laboratories for state market regulation. The construction of the national key laboratory on EOR was making headway. A number of key platforms in new energies and new areas, e.g. hydrogen energy, carbon neutrality etc., have kicked off. A demonstration base was fully launched and approved as one of the third batch of China’s “Mass Entrepreneurship and Innovation” Demonstration Bases.

We have taken energy and chemicals innovation to new heights. On December 28, CNPC Dubai Research Institute, Shenzhen New Energies Research Institute and Shanghai New Materials Research Institute were established, marking an important step in the new journey of building a national strategic technological force and a high ground of energy and chemicals innovation.

Research institutes

93



Key laboratories and testing centers

55



National R&D platforms

21





## Three New Research Institutes

The three research institutes were inaugurated in 2021 to provide strong support for the Company's international operation and new energies and new materials business.

### CNPC Dubai Research Institute

Middle East-based with an exposure to Africa and other regions, the institute provides optimized solutions for overseas upstream businesses.

### CNPC Shenzhen New Energies Research Institute Co., Ltd.

As an independent new energies innovation center, the institute provides a platform for strategic and decision-making support, technology incubation and commercialization, talent introduction and training, and international exchange and cooperation, in a bid to take the new energies innovation to new heights.

### CNPC (Shanghai) New Materials Research Institute Co., Ltd.

Taking the high ground of new materials innovation, the institute is a center for R&D in new technologies, technology commercialization, talent gathering and international exchange and cooperation.

## Major R&D Achievements

The Company implements actively an innovation-driven strategy focusing on major bottlenecks in key areas. Debottlenecking in core technologies and forward-looking, basic and strategic research were further strengthened and commercialization of new technologies for productivity gains was accelerated to achieve fruitful results in E&P, refining and petrochemicals, oilfield services and new energies etc.

### Top 10 Technological Innovation Achievements of CNPC

- ◆ Geological theories and E&P technologies for continental shale oil
- ◆ 1Mt/a ethane-to-ethylene technology set
- ◆ CG STEER rotary geosteering drilling system
- ◆ One-click interactive 7,000-meter automated drilling rig
- ◆ EV56 high-precision broadband vibroseis
- ◆ Multifunctional integrated reservoir numerical simulation software (HiSim4.0)
- ◆ AnyCem automatic cementing technology and equipment
- ◆ CLog multidimensional and high-precision imaging logging system
- ◆ 4<sup>th</sup>-generation fine zonal water injection technology
- ◆ Technology set on 1-butene/1-hexene production with flexible mutual conversion

**E&P:** The Company focused its ongoing R&D efforts on high-efficiency E&P and cost-effective production, innovative geological theories for carbonate reservoir forming, development and improvement of key technologies used in comprehensive geological evaluation for marine-facies deep shale gas, composite flooding in conglomerate reservoirs, and chemical flooding-based EOR in oilfields, so as to facilitate deep/ultra-deep strategic substitution, large-scale shale gas production and production stabilization/expansion in mature oilfields. These efforts provided technical support in achieving a record-high newly-added proven reserves of oil and gas equivalent and a steady production growth in 2021.

**Refining and Chemicals:** The Company continued to optimize its refining and chemical product mix, and facilitate coordinated progress in six key R&D projects (Big Refining, Big Ethylene, Big Aromatic Hydrocarbon, Refining and Chemical Transformation & Upgrading, New Polyolefin Products, New Chemical Materials for Oilfields), and implemented 27 field test projects, e.g. CBB capacitor, and ultra-high melt flow rate metallocene based polypropylene, etc. The CCOC catalytic cracking process for further reduction of olefins in gasoline and the zonal DCP process for heavy diesel were developed and commercialized. 1Mt/a ethane-to-ethylene unit, 1.5Mt/a liquid feedstock-to-ethylene unit, catalysts set for ethylene units and other core supporting technologies were developed and deployed to enhance the competitiveness of the Company's ethylene products.

**Oilfield Services:** R&D achievements regarding core technologies and equipment included open platform-based new-generation

ultra-large seismic processing and interpretation software, multi-dimensional high-precision imaging logging system, rotary geosteering drilling system, and one-click interactive 7,000-meter automated drilling rig. The Company is basically able to produce the entire spectrum of upstream equipment on its own, indicating a remarkable improvement in technical service capabilities and international competitiveness.

**New Energies and Green & Low-Carbon:** Geothermal technologies for the conversion of disposed wells into geothermal wells and thermal reservoir fracturing were making important progress; advances were made in building a pre-emptive technical reserve, e.g. natural gas hydrates, in-site conversion of shale oil and underground coal gasification etc. The carbon dioxide capture, utilization and storage (CCUS) source-sink pairing and potential evaluation methodology was developed; CCUS industrial tests were accelerated in main oil producing areas, with new progress in the debottlenecking and application of supporting technologies to provide strong support for improving oil recovery and facilitating the Company's green growth.

**Frontier Technology:** The Company has been developing new theories, methods and technologies in line with strategic development needs of the future and international technological development trends. Breakthroughs in understanding the mechanism of deep/ultra-deep oil and gas accumulation, and research on new geophysical evaluation technologies were achieved to provide support for deep E&P and EOR activities; geological theories on the accumulation and enrichment of continental shale oil were developed to guide and propel the continental "shale oil revolution"; theoretical understanding and core technology in nano-flooding, carbon dioxide flooding, and smart injection and production made important headway to improve effectively the recovery and producibility of low-permeability oilfields and high-water-cut oilfields. R&D efforts were organized to debottleneck technologies under study regarding new-generation high-value-added synthetic materials and products, and natural gas-based high-value-added chemicals, and to deploy a pre-emptive technical reserve for new chemical materials; major breakthroughs were made in high-end polyolefin materials for medical applications.



Changqing Oilfield Digital Command Center

## Digital Transformation and Intelligent Operation

Focusing on intelligent technology and product innovation, the Company has integrated digital technology into its products, services and processes along the oil and gas value chains to restructure the value system and rebalance the production relationship. In this way, we facilitate the shift from capacity-driven growth to innovation-driven growth by leveraging new elements, new growth-drivers and new capabilities to create new businesses, new operations and new business models that are in line with a "Digital CNPC".

The Company has implemented digital transformation in three main areas, i.e. business development, management reform and technological empowerment, and introduced an integrated, two-tier strategic framework by creating the application ecosystem centered on Industrial Internet technology system and cloud platform. The Internet, big data and artificial intelligence have become an integral part of the Company's business operations to facilitate digital transformation and intelligent operation in the form of intelligent oil/gas fields, intelligent refineries and chemical plants, smart marketing, and intelligent engineering.



Drones used in Yumen Oilfield for production site inspection

In 2021, the pilot programs of digital transformation and intelligent operation kicked off, involving 14 member companies in key business areas chosen as the first batch of demonstration bases, in a bid to explore a replicable, practical CNPC model of digital transformation and intelligent operation.

### China's first 5G smart refinery was unveiled at Changqing Petrochemical Complex

On June 10, 2021, China's first smart refinery with 5G dedicated network, 5G-enabled production process, 5G eco-system and all-scenario 5G application was launched at Changqing Petrochemical Complex.

The deployment of 5G dedicated network and mobile edge computing (MEC) platform helped to build a high-speed, large-bandwidth, low-latency, and high-reliability 5G cloud infrastructure that meets the needs of Changqing Petrochemical in terms of network latency and data security etc.

The 5G+ early warning system for mobile devices deployed on the MEC platform can track automatically the status of hundreds of mobile devices on premises through 24-hour real-time calculation and precise sensing, with an accuracy rate of over 95% for its early warning. Such a system enabled a significant drop in the failure rate and maintenance cost of equipment to ensure safety and stability in refining production.

Changqing Petrochemical also has an intelligent inspection route leveraging 5G, digital twin, and visual recognition technologies to improve the control and management of production operations.

### The first Blockchain + Energy company in Asia Pacific was incorporated

During the signing ceremony held for the SOE delegation at the 4th China International Import Expo on November 6, 2021, PetroChina International signed a cooperation agreement on Commodity Blockchain Platform with nine global partners including Sinochem Energy and COSCO Shipping Energy Transportation. As a result, TradeGo Pte. Ltd. was established as a joint venture engaging in blockchain-based commodity trading. This is the first "Blockchain + Energy" company in Asia Pacific.

TradeGo Pte. Ltd. offers a digital platform for blockchain-based commodity trading. This platform will effectively address the pain point problems related to security, authenticity and timeliness of key document delivery in international commodity trading and reduce information asymmetry among the various links of traditional trading processes. It is a ground-breaking solution to improve operating efficiency, lower financial costs and provide a safe, authentic and high-efficiency trading environment for upstream and downstream clients involved in commodity trading as well as the industry regulators.



## Technological Exchange and Cooperation

In the principle of mutual benefit and win-win cooperation, the Company works closely with energy companies, organizations and research institutes at home and abroad to carry out S&T exchange and R&D cooperation, in a bid to jointly promote technological progress and innovation in the industry.

Domestically, the Company's collaboration with Peking University, Tsinghua University and Chinese Academy of Sciences was mainly focused on oil and gas-related frontier technologies, new energies and new materials, with technical seminars to discuss R&D cooperation in multiple areas.

Internationally, the Company worked with its strategic partners, including TotalEnergies, Petronas, Rosneft, Gazprom and ADNOC on waterflooding and polymer flooding-based EOR, fracture design software, molecular management and smart refinery, carbon emission reduction and management etc.

*Isotactic Index by Low-resolution Nuclear Magnetic Resonance Spectrometry.*

In 2021, honors and awards received for achievements in R&D projects led or participated by the Company included: one first prize and two second prizes of the State Science and Technology Progress Award, one second prize of the National Award for Technological Invention, one silver prize and five excellence prizes of the 22nd China Patent Award, one first prize and two excellence prizes of the 3rd SOE Shining Star Innovation and Creativity Competition. In 2021, the Company filed 5,016 patent applications (including 4,779 patents for inventions) and was granted 4,277 patents (including 1,728 patents for inventions).

## S&T Awards and Intellectual Property Rights

The Company continued its efforts in standardization in 2021. The platform for standardization made steady headway and the Standardization Committee of the China Petroleum Society was set up. The Company played a leading role in the development and introduction of two international standards, including the ISO 24076:2021 *Plastics - Polypropylene (PP) - Determination of*

Patents applied

5,016



Patents granted

4,277



Daqing Refinery Control Center



# Annual Business Overview

Aiming at modernizing the corporate governance framework and capabilities, and advancing the green and low-carbon transition, CNPC restructured its business portfolio into four business segments, i.e. i) Oil, Gas and New Energies, ii) Refining, Chemicals, Marketing & New Materials, iii) Support & Services, and iv) Capital & Finance, highlighting business synergy, professional competence and industrial chain integration for domestic and overseas operations and promoting the establishment of a clean, low-carbon, safe, efficient and modern energy system.



## Oil, Gas and New Energies

In 2021, taking advantage of the economic recovery and rebound in oil prices, the Company made great efforts in optimizing the business structure and achieved a spectrum of important results in E&P. Meanwhile, the Company's crude oil production increased steadily, the natural gas business expanded in terms of size and revenue, and the new energies business got a quick start.

100-billion-cubic-meter natural gas plays. Domestically, newly proven oil in place totaled 1,045.27 million tons and newly proven gas in place stood at 1,095.1 billion cubic meters.

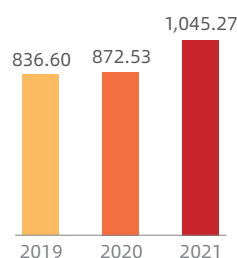
## Domestic Exploration and Production

In 2021, the Company reported a number of major exploration discoveries with its oil and gas production (TOE) hitting a record high.

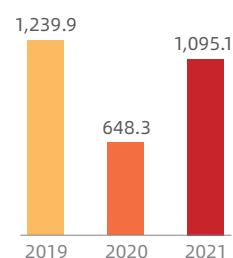
### Exploration

Sticking to its resource strategy, the Company stepped up efforts in improving exploration efficiency, with a focus on marine carbonate rocks, deep/ultra-deep exploration and continental shale oil, while boosting risk exploration, preliminary prospecting and concentrated exploration in key areas such as Ordos, Junggar, Tarim, and Sichuan Basin etc. In 2021, the Company's E&P efforts led to five strategic breakthroughs and 15 major discoveries and proved 23 large-scale oil and gas plays, including eleven 100-million-ton crude plays and twelve

Newly proven oil in place (Domestic)  
(mmt)



Newly proven gas in place (Domestic)  
(bcm)



### Reserves and Operating Data (Domestic)

	2019	2020	2021
Newly proven oil in place (mmt)	836.60	872.53	1,045.27
Newly proven gas in place (bcm)	1,239.9	648.3	1,095.1
2D seismic (kilometers)	11,478	7,852	7,264
3D seismic (square kilometers)	15,204	15,815	16,719
Exploratory wells	1,405	1,658	1,490
Preliminary prospecting wells	733	882	776
Appraisal wells	672	776	714



## Major Discoveries and Achievements in 2021

**Oil**

High-yield oil flows were obtained from exploratory wells at the Fuman oilfield and the Tabei area in the Tarim Basin, the East Fukang Slope in the Junggar Basin and the Xinglong Structural Belt in the Bayan-Hetao Basin.

**Natural Gas**

Major natural gas exploration breakthroughs were made in the southern margin of the Junggar Basin, the Ordos Basin, and the Bozi-Dabei area of the Tarim Basin, leading to the discovery of a number of large gas reservoirs.

**Shale Oil**

The Jurassic shale oil exploration in the Sichuan Basin made a major breakthrough.

### A one-billion-ton ultra-deep large hydrocarbon play was proved in the Tarim Oilfield

On June 4, 2021, four exploratory wells including Manshen No.2 and Manshen No.3 at the Fuman Oilfield in the Tarim Basin achieved a high output of more than 100 tons per day respectively, proving a super-rich fault zone with more than 200 million tons of estimated reserves. So far, the Fuman Oilfield has proved 34 fault zones from west to east, including Manshen and Yueman, with more than one billion tons of estimated reserves, making it the largest ultra-deep marine fault-controlled fracture-cavity carbonate reservoir in China.

Located on the south bank of the Tarim River in the hinterland of the Taklimakan Desert, and between two major hydrocarbon bearing areas in the Tarim Basin, i.e. Tazhong and Tabei, the Fuman Oilfield has a major oil-producing zone at a depth of about 8,000m below the surface. Ongoing R&D efforts targeting technical bottlenecks led to a major exploration breakthrough in ultra-deep marine carbonate rocks.

## Oil and Gas Production

Domestically, the Company produced 103.11 million tons of crude oil and 137.8 billion cubic meters of natural gas in 2021, with an increase of 0.85 million tons and 7.2 billion cubic meters respectively YOY. The full-year production hit a record high at 212.90 million tons of oil equivalent, with an increase of 6.58 million tons YOY.

### Development of Key Oil and Gas Fields

A range of effective measures were taken to ensure steady output growth in major domestic oil and gas fields. The oil and gas production of Changing Oilfield was on the rise and remained above 60 million tons of oil equivalent, with a year-on-year increase of over two million tons. Daqing Oilfield continued to maintain the crude output above 30 million tons. High-efficiency production from carbonate reservoirs in the Tarim Oilfield was achieved, with its oil and gas output staying above 30 million tons of oil equivalent. Southwest Oilfield saw steady growth in production as its shale gas and tight gas capacity expanded. Xinjiang Oilfield's crude output hit a record high. Liaohe Oilfield maintained stable production of above 10 million tons.

### Stabilizing Production of Mature Fields

Focusing on mitigating decline rates and enhancing recovery efficiency, the action plan for stabilizing production of mature fields was implemented effectively to keep decline rates well controlled. In 2021, the natural decline rate of oilfields leveled off and the composite decline rate dropped by 0.65 percentage points year-on-year. The natural decline rate and composite decline rate of high-water-cut and high-recovery-percentage of recoverable reserves decreased from a year earlier; and those of reservoirs with low-recovery rate and low-recovery percentage were flat for the year.

### Building up Production Capacity

Focusing on efficient oil and gas production, the Company leveraged technological progress to increase single well output and facilitated efficiency with management innovation. The year 2021 saw an addition of 11.85 million tons to the Company's crude capacity and an addition of 24.1 billion cubic meters to its natural gas capacity. The Fuman oilfield in the Tarim Basin completed a demonstration project of 2 Mt/a crude capacity

as the development activities picked up pace. Qingcheng, Changqing and Jimsar, Xinjiang saw a rapid ramp-up in the shale oil production. The key natural gas production ramp-up projects advanced steadily as new wells produced 11.3 billion cubic meters for the year.

### Unconventional Hydrocarbons

In 2021, the Company continued to step up unconventional E&P by enhancing the prediction and evaluation of sweet spots, pilot development and demonstration of profit-based capacity building. Guidelines were formulated to boost the efficiency and profitability of unconventional hydrocarbon development.

**Tight oil (shale oil):** A 1Mt/a-shale oil demonstration project was completed at Longdong, Changqing Oilfield. A tight oil capacity-building demonstration area and a nitrogen flooding pilot test area progressed well at Daqing Oilfield. A national shale oil demonstration area started construction in Gulong, Daqing. The Company produced 3,904,000 tons of tight oil in 2021.

**Tight gas:** Changqing Oilfield was built as the largest tight gas production base in China. The E&P of tight gas accelerated at Southwest Oilfield and Jilin Oilfield etc. The Company produced 38.04 billion cubic meters of tight gas in 2021.

**Shale gas:** Deep shale gas development in Luzhou made a major breakthrough and the 10-bcm shale gas field in the southern Sichuan saw a rapid growth in production. The Company produced 12.86 billion cubic meters of shale gas in 2021.

**CBM:** The CBM business stayed on course, with a full-year output of 2.32 billion cubic meters. Focusing on the medium-to-high-rank CBM resources in Shanxi province, the secondary evaluation was conducted in the Qinshui Basin and Edong gas field, bringing in new breakthroughs in deep CBM exploration.

### Foreign Cooperation in E&P in China

In 2021, CNPC's foreign cooperation E&P projects in China yielded a record-high amount of 11.94 million tons of oil equivalent, including 2.85 million tons of crude oil and 11.4 billion cubic meters of natural gas.

The Company deepened the cooperation with international partners, including Shell, TotalEnergies and Chevron etc., in E&P activities in China around low-permeability reservoirs, heavy

oil, shallow-water reservoirs, sour gas, high-temperature and high-pressure gas reservoirs, CBM, and tight gas. By the end of 2021, the Company had 29 E&P projects in operation with foreign partners.

These projects made steady headway in 2021. The Changqing Changbei Phase-I project remained stable as the Phase-II construction ramped up production capacity, producing more than 3 billion cubic meters for a 14th consecutive year. Fine management of gas reservoir was conducted in the Southwest Chuandongbei Project, seeing a new high in gas output. The natural gas production of the Changqing Sulige South Project increased year by year and the gas output of the Liaohe Haiyue Project grew for a third consecutive year.

Domestic oil and gas production

**212.90**

million tons of oil equivalent



Domestic crude production

**103.11**

million tons



Domestic natural gas production

**137.8**

billion cubic meters



## Overseas Oil and Gas Operations

In 2021, the Company continued to bolster its capabilities to manage global operations especially in Central Asia-Russia, Middle East, Africa, Latin America, and Asia Pacific, and achieved major breakthroughs in E&P activities. The Company's overseas equity oil and gas outputs stabilized at 100 million tons of oil equivalent as new projects and joint ventures made new progress. By the end of 2021, the Company's global oil and gas operations covered 32 countries and regions around the world.

## Oil and Gas Exploration

In 2021, the Company reported a number of major overseas discoveries. 1-billion-ton potential hydrocarbon reserves were discovered in Alam, Brazil and Yamal, Russia respectively; two 100-million-ton high-quality reserves and two 100-million-ton potential oil and gas reserves were discovered in Niger and Chad. Exploration activities in the Buzios project in Brazil, the PK project in Kazakhstan and the Block 5 project in Oman made significant progress.

### Central Asia-Russia

The Company operated cooperation projects in Russia, Kazakhstan, Turkmenistan, Uzbekistan and other countries in the Central Asia-Russia region. Oil and gas cooperation in this region continues to deepen as the "Belt and Road" Initiative advances steadily. The three LNG trains of Yamal LNG in Russia maintained high-utilization, safe and stable operation and the fourth train went on stream in May. The Arctic LNG-2 was half way through construction. The surface works of Amu Darya Territory B East Phase II in Turkmenistan were completed and the surface works of Territory B West gas fields were nearly half way of the construction.

### Middle East

The Company's business operations in the Middle East were expanding steadily as its investment portfolio and regional presence continued to be optimized. The Halfaya Gas Processing Plant in Iraq was half way through the construction. The UAE Onshore-Offshore Phase-II Project started construction.

### Africa

The Company's six oilfield surface works at Block H in Chad were put into operation in February. The second phase of the Niger project started construction. The FLNG vessel for the Area-4 deepwater floating liquefied natural gas (FLNG) project in Mozambique was completed in November and headed towards the operating site.

### Latin America

The Company's Buzios project in Brazil started to produce oil; the first floating production storage and offloading (FPSO) unit at Mero 1 Block of the Libra project was near completion and the second FPSO unit was more than half way through the construction.

### Asia-Pacific

The Company's projects in the Asia-Pacific region remained stable. The first phase of Arrow Energy's Surat Gas Project progressed well.



## Oil and Gas Production

The Company stepped up efforts in coordinated planning and life cycle management under development programs to achieve steady growth in overseas oil and gas production. The Company's overseas equity production amounted to 101.39 million tons of oil equivalent in 2021, including 76.33 million tons of crude oil and 31.5 billion cubic meters of natural gas.

## Pipeline Construction and Operation

The Company's overseas oil and gas pipelines maintained safe and stable operation, and its strategic routes in northwest and southwest delivered 20.87 million tons of crude oil and 51.44 billion cubic meters of natural gas throughout the year.

The pipeline projects under construction moved forward steadily. The agreement on construction and operation of the Niger-Benin Crude Pipeline took full effect as the pipeline construction went in full swing. The Kazakhstan Northwest Crude Pipeline Phase 2 Revamp Project was completed and put into operation. The No. 1 tunnel project for the Tajikistan Section of Central Asia-China Gas Pipeline-Line D was completed and tested for acceptance.

## Refining and Chemicals

The production and operation of the Company's overseas refining and chemical projects remained stable, processing 34.07 million tons of crude oil throughout the year. The Shymkent refinery in Kazakhstan completed a triennial overhaul. The refineries in Africa bolstered marketing efforts as the refinery in Chad reported the best-ever performance indicators and the refinery in Niger used a coordinated approach to its production and marketing activities to drive up product sales.

## Assets Optimization

The Company made many achievements in its overseas project development. The Company signed a major stake acquisition agreement and delivered a major project in Iraq and Brazil respectively while positive progress was made in oil and gas cooperation in the Middle East and Central Asia etc. The contracts for five projects in Kazakhstan and Indonesia were extended. The Company withdrew from three countries and made an exit from five projects/blocks as part of ongoing efforts to optimize its overseas assets portfolio, business structure and regional presence.



Zhalaroer Oilfield in Kazakhstan

## Natural Gas Sales

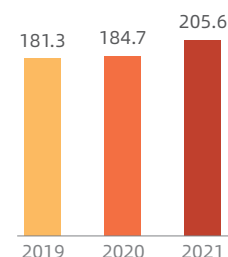
In 2021, as the economy recovered and the shift to clean energy accelerated, the domestic market saw a surge in the demand for natural gas. Leveraging a market-oriented approach, the Company optimized the production and operation processes, boosted domestic reserves and production ramp-up and diversified overseas sources to achieve a strong growth in natural gas sales. The full-year domestic sales stood above 200 billion cubic meters for the first time and reached 205.6 billion cubic meters, up by 11.3% year-on-year.

## Natural Gas Marketing

The Company achieved remarkable results in natural gas marketing through ongoing efforts in exploring the end-user market, forming strategic partnerships with key areas and large enterprises, improving the market-driven trading system, piloting natural gas-electricity-PV integration projects and promoting integration of natural gas and new energies. A number of urban gas projects were implemented in Xinjiang, Ningxia and Anhui, with a focus on provincial capitals and key cities. Marketing efforts targeting downstream urban gas end users were stepped up, adding about 1.48 million new end users throughout the year. The Company worked with business partners in Sichuan and other places in building service stations selling LNG and CNG. The urban gas-centered integrated energy business picked up the pace. By the end of 2021, about 11 projects went on stream with an installed capacity of 229 MW.

By the end of 2021, the Company's natural gas marketing network covered 31 provinces, municipalities and autonomous regions. The end-user sales volume totaled 46.4 billion cubic meters throughout the year, up by 11.2% from a year earlier.

Domestic natural gas sales (bcm)



## LNG

The Company further expanded its peak shaving capacity, optimized the planning for LNG operations and reinforced the offshore gas corridor through the development of LNG infrastructure. The Jingtang LNG peak-shaving project and the Jiangsu LNG terminal phase-III project became operational, effectively



Jiangsu LNG Terminal

improving the peak-shaving capacity and the ability to cope with extreme weather conditions in the Beijing-Tianjin-Hebei and Yangtze River Delta regions.

By the end of 2021, the Company had two LNG terminals in Jiangsu and Tangshan, with a total annual gasification and loading volume of 16.51 billion cubic meters. In 2021, the Company had 16 LNG plants in operation, with a total LNG processing volume of 2.4 billion cubic meters.

## Gas Storage Facilities

In 2021, the expansion of the existing gas storage facilities accelerated. Twenty-one gas storage wells were put into operation as planned after the capacity expansion; new projects, including the gas storage facilities of Jidong Oilfield and Liaohe Oilfield, progressed well to ensure sustained and fast-paced growth in the Company's storage and peak-shaving capabilities. The full-year gas injection stood at 12 billion cubic meters with a cumulative peak shaving capacity of 13.9 billion cubic meters.

## New Energies

Making the green and low-carbon energy transition a top priority, the Company has included new energies in its core operations to facilitate the shift to an integrated energy company across oil, gas, thermal energy, electricity and hydrogen, promoting the integrated development of fossil energy and new energies, based on a three-step approach of "clean alternative, strategic replacement and green development".

## Hydrogen Energy

Tapping into the hydrogen energy business, the Company's high-purity hydrogen supply capacity in operation has reached 1,500 t/a. Eight hydrogen refueling stations (integrated energy service stations) have been completed, with a processing capacity of seven tons per day. So far, the Company's hydrogen production capacity has exceeded 2.6 Mt/a, and the 19 hydrogen purification projects being planned or under construction cover seven regions including Bohai Rim, Shaanxi-Gansu-Ningxia, South China, Southwest China, Xinjiang, Heilongjiang and Jilin.

## Geothermal Energy

Since 2021, the Company has put into operation six geothermal heating projects in Xiong'an New Area, Tangshan and other places, increasing the coverage of geothermal heating by 9.6 million square meters. Currently, the Company has 16 clean heating projects in operation or under construction. The projects in operation are able to replace 350,000 tons of standard coal and reduce nearly one million tons of carbon dioxide emissions on an annual basis.

## Wind and Solar Power Generation

In 2021, the Company received a 1.2 million-kilowatt approval for wind and solar power generation and added 0.24 million kilowatts to the existing installed wind and solar capacity. A 200 MW photovoltaic power plant in Yumen Oilfield was connected to the grid, marking the Company's first grid-connected PV project. When operating at full capacity, the project will generate approx. 400 million kWh per year, equivalent to 110,000 TCE and reducing 280,000 tons of carbon dioxide emissions. A 6.9 MW distributed photovoltaic power station was completed and put into operation in Yingdong, Qinghai Province.



Photovoltaic power generation project at Jilin Oilfield



## Oilfield Services

In 2021, the Company's oilfield service business played an important role in adding reserves, increasing production and reducing costs by carrying out management innovation, improving quality and efficiency and coordinating production, operation and risk mitigation.

## Geophysical Prospecting

In 2021, CNPC acquired data of 34,000 kilometers of 2D lines and 86,000 square kilometers of 3D profiles.

Focusing on key basins, the Company made a number of major discoveries by employing new technologies, new equipment and new software, and ramping up R&D efforts in new areas, new types of resources and risk exploration activities. The "broadband, wide azimuth and high density" seismic prospecting techniques were widely adopted, leading to a remarkable improvement in location conformity in large urban areas and complex mountainous scenarios, and a wide application of vibroseis.

## Drilling

In 2021, the Company spudded 9,740 wells and completed 9,602 wells, with a total footage of 23.08 million meters.

IT-enabled drilling techniques and intelligent solutions were widely used and a three-year quality improvement action plan for oil, gas and water wells was launched to improve the quality and efficiency of drilling operations. The drilling speed was improved by 17.1% for five key types of wells.

## Well Logging and Mud Logging

In 2021, the Company completed 89,152 well-times of well logging, up by 5.23% year-on-year.

A remote technical support center was set up to provide remote logging and support. The "logging kit" was upgraded to support time-consuming tasks in high-temperature and high-pressure scenarios. Through-pipe logging tools were successfully applied to solve logging problems with long horizontal sections and complex well conditions.



Offshore geophysical prospecting operations of BGP

The Company completed 10,151 instances of mud logging throughout the year, by deepening researches on integrated geo-steering solutions as well as leveraging hydrocarbon detection/real-time monitoring techniques.

## Downhole Operations

In 2021, the Company completed 84,000 well-times of downhole operations, including 60,000 sections/intervals of fracturing.

In line with the “Four Improvements Program” (improvement in quality, speed, output, and efficiency), the unconventional SRV fracturing 2.0 was adopted to boost fracturing capabilities significantly. A number of high-yield oil and gas wells were identified in Xinjiang, Sichuan and Tarim fields as risk exploration and formation testing for deep and ultra-deep wells continued to improve. Service capabilities required for snubbing operations were strengthened and more than 1,200 new wells were successfully commissioned.

## Offshore Engineering

In 2021, the Company spudded 94 offshore wells and completed 96 wells with a total drilling footage of 217,000 meters. About 271 well-times of cementing services were provided.

The Company deployed four offshore drilling rigs, four production test/production platforms and 17 vessels to serve three offshore oilfield projects in the Bohai Bay. In the international market, the Company was awarded the Kuwait offshore site survey project, which progressed steadily.

### Oilfield Service Data

		2019	2020	2021
Geophysical prospecting	2D seismic data acquired (kilometers)	56,551	18,027	34,565
	3D seismic data acquired (square kilometers)	102,958	85,443	86,496
Drilling	Wells completed	11,571	9,350	9,602
	Drilling footage (million meters)	27.45	21.03	23.08
Well logging	Well logging operations (well-times)	105,746	84,721	89,152
Mud logging	Mud logging operations	13,175	10,011	10,151
Downhole operations	Downhole operations (well-times)	87,563	80,553	83,714
	Formation test (layers)	7,602	9,998	9,783
Offshore engineering	Offshore drilling footage (meters)	264,700	301,100	217,000

## Refining, Chemicals, Marketing & New Materials

In 2021, the Company continued to reduce the output of refined products and ramp up that of chemicals as the transformation and upgrading in refining and chemicals business picked up pace. In 2021, CNPC processed 166.74 million tons of crude oil domestically, and produced 108.92 million tons of refined products and 6.713 million tons of ethylene. There was a marked increase in the production of new materials as the campaign for boosting new materials business kicked off. Based on in-depth market research and focusing on the three prongs of marketing, namely retailing, wholesales & direct sales, and non-fuel business, domestic sales of refined products reached 111.26 million tons.

### Refining and Chemicals

The Company continued to hold down the utilization of refining facilities, raise the utilization of chemical plants and optimize the product portfolio, leading to new breakthroughs in the transformation and upgrading of the refining and chemicals business. The output of jet fuel, lube base oil and paraffin increased by 12%, 14% and 13% respectively, and the yield of refined products decreased by 1.7 percentage points year-on-year.

### Two national ethane-to-ethylene demonstration projects were completed

In August 2021, Lanzhou Petrochemical's Changqing Ethane-to-ethylene Project of 800 Kt/a began to produce up-to-standard ethylene products. In the same month, Dushanzi Petrochemical's Tarim Ethane-to-ethylene project was successfully commissioned at first try.

Both included as national demonstration projects, these two use CNPC's proprietary technology, i.e. ethylene production via ethane cracking, and exhibit world-leading technical and economic indicators such as ethylene yield and energy consumption.

Highlighting a green and low carbon design, both projects employ state-of-the-art new technologies such as flue gas denitrification, catalytic oxidation for treatment of spent caustic, ultrafiltration + reverse osmosis, and evaporative crystallization to minimize emissions of carbon dioxide and nitrogen oxides, etc.

#### Refining and Chemicals Operating Data (Domestic)

	2019	2020	2021
Crude runs (mmt)	168.44	160.02	166.74
Utilization rate of refining units (%)	84.1	82.3	81.6
Refined product output (mmt)	119.13	107.23	108.92
Gasoline output	50.44	46.28	49.39
Kerosene output	14.02	10.23	11.29
Diesel output	54.68	50.72	48.25
Lube oil output (mmt)	1.63	1.58	1.89
Ethylene output (mmt)	5.86	6.35	6.71
Synthetic resin output (mmt)	9.58	10.29	10.90
Synthetic fiber output (mmt)	0.04	0.03	0.02
Synthetic rubber output (mmt)	0.91	1.00	1.04
Urea output (mmt)	1.21	2.16	2.42
Synthetic ammonia output (mmt)	1.32	1.86	2.00



## Construction and Operation of Large Refining & Chemical Bases

As the Company continues to improve the operational stability of its refining and chemical plants, 99.7% of facilities maintained stable operation throughout the year. By the end of 2021, the Company has in total eight large integrated refining-petrochemical complexes and thirteen 10 Mt/a refineries in China.

A number of key petrochemical projects made significant headway. Using CNPC's proprietary technology for ethylene production via cracking of ethane, two ethane-to-ethylene projects in Changqing and Tarim were set up and running smoothly with world-leading technical and economic indicators. Several projects, including the 300 Kt/a-polypropylene plant of Liaoyang Petrochemical. The first batch of alkylation projects of Dalian Petrochemical and Dagang Petrochemical were put into production. Jinzhou Petrochemical's residual hydrogenation unit and Jinxi Petrochemical's continuous catalytic reforming unit were completed and delivered. The integrated refining and petrochemical project of Guangdong Petrochemical and the ABS project of Jilin Petrochemical (Jieyang) picked up pace.

## Optimization of Product Portfolio

The product portfolio of refining and chemical operations continued to optimize, aiming to increase the output of high-end and high-value products. In 2021, the Company's yield of refined products was 65.3%, with a year-on-year decrease of 1.7 percentage points. The output of propylene, aromatics and other lucrative products increased steadily. 20 of the 28 key technical and economic indicators of the Company's refineries were better than that of 2020.

In response to the sulfur limit requirement of the International Maritime Organization (IMO), the Company ramped up R&D and production of low-sulfur marine fuels and produced 4.07 million tons of low-sulfur marine fuels throughout the year.

The R&D and production of new chemicals and specialty chemicals gained momentum and the efforts to reduce the output of refined products and ramp up that of chemicals made remarkable headway. The output of ethylene, synthetic resin, synthetic rubber, chemical fertilizers and other products grew steadily. 83 types of

new chemical products were developed throughout the year, with a total output of up to 374,000 tons.

## Development and Application of New Materials

In 2021, the Company boosted new materials business based on its 14th Five-Year Plan for New Materials Business Development, focusing on 26 new materials in seven categories, so as to form signature products with a competitive edge. The annual production of new materials was 547,000 tons. Jinzhou Petrochemical began mass production of electrode coke and specialty coke as anode material; Dushanzi Petrochemical's 60,000 t/a solution-polymerized styrene-butadiene project was completed and delivered; a number of joint venture projects for polycarbonate, polyoxymethylene, and carbon fiber, etc. advanced smoothly. In December, PetroChina Shanghai New Materials Research Institute was established to provide strong support for the development of new materials business.

### R&D Breakthrough in High-performance Rubber Materials

Functionalized solution-polymerized styrene-butadiene rubber is a 3rd-generation SSBR (solution-polymerized styrene-butadiene rubber). As an ideal material for high-performance and eco-friendly tires, functionalized SSBR has become a research hotspot in synthetic rubber for excellent profile in wet traction, skid resistance, abrasion resistance, and rolling resistance.

The Company worked with Dalian University of Technology and Tongji University to develop the technology for the functionalization of SSBR. In May 2021, The Company began to produce the new functionalized SSBR product (SSBR72612F) and it passed the 72-hour performance acceptance test. The start of commercial production of functionalized SSBR of the Company marks a new breakthrough in the domestic high-performance rubber sector.

## Marketing and Sales

In 2021, the Company stepped up its marketing efforts in targeting institutional customers and crossover marketing campaigns. Marketing strategies were flexibly adjusted and the marketing network was optimized, in a bid to improve the quality and efficiency of marketing operations.

## Refined Products

In 2021, amid the resurgence of COVID-19, and frequent strikes of floods, blizzards and other natural disasters, the approach of fine marketing was adopted by fully leveraging the Company's integrated strengths across the industry chain as well as improving the coordination between production and sales. Multi-tiered and classified account management was enhanced and pilot programs for electronic refueling cards and apps were launched. The Company also responded actively to the regional and temporary diesel shortage in the fourth quarter to ensure market supply, and improve quality and profitability. The full-year domestic sales of refined products reached 111.26 million tons.

## Marketing Network

With an aim to become a top service provider of oil, gas, hydrogen, electricity and non-fuel products at home and abroad, the Company continued to optimize its investment portfolio and business priorities in line with changes in the vehicle fuel demand. The marketing operations were undergoing transformation and upgrading towards hydrogen energy, photovoltaics and charging stations to provide new services. Throughout the year, the Company developed a total of 300 service stations and put into operations 305 service stations. 8 hydrogen refueling stations and 66 battery swap or recharging

stations became operational. As of the end of 2021, the Company has a total of 22,684 service stations in operation across the country.

The Service Station 3.0 program was pushed forward, highlighting digital transformation, differentiated marketing, and fine management to create an intelligent and user-oriented digital service platform. Smart refueling stations, smart supply chain, and the scenarios of the "people-cars-life" ecosystem continued to take shape at accelerated pace. Mobile payment services via WeChat, Alipay, and CNPC Youtu platform were launched. Digital currency payment was piloted in Shenzhen, Guangdong, Xiong'an, Hebei and other places.

According to the report of the 2021 China Brand Power Index<sup>SM</sup> (C-BPI) released by the renowned brand rating and consulting company Chnbrand, CNPC ranked the first among China's fuel retailers for the fifth consecutive year.

## Non-fuel Business

The Company consolidated its third-party partner resources like centralized procurement suppliers to provide the service package of "products + services + fuels", so as to further integrate the marketing of fuel and non-fuel products. Car services such as car wash were boosted to promote both fueling and other related services. Leveraging more than 7,000 service stations in villages and small towns, the Company joined hands with relevant companies to create a new business model of "fertilizers + agricultural materials and equipment + finance + agricultural products" to serve the rural areas with tailored approaches. Pilot projects were launched to promote own-brand products, poverty alleviation products and specialty products through private service stations. The sales revenue from non-fuel business totaled RMB 27.3 billion in 2021, including RMB 24.9 billion from convenience stores.

### CNPC's first comprehensive energy station went into operation in Beijing

On September 30, 2021, CNPC Jinlong Comprehensive Energy Service Station opened in Yanqing, Beijing. The service station offers oil fueling, gas fueling, hydrogen fueling, charging, and convenience store services that enable a one-stop energy access covering oil, gas, hydrogen, electricity and non-fuel products.

Hydrogen fueling: the station served the hydrogen vehicles used in Beijing Winter Olympic Games with a daily capacity of 1,500 kilograms. Oil fueling: the station provides intelligent services such as smart fueling payment based on license plates, smart monitoring, as well as intelligent light control through

technologies such as IoT, AI-enabled video algorithm, smart inventory and electronic price tags etc. Charging: the station has three 120-kilowatt double chargers and six parking spaces, allowing an electric car to complete charging in 15 minutes. LNG fueling: the station is equipped with a 30-cubic-meter skid-mounted LNG fueling unit with a storage capacity of 11 tons. Non-fuel products: the convenience store has three sections, which are for immersive shopping, uSmile fresh brewed coffee, and entertainment respectively, offering more than 100 kinds of own-brand products in 10 categories.

## International Trade

In 2021, based on resources and markets at home and abroad, the Company enhanced integrated global operations and improved its global marketing network to build up international marketing capabilities and boost marketing of equity oil and gas overseas. The Company adjusted plans for refined product exports, expanded overseas markets for refining and chemical products, made preemptive analysis of the market, and took a proactive approach to secure gas imports for winter in advance, to ensure domestic energy demand. The Company's three international operation hubs in Asia, Europe and the Americas continued to improve operation management and boost the ability to operate across regions, markets and product lines. The Company completed a trade volume of 490 million tons and sales revenue of USD 230.4 billion for 2021.

### Crude Trading

The Company achieved high-quality development with improving volume and profitability in its crude trading business by optimizing the allocation of resources, establishing an efficient, flexible and stable supply and distribution system, and boosting comprehensive strength in resource acquisition, market development, cross-regional coordination, crude futures/paper trading, etc.

### Refined Products Trading

Market trends at home and abroad were watched closely and market-oriented changes to the export plans of refined products were made in a flexible manner. Marketing efforts in emerging markets were stepped up to make new breakthroughs in refined products trading in Pakistan, Mexico, India, the Netherlands and

other places. Biodiesel business of the Company continued to expand, and ranked among the top three in Europe. The Company actively participated in futures trading in domestic futures exchanges and ranked among the top in terms of the delivery of bonded fuel oil contracts.

### Natural Gas Trading

Based on analysis of international natural gas markets, the timing and structure of gas imports were optimized in response to changes in demand and supply conditions to ensure the stability in the Company's natural gas industry chain. Global LNG trade operations were strengthened as steady progress was made in the construction of the Company's own LNG fleet. The Company also tapped into carbon trading.

### Chemicals Trading

As market exploration for chemicals exports advanced actively, new breakthroughs were made in the export of many chemical products such as polypropylene and solid wax. Chemical fiber raw materials and light hydrocarbons gained momentum, yielding an increase in both volume and profitability.

### Maritime Shipping

Maritime shipping operations continued to optimize and consolidate, improving the global business layout and IT application to build up shipping service capabilities in the forms of voyage charter, time charter and contract of affreightment (COA) etc.



A LNG carrier heading towards the LNG terminal in east Guangdong

## Support & Services

In 2021, the Company leveraged its expertise and lean management to improve the quality and market competitiveness of its service businesses, i.e. Engineering & Construction, Equipment Manufacturing and Research & Consulting, highlighting the essential role of technological innovation and boosting the Company's high-quality development.

### Engineering & Construction

The Company continued to enhance its professional services and value-creating capabilities by improving the coordinated project management mechanism for key projects and pushing ahead with standardized design, large-scale procurement, factory prefabrication, modular construction, information management and digital delivery. By the end of 2021, the Company performed 75 major projects in surface engineering, refining & petrochemicals, and storage & transportation in the oil and gas field at home and abroad. China Petroleum Engineering Corporation ranked No. 4 on the ENR's Top 10 Global Oil and Gas Contractors list, and No.33 on the ENR's Top 250 Global Contractors (measured by revenue generated globally) in 2021, up one place from a year ago respectively.

### Oil and Gas Field Surface Engineering

The ethane recovery project in Tarim Oilfield was successfully put into operation. The first and second facilities at the Amur Gas Processing Plant in Russia were delivered as scheduled. The Bab Field upgrading project in the UAE, the Halfaya Gas Processing Plant in Iraq and the surface project for the Contract Territory B west gas fields in Bagtiyarlyk progressed smoothly, and the integration project of the Niger Oilfield Phase II started.

### Storage & Transportation

A number of projects were completed and are up and running, including the peak shaving project for the Tangshan LNG Terminal, the expansion of the Jiangsu LNG Terminal, the supporting pipeline for the East Guangdong LNG Project and the Thailand Ratchaburi Natural Gas Pipeline etc. Projects that are under construction include the south section of the Eastern Russia-China Natural Gas Pipeline, the Shenzhen LNG Peak Shaving Station, the Tianjin Nangang LNG Storage Project, the Wenzhou LNG Storage & Peak Shaving Center, and the Tangshan LNG Distribution Pipeline etc. Gas storage projects advanced steadily. The gas storage facilities at Suqiao, Hebei reached the designed capacity and the salt cavern gas storage projects at Chuzhou and Huai'an, Jiangsu progressed as planned.



The crude oil terminal construction site of the refining-petrochemical integration project at Guangdong Petrochemical



## Refining & Chemicals Engineering

The ethane-to-ethylene projects at Changqing and Tarim oilfields and the 100 Kt/a EVA plant at Sinochem Quanzhou became operational. The integration project of Guangdong Petrochemical picked up pace. The Dushanzi Tianli High & New Tech's 200 Kt/a EVA project, Jingzhou Petrochemical supply-side restructuring project, and the Jinxi Petrochemical supply-side restructuring were going well. The overhaul and maintenance projects at Dagang Petrochemical, Jilin Petrochemical and Fushun Petrochemical were completed.

## New Energies & New Materials

Leveraging its technological strengths and engineering capabilities, the Company explored actively the market of new energies and new materials. The 200 MW photovoltaic power generation demonstration project in Yumen Oilfield was connected to the grid and became operational. The by-product hydrogen purification project Phase I of North China Petrochemical came on stream. New materials projects were launched, including the 60 Kt/a e-SBR EPC project of Dushanzi Petrochemical and the Shengtong Juyuan polycarbonate project in Henan province.

## Overseas Market Development

The Company achieved good results in optimizing its global market layout and exploring the overseas markets, including the contracts for the Zubair Mishrif Degassing Station Expansion Project in Iraq, the first contract with the Italian energy company Eni that aimed at the high-end market. The contract with Botswana Water Utilities for the Phase 2 and 3 of the procurement and construction of the water pipeline from Mamacia to Gaborone network marked CNPC's debut in Botswana. In addition, we signed the contract for the Niger-Benin Crude Oil Distribution Pipeline Project (Niger section + Benin section), the FEED +EPC contract for six Contract Territory B west gas fields in Bagtiarlyk, Turkmenistan, the contract with Thai state-controlled oil company PTT for the No.7 Gas Plant EPC Project, the contract with PT Pertamina for the East Java LPG Refrigerated Terminal Development - Onshore Terminal and Jetty EPC Project, and the contract with ADNOC Onshore for the Bu Hasa Oilfield EPC project in UAE. All these achievements helped bolster the foundation of cooperation among nations along the "Belt & Road".

## Petroleum Equipment Manufacturing

The Company's equipment manufacturing business remained focused on technology, quality, service and the market. Remarkable results were achieved in terms of productivity and financial gains, as transformation and upgrading picked up pace, lean management deepened, and continuous improvement was made in automation, information management, digitalization, and intelligent operation. The Company's supply chain and marketing network continued to grow with overseas branches in Central Asia, Latin America, the Middle East, Africa, Asia Pacific and other key international oil and gas production regions. By the end of 2021, the Company sold petroleum equipment to more than 80 countries and regions around the world.

The transition to "manufacturing + service" and "product + service" made headway and input to service operations was stepped up to extend the value chain and enhance market competitiveness. Baoji Petroleum Steel Pipe Co., Ltd., a subsidiary of CNPC, was recognized by the Ministry of Industry and Information Technology as one of the third batch of National Service-oriented Manufacturing Model Enterprises. Baoji Oilfield Machinery Co., Ltd. was awarded a Service-oriented Model Enterprise in Shaanxi Province.

With a focus on E&P in shale gas and shale oil, the Company doubled efforts in research and development of core technologies and key equipment. New breakthroughs were made in key equipment solutions such as HMI-enabled one-touch 7,000-meter drilling rig, 5000HP/7000HP electric fracturing skid, ultra-high strength CT150 coiled tubing, and high-pressure gas injection compressor etc., with some of these products up to world-class.

The Company has set up overseas offices in many countries and regions around the world, underscoring the importance of international market development and cooperation. In 2021, the Company opened up three new markets, i.e. the DR Congo, Vietnam and Togo. The "product + service" business model facilitated market breakthroughs in many countries and regions. The Asian large-diameter steel pipe manufacturing project was successfully completed in Kazakhstan, the Australian line pipe project was successfully signed. The Company's compressor products entered high-end market and were installed in the gas processing plant in Tanzania. A long-term service agreement for electric pumps was recently signed in Niger, keeping the Company's share in Niger's electric pump market.

## Capital & Finance

The Company has a complete set of financial licenses, with business operations covering in-house banking, financial leasing, trust, insurance, insurance brokerage, securities, etc. In 2021, the Company optimized its business structure and made capital and finance one of its four business segments, aiming to shore up brand building for petroleum-finance services and support the Company's high-quality development.

Using the Company's professional platform, capital & finance business implemented the "dual-driver" approach to market services and industry-finance integration. In line with the trends of industry finance, efforts were made to strengthen the alignment of financial services with production needs and collaboration between financial institutions and tap into green finance and new energies business, in a bid to expand external markets and enhance market competitiveness and brand influence. CNPC Capital made it to the 2021 Top 100 Listed Companies in China and received again the Top 100 Chinese Enterprises Award and China Ethical Enterprise Award. In 2021, Kunlun Capital, an industrial capital investment company founded with an investment of RMB 10 billion, was established successfully and have set up its first green and low-carbon innovation fund.

### Capital Management

Financial functions such as cash concentration, settlement, fund monitoring and financial services are performed through China Petroleum Finance Company, a subsidiary of the Company, to support the centralized capital management and the effective utilization of funds. China Petroleum Finance Company continued to improve the quality of its financial products and customer service capabilities by introducing four innovative products, i.e. Green Sales Loan, Forex Easy Loan, Cross-border Connect and Oil Product Discounts. Credit services for the industry chain buyers were successfully launched, as part of the efforts to expand the scope of financial services and support the high-quality development of the oil and gas operations.

### Banking

Bank of Kunlun, a subsidiary of CNPC, further clarified the roadmap towards its strategic goals and remained committed to the industry finance business. The focus was on business expansion along the industry chain, with a substantial year-on-year increase in both the amount of lending and loan balances of its industry finance business. Online products such as Gas Easy Loan, Oil Easy Loan and CNPC E-Connect were developed and launched to introduce an integrated marketing mechanism and tap into the downstream finance market.

### Trust

Kunlun Trust, a subsidiary of CNPC, pushed ahead with the shift to business innovation, offered a wider range of investment instruments

and explored business models in green and low-carbon operations, new energies, new materials and new technologies etc. to further enhance its business portfolio. ABS (asset-backed securities), ABN (asset-backed notes) and non-financial management services displayed a strong momentum with optimized processes and incentives, pushing the size of securities assets to nearly RMB 30 billion.

### Financial Leasing

In 2021, Kunlun Financial Leasing, a subsidiary of CNPC, was deeply engaged in the oil and gas market along the industry chain with full-year lending amounting to RMB 13.716 billion, up 18% from a year ago. The total earnings of Kunlun Financial Leasing since its inception exceeded RMB 10 billion, marking a historical milestone for its business growth.

### Insurance

The captive insurance business broadened the coverage of property insurance policies. Overseas captive insurance arrangements now cover 54 projects in 23 countries after adding five new projects, including the Niger-Benin Pipeline. Generali China Life Insurance tapped into 17 new industry finance projects throughout the year, seeing a sustained growth in insurance premiums. Based on a more sophisticated risk management system, Generali China Insurance reported more than RMB 1 billion in premium income for the year, staying profitable for three consecutive years.

### Insurance Brokerage

Kunlun Insurance Brokerage Company, a subsidiary of CNPC, won the bid for the insurance brokerage project of the China Oil & Gas Pipeline Network Corporation and became its chief insurance broker.

#### Kunlun Capital boosts CNPC's strategic shift

On June 28, 2021, CNPC Kunlun Capital Co., Ltd. was established in Beijing. Kunlun Capital focuses on strategic emerging industries such as new energies, new materials, energy conservation and environmental protection, and high-end intelligent manufacturing. Meanwhile, the integration of the innovation chain with the industrial chain will be enhanced through equity investment. The aim is to facilitate CNPC's efforts to increase the share of new energies business, accelerate the development and utilization of new materials, commercialize technological achievements, facilitate the incubation process of new business models, and help to implement the three-step strategic approach, i.e. "clean alternatives, strategic replacement and green development".







# Financial Statements

## Consolidated Balance Sheet

million RMB yuan

Item	2019	2020	2021
<b>Current assets</b>			
Cash and cash equivalent	235,219.65	229,805.98	271,391.44
Funds lent*	218,250.12	185,735.05	231,062.05
Financial assets held for trading	71,433.97	90,336.79	106,791.43
Derivative financial assets	216.93	1,517.35	398.49
Notes receivable	511.90	705.98	452.16
Accounts receivable	102,826.89	81,434.34	84,149.57
Receivables under financing	7,562.56	8,261.93	2,540.43
Prepayments	158,604.29	202,726.16	153,383.54
Premium receivable*	94.12	69.62	101.22
Reinsurance accounts receivable*	615.50	845.91	797.39
Reinsurance reserves receivable*	1,291.31	1,642.82	1,771.00
Other receivables	30,613.57	36,270.47	57,579.58
Financial assets purchased under resale agreements*	10,957.11	24,700.22	62,059.09
Inventories	257,020.86	177,126.67	189,004.94
Contract assets	0.01	59,720.40	74,258.89
Assets held for sale	-	42,612.74	-
Non-current assets maturing within one year	168,726.62	140,145.28	197,170.16
Other current assets	132,878.14	144,217.31	111,857.78
<b>Total current assets</b>	<b>1,396,823.55</b>	<b>1,427,875.02</b>	<b>1,544,769.16</b>
<b>Non-current assets</b>			
Loans and advances issued*	29,149.65	116,262.45	101,454.52
Debt investments	93,385.88	95,439.55	70,676.25
Other debt investments	40,430.82	42,224.44	21,161.19
Long-term accounts receivable	54,294.96	52,329.15	47,579.43
Long-term equity investments	154,018.37	292,118.13	317,945.69
Other investments in equity instruments	10,778.95	9,081.59	8,213.47
Other non-current financial assets	42,810.70	53,528.19	33,662.27
Investment properties	2,855.36	2,475.44	2,467.83
Fixed assets	905,281.70	585,065.95	583,336.40
Construction in progress	277,849.67	252,217.09	259,819.94
Productive biological assets	0.15	-	0

## Consolidated Balance Sheet (continued)

million RMB yuan

Item	2019	2020	2021
Oil and gas assets	970,722.41	944,188.74	952,596.50
Right-of-use assets	-	-	45,834.09
Intangible assets	100,875.87	101,544.28	105,979.60
Development expenditure	1,251.68	963.68	1,145.53
Goodwill	42,905.99	8,218.11	8,077.95
Long-term deferred expenses	46,604.68	52,474.45	35,756.12
Deferred tax assets	33,542.12	20,542.86	21,694.34
Other non-current assets	32,159.61	32,124.71	30,263.90
<b>Total non-current assets</b>	<b>2,838,918.57</b>	<b>2,660,798.81</b>	<b>2,647,665.02</b>
<b>Total assets</b>	<b>4,235,742.12</b>	<b>4,088,673.83</b>	<b>4,192,434.18</b>
<b>Current liabilities</b>			
Short-term loans	102,286.47	71,623.21	69,037.11
Borrowings from central bank*	1,331.12	2,624.23	7,887.49
Borrowing funds*	65,139.67	50,392.82	49,055.04
Derivative financial liabilities	3,551.41	4,698.08	3,640.25
Notes payable	41,554.65	60,397.70	68,562.99
Accounts payable	379,410.75	331,213.44	362,295.11
Receipts in advance	32,884.98	5,932.95	2,718.61
Contractual liabilities	81,784.64	114,449.18	105,583.80
Funds from sales of financial assets with repurchase agreement*	30,324.45	26,671.98	32,748.93
Deposits from customers and interbank*	198,436.48	200,083.54	204,244.40
Funds arising from acting trading of securities*	0.01	0.01	0.01
Employee benefits payable	44,763.16	38,931.87	46,203.38
Taxes payable	78,407.69	72,405.53	88,123.36
Other payables	79,106.03	84,212.70	78,730.86
Handling charges and commissions payable*	29.85	40.06	27.59
Reinsurance accounts payable*	582.44	719.83	592.40
Liabilities held for sale	-	2,261.52	-
Non-current liabilities due within one year	72,592.67	59,828.46	94,871.38
Other current liabilities	88,604.46	57,946.62	54,875.37
<b>Total current liabilities</b>	<b>1,300,790.93</b>	<b>1,184,433.73</b>	<b>1,269,198.08</b>

## Consolidated Balance Sheet (continued)

million RMB yuan

Item	2019	2020	2021
<b>Non-current liabilities</b>			
Reserve for insurance contracts*	3,691.38	4,461.50	5,651.65
Long-term loan	21,146.92	54,104.05	91,473.65
Debentures payable	302,950.55	333,188.51	244,297.40
Lease liabilities	-	-	28,321.54
Long-term payables	5,668.89	5,021.67	12,611.61
Long-term employee remuneration payable	1,613.01	1,515.78	1,481.84
Accrued liabilities	164,026.22	139,443.84	150,091.81
Deferred income	23,790.49	12,808.10	10,500.30
Deferred tax liabilities	35,287.71	31,310.22	44,285.11
Other non-current liabilities	3,156.24	3,144.16	2,808.28
<b>Total non-current liabilities</b>	<b>561,331.41</b>	<b>584,997.83</b>	<b>591,523.19</b>
<b>Total liabilities</b>	<b>1,862,122.34</b>	<b>1,769,431.56</b>	<b>1,860,721.27</b>
<b>Owners' equity</b>			
Paid-up capital (or share capital)	486,855.00	486,855.00	486,855.00
Other equity instruments	104,727.09	147,702.14	102,994.08
Capital reserve	275,435.62	255,441.43	269,023.34
Other comprehensive income	-14,870.81	-43,451.99	-53,658.65
Special reserve	32,439.08	17,690.80	16,243.69
Surplus reserve	1,084,354.66	1,084,371.23	1,085,311.85
General risk provisions*	11,663.96	11,857.50	12,585.14
Undistributed profit	-10,996.23	18,121.74	70,812.45
<b>Total equity attributable to CNPC</b>	<b>1,969,608.37</b>	<b>197,8587.85</b>	<b>1,990,166.90</b>
Minority interest	404,011.41	340,654.42	341,546.01
<b>Total owners' equity</b>	<b>2,373,619.78</b>	<b>2,319,242.27</b>	<b>2,331,712.91</b>
<b>Total liabilities and owners' equity</b>	<b>4,235,742.12</b>	<b>4,088,673.83</b>	<b>4,192,434.18</b>

## Consolidated Income Statement

million RMB yuan

Item	2019	2020	2021
<b>1. Revenue</b>	<b>2,771,434.92</b>	<b>2,087,146.80</b>	<b>2,807,275.07</b>
Including: Operating revenue	2,747,058.33	2,064,488.05	2,781,399.49
Interest income*	21,834.38	20,215.08	22,740.06
Premiums earned*	707.50	696.22	1,520.17
Handling charges and commission income*	1,834.71	1,747.44	1,615.35



## Consolidated Income Statement (continued)

million RMB yuan

Item	2019	2020	2021
<b>2.Total cost of operations</b>	2,628,014.71	2,029,239.85	2,629,728.10
Including: Operating cost	2,139,324.00	1,587,693.90	2,142,204.38
Interest expenses*	10,372.70	8,884.92	8,398.94
Handling charges and commission expenses*	220.44	278.62	1,566.51
Net expenditure for compensation payments*	400.64	505.07	577.28
Net amount of provision for insurance contract*	340.35	305.26	1,011.95
Reinsurance costs*	133.29	180.61	158.54
Tax and surcharges	240,296.07	205,249.12	239,683.39
Selling expenses	83,884.02	79,366.75	79,404.47
Administrative expenses	99,857.52	79,018.52	84,406.40
R&D expenses	21,752.70	22,759.34	25,291.79
Finance expenses	10,262.19	25,401.03	22,442.15
Others	21,170.79	19,596.71	24,582.30
Add: Other gains	13,021.95	11,530.91	15,585.58
Gain from investment (Loss is represented by "-")	19,808.26	52,418.83	46,223.07
Exchange gain (Loss is represented by "-")*	62.43	105.56	46.95
Net exposure gains (Loss is represented by "-")	-	-	-
Gains from change in fair value (Loss is represented by "-")	1,229.86	3,523.43	6,397.71
Credit impairment loss (Loss is represented by "-")	-6,071.67	-796.91	-5,773.76
Impairments loss of assets (Loss is represented by "-")	-26,895.70	-29,625.36	-36,561.29
Gain on disposal of assets (Loss is represented by "-")	1,462.36	1,829.43	1,501.47
<b>3.Operating profit (Loss is represented by "-")</b>	146,037.70	96,892.84	204,966.70
Add: Non-operating revenue	12,141.58	16,605.27	7,976.85
Less: Non-operating expenses	37,815.58	25,978.38	46,466.81
<b>4. Earnings before taxes (Loss is represented by "-")</b>	120,363.70	87,519.73	166,476.74
Less: Income tax expenses	60,772.82	37,248.11	66,213.42
<b>5.Net income (Net loss is represented by "-")</b>	59,590.88	50,271.62	100,263.32
(1) Classified by continuity of operations:			
Net income from continuous operation	59,590.88	50,271.62	100,263.32
Net income from discontinued operation	-	-	-
(2) Classified by ownership:			
Net income attributable to CNPC	30,695.67	31,568.74	62,165.26
Minority interest	28,895.21	18,702.88	38,098.06

Note: Those with the \* symbol are line items for financial companies

## 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 the *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 of the Company starts on January 1 and ends on December 31 of each calendar year.

#### 3. Standard accounting currency

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

#### 4. Accounting basis and valuation

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

#### 5. Recognition of cash and cash equivalents

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

#### 6. Foreign currency accounting and translation of financial statements in foreign currency

##### (1) Foreign currency accounting

Our foreign currency transactions are converted into RMB 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 at the spot exchange rate on the balance sheet date. The exchange gains and losses arising from these transactions that

occurred in the production and operation period are recognized as financial expenses; those related to the acquisition and construction of fixed assets, oil and gas assets and other assets in line with the capitalization condition are handled according to relevant provisions on borrowing costs; and those occurred in the period of liquidation are recognized as liquidation gain or loss.

A non-monetary foreign currency asset measured at historical cost is converted into RMB at the spot exchange rate on the trading day, with its amount in RMB unchanged. A non-monetary foreign currency asset measured at fair value is converted into RMB at the spot exchange rate for the date when the fair value is determined, with the difference recognized in profit or loss for the current period 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 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 exchange difference of Foreign Currency Balance Sheet arising from the conversions mentioned above is separately listed in "Converted Difference in Foreign Currency Statement" under the owner's equity. The exchange difference arising from monetary foreign currency items materially invested in foreign operation due to the change in exchange rate is also separately listed in the owner's equity when preparing consolidated financial statements. When disposing foreign operation, the related exchange difference is carried, in proportion, into profit or loss for the current period during which the operation is disposed.

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 generally 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".

## 7. Financial instruments

Financial instruments include cash at bank and on hand, equity securities other than those classified as long-term equity investments, receivables, payables, borrowings, debentures payable and share capital, etc.

### (1) Classification of financial assets

Financial assets are classified, upon initial recognition, by form of management and cash flow characteristics into: Financial assets measured at amortized cost, financial assets measured at fair value with changes in fair value recognized in other comprehensive income, and financial assets measured at fair value with changes in fair value recognized in profit or loss for the current period.

### (2) Classification of financial liabilities

Financial liabilities are classified into: Financial liabilities measured at fair value with changes in fair value recognized in profit or loss for the current period and financial liabilities measured at amortized cost.

### (3) Impairment of financial instruments

For financial assets measured at amortized cost, contractual assets, and debt investments measured at fair value with changes in fair value recognized in other comprehensive income, impairment losses and provisions should be based on expected credit loss.

## 8. Inventory

### (1) Classification of inventory

Inventories include raw materials, work in progress and semi-finished goods, finished goods, and goods sold, etc.

### (2) Measurement method of cost of inventories

Inventories are carried at the actual cost when acquired, using perpetual inventory method; the 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 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 the 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 defined by selling price deducts 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. Contractual asset

The right to receive consideration for goods transferred to the customer that depends on factors other than the passage of time is recognized as a contract asset. The unconditional right (that is, only dependent on the passage of time) to receive consideration from the customer is presented separately as a receivable.

## 10. Long-term equity investments

### (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 the investment cost.

For a long-term equity investment obtained through a combination of entities not under common control, the combined cost should be accounted as 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 the payment of cash, the actual purchase price thus paid should be recognized as the 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 the initial cost of investment.

## (2) Subsequent measurement and profit or loss recognition

### a. Long-term equity investments by cost method

The Company's long-term equity investments in its subsidiaries are accounted by the cost method. Except for cash dividends or profit distributions declared but not yet distributed that have been included in the price or consideration paid in obtaining the investments, the Company recognizes its share of the cash dividends or profit distributions declared by the investee as investment income for the current period.

### b. Long-term equity investments by equity method

Long-term equity investments in associates and joint ventures are accounted by the equity method. When the initial cost of investment is bigger than the proportionate share of the fair value of the investee's identifiable net assets at the time of investment, no adjustment to the initial cost of such long-term equity investment is made; When the initial cost of investment is smaller than the proportionate share of the fair value of the investee's identifiable net assets at the time of investment, the gain in profit is recognized.

The investor's share of the net profit or 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 the owner's equity.

The investor's share of the net profit or loss of the investee is based on the fair value of the investee's net identifiable assets upon the acquisition of the investment and recognized after adjustment to the investee's net profit made in accordance with the investor's accounting policies and fiscal periods. Accounting of investments held should be based on the investor's share of the net profit, other comprehensive income and other changes in the owner's equity listed in the investee's consolidated financial statements.

The investor's share of the loss of the investee should be accounted as follows: i) writing down the carrying value of the long-term equity investment; ii) in the event that the carrying value of such long-term equity investment is not enough for write-down, investment loss should be recognized as much as the carrying value of long-term interests that, in substance, form part of the net investment in the investee to write down the carrying value of long-term receivables, etc.; and iii) additional obligations assumed by the investor under the investment contract or agreement should be recognized as estimated liabilities and taken into investment loss of the current period. If the investee makes a profit in subsequent periods, the carrying amount of estimated liabilities should be written down in reverse sequence after deduction of the share of unrecognized loss, and the carrying value of long-term interests that, in substance, form part of the net investment in the investee as well as the carrying value of the long-term equity investment should be restored with the investment income recognized accordingly.

### c. Disposal of long-term equity investments

In the disposal of long-term equity investments, the difference between the carrying amount and the actual purchase price is accounted as profit or loss for the current period.

Upon the 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 profit or loss for the current period in proportion.

If the investor loses joint control or significant influence over an investee for reasons such as partial disposal of the equity investment, any retained interest should be recognized in profit or loss for the current period, and measured as a financial instrument at the difference between fair value and carrying value

at the date when joint control or significant influence is lost. All amounts previously recognized under the equity method as other comprehensive income in relation to such equity 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 profit or loss for the current period.

In the event that the investor loses control over an investee for reasons such as partial disposal of the equity investment, when preparing separate financial statements, equity accounting is required for retained interest with joint control or significant influence over the investee, and adjusted on the basis of equity accounting as would have been required upon acquisition of such interest; retained interest without joint control or significant influence over the investee should be recognized in profit or loss for the current period and measured as a financial instrument at the difference between the fair value and carrying value on the date of loss of control.

In the event that the equity interest being disposed of has been acquired through a combination of entities for reasons such as additional investment, when preparing separate financial statements, all amounts previously recognized under the equity method as other comprehensive income and other owner's equity in relation to such equity investment should be transferred in proportion, if retained interest is accounted for at cost or under the equity method; all amounts previously recognized as other comprehensive income and other owner's equity should be transferred entirely, if the retained interest is recognized and measured as a financial instrument.

#### (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) Impairment test and provisions for impairment

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

Non-marketable long-term equity investment may be impaired in the following circumstances:

- 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;
- The goods or services of the invested business are obsolete or there is a change in market needs, resulting in serious deterioration in the financial conditions of the invested business;
- The invested business has lost its competitive edge due to major changes in production technology in the sector, resulting in serious deterioration in the financial conditions of the invested business such as clean-up or liquidation;
- Other circumstances demonstrating a substantial failure of the invested business to generate economic benefits for the Company.

### 11. Right-of-use assets

The right-of-use asset is initially measured at cost, including: the initial measurement of the lease liability; the lease payments paid on or before the commencement date of the lease term, if there is a lease incentive, minus the amount of the lease incentive received; initial direct costs incurred by lessee; costs that are expected to be incurred to dismantle and remove the leased asset, restore the site on which the leased asset is located, or restore the leased asset to the condition agreed upon in the terms of the lease; excluding costs incurred to produce inventory.

### 12. Lease liability

The lease liability is initially measured at the present value of the unpaid lease payments at the commencement date of the lease term. When calculating the present value of lease payments, the interest rate implicit in the lease is used as the discount rate; if the interest rate implicit in the lease cannot be determined, the incremental borrowing rate is used as the discount rate. Lease payments include: fixed payments and in-substance fixed

payments net of any amount related to lease incentives; variable lease payments that depend on an index or ratio; lease payments include the exercise price of the purchase option where there is reasonable certainty that the option will be exercised, the exercise price of the option; where the lease term reflects that the option to terminate the lease will be exercised, the lease payments include the amount payable to exercise the option to terminate the lease; the amount expected to be due based on the residual value of the guarantee provided.

### 13. Revenue

Revenue should be recognized when the performance obligation in the contract is fulfilled, i.e. control of goods or services by the customer. Where a contract has multiple performance obligations, the transaction price should be allocated to these performance obligations upon the effective date of the contract by reference to the relative proportion of standalone selling prices of promised goods or services and revenue should be measured accordingly.

### 14. Government grants

#### (1) Types of government grants

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

#### (2) Acknowledgment of government grants

The Company will acknowledge the government grants that it is eligible for and has received.

#### (3) Accounting treatment of government grants

Asset-related government grants are recognized as deferred income which is taken into profit or loss for the current period appropriately and systematically during the lifespan of related asset.

Income-related government grants used to recover relevant costs, expenses or losses in the subsequent period are recognized upon receiving as deferred income which is taken into profit or loss for the current period during the verification of related costs, expenses or losses, or used to write down relevant costs, expenses or losses; those used to recover relevant costs, expenses and losses incurred by the Company are directly recognized as profit or loss for the current period, or used to write down relevant costs, expenses or losses.

#### (4) Measurement of government grants

Government grants in the form of monetary assets are measured at the amounts received or receivable. Government grants in the form of non-monetary assets are measured at fair value.

### 15. 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 tax 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.

### 16. Lease

A lease is a contract whereby the lessor transfers the right to use the asset to the lessee for consideration within a certain period of time. On the contract inception date, assess whether the contract is a lease or contains a lease. A contract is or contains a lease if a party to a contract transfers its right to control the use of one or more identified assets for a period of time in exchange for consideration. To determine whether a contract transfers the right to control the use of an identified asset over a period of time, the following assessments should be made:

(1) Whether the contract involves the use of the identified asset. An identified asset may be specified explicitly by the contract or implicitly when the asset is available to the customer and the asset is physically distinguishable, or if some part of the capacity or other part of the asset is physically indistinguishable but substantially represents the full capacity of the asset, so that the customer obtains almost all the economic benefits arising from the use of the asset. An asset is not an identified asset if the supplier of the asset has a substantial right to substitute the asset throughout the period of use;

(2) Whether the lessee is entitled to almost all the economic benefits arising from the use of the identified assets during the period of use;

(3) Whether the lessee has the right to direct the use of the identified assets during the period of use.

If the contract contains multiple separate leases at the same time, the lessee and the lessor shall split the contract and conduct accounting treatment for each separate lease. If the contract contains both lease and non-lease components, the lessee and the lessor will split the lease and non-lease components. When splitting the lease and non-lease components included in the contract, the lessee allocates the contract consideration according to the relative proportion of the sum of the stand-alone prices of the lease components and the stand-alone prices of the non-lease components.

#### (1) The Group as the lessee

On the commencement date of the lease term, a right-of-use asset and a lease liability are recognized for the lease. The right-of-use asset is initially measured at cost, including the initial measurement of the lease liability, lease payments made on or before the commencement date of the lease term (net of any amount related to the lease incentives received), initial direct costs incurred, and costs that are expected to be incurred to dismantle and remove the leased asset, restore the site on which the leased asset is located, or restore the leased asset to the condition agreed upon in the terms of the lease.

Right-of-use assets are depreciated using the straight-line method. If it can be reasonably determined that the ownership of the leased asset will be obtained when the lease term expires, depreciation will be accrued over the remaining useful life of the leased asset. Otherwise, the leased asset is depreciated over the shorter of the lease term and the remaining useful life of the leased asset.

The lease liability is initially measured at the present value of the unpaid lease payments at the commencement date of the lease term, discounted at the interest rate implicit in the lease. If the interest rate implicit in the lease cannot be determined, the incremental borrowing rate is used as the discount rate.

#### (2) The Group as the lessor

On the lease commencement date, the Group classifies leases into finance leases and operating leases. A finance lease is a lease that transfers substantially all of the risks and rewards associated with ownership of the leased asset, regardless of whether the ownership is ultimately transferred. Operating leases refer to leases other than finance leases.

## 17. Changes in Accounting Policies

The Company has implemented since January 1, 2021 the *Accounting Standards for Enterprises No. 21 - Leases* (the "New Lease Standards" ) as amended by the Ministry of Finance in 2018.

In the event of any discrepancy between the new lease standards and the former lease standards prior to January 1, 2021, adjustments based on the cumulative effect of initial application of the new lease standards have been made on the retained earnings and the amount of other related items in the financial statements as of January 1, 2021. No adjustments to the information of these comparative periods have been made.



## B. Main Types of Taxes

### 1. Corporate income tax

Corporate income tax shall be calculated on the basis of taxable income and the applicable tax rate shall be 15% and 25%.

In accordance with the *Directive on Tax Policy Issues in Relation to the Further Implementation of the Western China Development Strategy* (CS [2011] NO.58) announced by the Ministry of Finance, the General Administration of Customs and the State Taxation Administration, business establishments in the industries encouraged to develop in the western region are entitled to a reduced corporate income tax rate of 15% from January 1, 2011 to December 31, 2020. 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. In accordance with the *Announcement on Continuing the Corporate Income Tax Policy for the Western Development Strategy* ([2020] No. 23) jointly issued by the Ministry of Finance, the State Taxation Administration and the National Development and Reform Commission, business establishments in the encouraged industries in the western region are still entitled to the reduced corporate income tax rate of 15% from January 1, 2021 to December 31, 2030.

Under the *Corporate Income Tax Law, Implementing Regulations of the Corporate Income Tax Law, Administrative Measures for the Determination of High and New Technology Enterprises* (GKFH [2016] No.32) and *Guidelines for Eligibility Management of High and New Technology Enterprises* (GKFH [2016] No.195), the corporate income tax rate applicable to a high and new tech company is 15%. The Company's subsidiaries with the High and New Technology Enterprise Certificate are eligible for the preferential tax rate of 15%.

The Ministry of Finance and the State Administration of Taxation jointly issued the *Announcement on Further Improving the Policy of Pre-Tax Super-Deduction of Research and Development Expenses* (Announcement No. 13 of 2021), stipulating that, for manufacturing companies, the super deduction ratio of R&D expenses increases from 75% to 100% from January 1, 2021 to reduce the tax burden of manufacturing enterprises.

The overseas investment projects and subsidiaries of CNPC are subject to the applicable local tax rates in accordance with the contracts and relevant tax regulations of the host country.

### 2. Value-added tax (VAT)

The taxable amount in calculating the VAT is based on the value added. The VAT payable is calculated by multiplying the taxable sales amount by the applicable tax rate and deducting the input tax deductible in the current period. The applicable tax rates are 6%, 9%, or 13%.

According to the *Notice on the Import Tax Policy for the Exploration, Development and Utilization of Energy Resources during the 14th Five-Year Plan Period* (CGS [2021] No. 17) issued jointly by the Ministry of Finance, the State Administration of Taxation, and the General Administration of Customs, from January 1, 2021 to December 31, 2025, for the construction of cross-border natural gas pipelines and imported LNG receiving, storage and transportation facilities approved by the National Development and Reform Commission, as well as the natural gas (including pipeline gas and liquefied natural gas) imported from the expansion projects of imported LNG receiving, storage and transportation facilities approved by the provincial government, a certain proportion of the import value-added tax will be refunded.

In accordance with the *Directive on the Relevant Policies for Deepening Value-added Tax Reform* ([2019] No.39 issued by the Ministry of Finance, the State Taxation Administration and the General Administration of Customs), the new tax rates of 13% and 9%, instead of 16% and 10%, are applicable to taxable sales and imports respectively, effective since April 1, 2019.

In accordance with the *Directive on the Relevant Policies for Deepening Value-added Tax Reform* ([2019] No.39 issued by the Ministry of Finance, the State Taxation Administration and the General Administration of Customs), taxpayers of production and consumer services (including financial services) are eligible for incremental tax credit from April 1, 2019 to December 31, 2021 by adding 10% to the input tax deductible in the current period.

In accordance with the *Notice on Printing and Distributing VAT Management Measures for Oil and Gas Enterprises* (CS [2009] No.8) and the *Supplementary Directive on VAT-related Issues for Oil and Gas Enterprises* (CS [2009] No.97) issued by the Ministry of Finance and the State Taxation Administration, the Company is subject to VAT on production-related services provided in the process of producing oil and gas and exempt from VAT on the transfer or supply of taxable goods and services for production between the oil and gas field companies and the non-independent accounting units.

Overseas subsidiaries are subject to the applicable local tax rates.

### 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 consumption tax. The rate of education surcharge is 3% of the amounts actually paid for value-added tax and consumption tax.

### 4. Consumption tax

The taxable amount in calculating the consumption tax is based on the sales volume of taxable products. The amount of the consumption tax payable is RMB 1.52 per liter for gasoline, naphtha, solvent oils and lubricants, and RMB 1.20 per liter for diesel and fuel oils.

In accordance with the *Directive on Increases in Fuel Consumption Tax* (CS [2015] No.11) announced by the Ministry of Finance and the State Taxation Administration, the unit consumption tax amount has increased from RMB 1.40 to RMB 1.52 per liter for gasoline, naphtha, solvent oils and lubricants, and from RMB 1.10 to RMB 1.20 per liter for diesel, jet kerosene and fuel oils, effective since January 13, 2015. The suspension of consumption tax remains unchanged for jet kerosene.

In accordance with the *Directive on Consumption Tax Exemption for Oil Consumption in the Production of Oil Products* (CS [2010] No.98) announced by the Ministry of Finance and the State Taxation Administration, the Company has been exempt from consumption tax since January 1, 2009 on self-produced refined oils used as fuel, power and raw materials to produce oil products.

In accordance with the *Provisional Directive on Consumption Tax Refund (Exemption) for Naphtha and Fuel Oil Used in Producing Ethylene and Aromatic Hydrocarbons* ([2012] No.36) issued by the State Taxation Administration, the Company is exempt from consumption tax on self-produced naphtha and fuel oil for continuous production of ethylene and aromatic hydrocarbons, and also exempt from consumption tax on self-produced naphtha and fuel oil sold under the dedicated direct supply programs announced by the State Taxation Administration.

### 5. Resource tax

The taxable amount in calculating the resource tax is based on the sales volume of taxable resource products such as crude oil, natural gas and shale gas, and the applicable tax rate ranges from 1% to 6%.

In accordance with the *Resource Tax Law of the People's Republic of China*, CNPC is eligible for resource tax exemption for crude oil and natural gas used for heating during the process of crude oil production and transportation in oilfields and eligible for a resource tax reduction of 20% for crude oil and natural gas produced from low abundance fields; 30% for sour gas, and crude oil and natural gas produced by means of tertiary recovery or deep-water operations; and 40% for heavy oil and high pour point oil.

In accordance with the *Directive on Cutting Resource Tax on Shale Gas* (CS [2018] No.26) announced by the Ministry of Finance and the State Taxation Administration, resource tax on shale gas is cut by 30% (from the standard rate of 6%) from April 1, 2018 to March 31, 2021 to boost shale gas production and increase gas supplies. On March 15, 2021, the Ministry of Finance and the State Administration of Taxation jointly issued the *Announcement on Extending the Implementation Period of Some Preferential Tax Policies* (MOF/SAT Announcement No. 6 [2021]); after the expiry of the existing preferential tax policies on March 31, 2021, the implementation period of such policies will be extended to December 31, 2023.

### 6. Special oil gain levy

The taxable amount in calculating the special oil gain levy is based on the excess income from the domestic crude oil sales with price exceeding a certain level, and the applicable tax rate ranges from 20% to 40%.

In accordance with the *Directive on Raising the Threshold for Special Oil Gain Levy* (CS [2014] No.115) issued by the Ministry of Finance, with the approval of the State Council, the Ministry of Finance has decided to raise the threshold for special oil gain levy to USD 65 per barrel, effective from January 1, 2015, with the five-level progressive ad valorem rates remaining in place.



Jun. 28



Aug. 3



Aug. 30

## Major Events

### January

Jan. 15 CNPC signed the contract to become an official partner of the China Pavilion at the Expo Dubai 2020.

### February

Feb. 5 A strategic partnership agreement was signed with the State Power Investment Corporation in Beijing.

Feb. 11 A major breakthrough was made in the ultra-deep exploration in the Tarim Basin (Manshen Well-3).

### April

Apr. 6 A strategic partnership agreement was signed with China Post in Beijing.

### May

May 18 CNPC led the effort in establishing the China Oil and Gas Methane Alliance, and served as the first president.

### June

Jun. 10 China's first 5G smart refinery was launched at Changqing Petrochemical.

Jun. 18 A new ultra-deep hydrocarbon play of 1-billion-ton was discovered in the Tarim Basin.

Jun. 28 Kunlun Capital Co., Ltd. was established.

### July

Jul. 8 CNPC Intelligent Operation Center was put into operation.

Jul. 16 The Company participated in the national carbon market first-day trading, and became one of the 10 companies receiving the National Carbon Market First-day Trading Certificate.



Aug. 31



Nov. 5



Dec. 27



Dec. 28

## August

- Aug. 3 Lanzhou Petrochemical's Changqing Ethane-to-Ethylene Project became operational.
- Aug. 30 Dushanzi Petrochemical's Tarim Ethane-to-Ethylene Project became operational.
- Aug. 31 A strategic partnership agreement was signed with Peking University.

## September

- Sep. 25 The Carbon Peak & Carbon Neutrality Research Institute was jointly established by Renmin University of China.
- Sep. 29 A strategic cooperation framework agreement was signed with Aluminum Corporation of China.

## November

- Nov. 3 Four R&D projects led or participated by CNPC received one first prize of the State Science and Technology Progress Award, two second prizes of the State Science and Technology Progress Award and one second prize of the National Technology Invention Award.
- Nov. 5 The CNPC International Cooperation Forum & Signing Ceremony was held during the 4th China International Import Expo.
- Nov. 29 The 3rd China-Russia Energy Business Forum opened, co-hosted by CNPC and Rosneft.

## December

- Dec. 1 A strategic cooperation framework agreement was signed with Sinopec.
- Dec. 13 Karamay Oilfield was included in the National Industrial Heritage List.
- Dec. 14 The OGI 2021 Annual Report was jointly signed and released with other OGI member companies.
- Dec. 27 The 200 MW photovoltaic power generation demonstration project at Yumen Oilfield was connected to the grid.
- Dec. 28 Dubai Research Institute, Shenzhen New Energies Research Institute and Shanghai New Materials Research Institute were established.



# 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 directional wells where the wellbore axis is near horizontal, or more or less 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.

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

## VOCs

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

## Carbon capture, utilization and storage (CCUS)

CCUS is a process of separating carbon dioxide (CO<sub>2</sub>) from emission sources of industry or related energy industries and having it sequestered in geological structures or utilized to prevent CO<sub>2</sub> from being released into the atmosphere. It is a technical system aimed at reducing man-made carbon dioxide emissions.

## Carbon Peak

Carbon peak means that, at a certain point in time, carbon dioxide emissions will no longer increase, reach the peak, and then gradually fall back.

## Carbon neutrality

A state in which the net amount of man-made carbon dioxide emissions is reduced to zero because it is balanced by actions to offset these emissions.

### About this Report

In this report, the expressions "CNPC", "the Corporation", "the Company" and "we" are used for convenience where references are made to China National Petroleum Corporation. This report is presented in Chinese and English. In case of any divergence of interpretation, the Chinese text shall prevail.

Recycled/recyclable paper is used for this report.

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**Pursuing green development and supplying  
reliable energy to fuel our customers'  
growth and power people's happy life**