

# 2

## Responsible Operation

We are always committed to the principle of "people oriented, quality foremost, safety first, environment prioritized" to achieve "zero defects, zero injuries and zero pollution". We regard providing clean energy, minimizing environmental impact and reducing emissions as the strategic foundation for the Company' s sustainable development. The Company continues to improve the quality management of product and service, and promote safe, environmentally-friendly and resource-saving operations, in order to promote the construction of an ecological civilization and develop a resource-saving and environmentally-friendly enterprise.

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SDGs

|   |   |  |   |   |  |   |  |
|---|---|--|---|---|--|---|--|
| <p><b>6</b> Clean water and sanitation</p>  <p>Ensure access to water and sanitation for all</p> | <p><b>7</b> Affordable and clean energy</p>  <p>Ensure access to affordable, reliable, sustainable and modern energy for all</p> | <p><b>8</b> Decent work and economic growth</p>  <p>Promote inclusive and sustainable economic growth, employment and decent work for all</p> | <p><b>11</b> Sustainable cities and communities</p>  <p>Make cities inclusive, safe, resilient and sustainable</p> | <p><b>12</b> Responsible consumption and production</p>  <p>Ensure sustainable consumption and production patterns</p> | <p><b>13</b> Climate action</p>  <p>Take urgent action to combat climate change and its impacts</p> | <p><b>14</b> Life below water</p>  <p>Conserve and sustainably use the oceans, seas and marine resources</p> | <p><b>15</b> Life on land</p>  <p>Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss</p> |
|---|---|--|---|---|--|---|--|

## Safe Operation

We actively promote the building of a long-acting safety system and comprehensively enhance our work safety management. In 2017, we continued to take regulatory measures and fulfilled safety responsibilities, resulting in further progress in our grassroots work and a stable improvement in safety performance.

### Management System and Performance Assessment

In 2017, we enacted and amended some management rules and regulations including the *Regulations on Administrative Sanctions against Persons Liable for Production Safety Accidents and Environmental Incidents*, fully implemented the production safety responsibility system, and strengthened regulations on production safety at the grassroots level. In order to further enhance the ability of all the employees to fulfill their duties in a safe manner, we evaluated their ability to perform duties safely and their safety skills, and organized matrix training on safety knowledge and skills.



| HSE management system objectives  | Major progress in 2017   |
|---|--|
| To optimize the system examination mode and achieve full coverage of quantitative HSE examination | <ul style="list-style-type: none"> <li>Developed and issued the Standard for Quantitative Examination of HSE Management System (Second Edition)</li> <li>Examined over 110 production and operation enterprises</li> </ul> |
| To fully promote the standardized construction of grassroots stations                             | <ul style="list-style-type: none"> <li>Compliance of standardized construction at grassroots stations: 56%</li> <li>84.8% and 77.3% of managers and employees were assessed in HSE performance</li> </ul>                  |
| To comprehensively promote the job-oriented training matrix                                       | <ul style="list-style-type: none"> <li>Prepared HSE training matrix guidelines for 10 major specialities</li> </ul>  |

## Hazard Control

We attach equal importance to both prevention and control of hazards. To effectively improve the fundamental safety of the Company, we set a closed-loop management mechanism for hazard identification and control. In 2017, we fully launched special campaigns to treat hazardous chemicals and to identify and eliminate safety hazards relating to oil and gas pipelines. After completing hazard treatment of long-distance pipelines, we continued the rectification of hazards in the gathering and transmission pipelines of oil and gas fields. The rectification rate of hazards in the chemical tank field hazards reached 100%.

## Safety Risk Management

We fully guaranteed process safety, strengthened management and control over safety risks in the production process, implemented a dual-prevention mechanism covering risk prevention and control and hazard identification and treatment for production safety, and established a classified risk prevention and control system, so as to eliminate safety risks and potential hazards to prevent accidents. In order to further strengthen risk supervision and control in high-risk and risk operations and sensitive periods, we set up "red lines" for strengthening ideology, discipline, enforcement and assessment in critical risk areas. Safety and environmental protection technology diagnosis and management assessment were carried out on key areas such as hazardous chemicals, key subsidiaries, key projects and high-risk areas to ensure major risks are under control.

## Supply Chain Safety

We included suppliers and contractors into our safety management, and had an all-process management on their access, selection, training, use and evaluation, so as to prevent and reduce accidents caused by suppliers and contractors.

**100%**

Rectification rate of long-distance pipeline hazards reached 100%

**100%**

Rectification rate of oil and gas field gathering and transport pipeline hazards reached 100%

**100%**

Rectification rate of chemical tank field hazards reached 100%

**7**

Safety and environmental technology diagnosis and management assessment were conducted at 7 key subsidiaries and projects; significant problems and major hazards were handled with follow-up measures

## CNPC Supply Chain Safety Management Process



We

- Fully promoted and implemented the safety access system for contractors' construction operation
- Issued the *Opinions on Further Strengthening Management of Contractors' Construction Operation Safety*
- Adopted the contractor project joint safety committee system

## Hazardous Chemicals Management

We exercised full process management on hazardous chemicals covering production, storage and transportation. In 2017, we carried out a comprehensive survey on basic information on hazardous chemicals and established an information platform on hazardous chemical safety supervision. We issued the *Implementation Plan for Comprehensive Management of Hazardous Chemical Safety*, established and improved hazardous chemicals management systems, organized centralized training for key personnel in charge of hazardous chemicals enterprises, and operated the information platform for comprehensive regulation of hazardous chemicals, so as to keep improving our safety management of hazardous chemicals.

## Emergency Management

We make unremitting efforts to improve our emergency management system and our comprehensive capability of emergency response has been steadily improved. In 2017, we urged our subsidiaries to revise their emergency plan, continued to promote the application of the site handling plan and emergency response card at the grassroots level. As a result, our emergency plan system was continuously improved. We organized the desktop maneuver of "emergency disasters in Myanmar-China Pipeline Project (Chinese Section)". Some of our subsidiaries including Southwest Pipeline and Yunnan Petrochemical carried out emergency drills. We promoted the building of the national base for hazardous chemicals emergency rescue and training. The construction of the emergency response center and the establishment of locations for supplying emergency materials and equipment for oil-spill were in orderly progress, and our capacity of emergency response and rescue was further enhanced.



## Offshore Oil Production Safety

We strengthened supervision of offshore oil production safety. We carried out special inspections on project commencement in spring, typhoon prevention, offshore operations in winter, and wharf workplace safety. We implemented the "tag and check" system on major potential hazards. Additionally, emergency response drills were carried out for fire and explosions at offshore oil and gas production facilities, rescue of personnel overboard, as well as oil spills and pollution, so as to ensure the steady and orderly operation of offshore oil production. In 2017, we realized stable and orderly operation at our offshore oil production facilities.

## Overseas Security Management

Personnel safety has always been an overriding priority in our operations. We constantly reinforced the operation of social security management system, fully strengthened social security risk prevention and control, and continuously enhanced emergency response capabilities. In 2017, there were no fatalities in our overseas projects concerning social security.

### Overseas Security Risk Management

| Risk level          | Management measures   |
|---------------------|---|
| Extremely high risk | CNPC sets out clear and unified security management requirements and implements intensified security management policies  |
| High risk           | Before project implementation: carry out security risk assessment and formulate an effective security program. The project shall not be implemented until it is reviewed and approved by the Company. During project implementation: keep improving the security program and revising the emergency response plan according to changes in local security situations, and organize drills to ensure personnel safety |
| Medium risk         | Carry out risk assessment, formulate an emergency response plan and implement security measures before project implementation   |
| Low risk            | Implement necessary security measures   |

### Major initiatives for overseas security in 2017

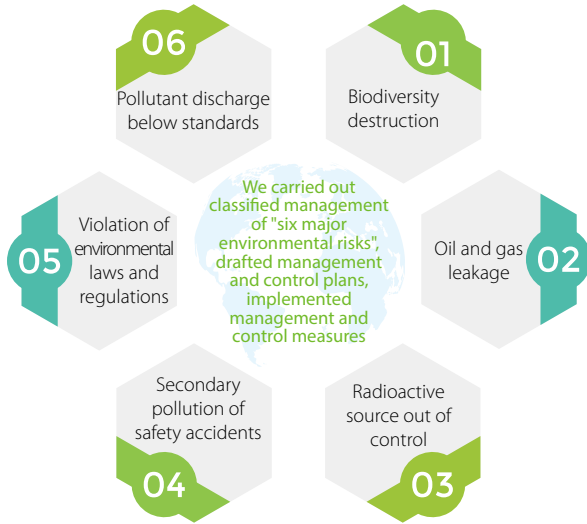
- Kept improving security management system to increase its relevance, practicality and operability
- Strengthened monitoring and evaluation of the security management system's operational performance, and conducted security management system review of overseas projects
- Continuously strengthened anti-terrorism security training for overseas employees to improve their emergency response capabilities. More than 17,000 employees were trained at 281 training sessions in 2017
- Strengthened IT-based management, comprehensively promoted the application of the "overseas risk" APP, and strengthened information sharing and emergency management capabilities

## Environmental Protection

We take the initiative to evaluate the environmental impact of our management and activities, and make efforts to reduce adverse effects on the environment and climate. By improving the resource utilization efficiency, implementing the Clean Air Act, promoting energy conservation and emission reduction, and striving to achieve environmentally-friendly and resource-saving operations. We vigorously advocate ecological civilization, in order to achieve harmonious development with the environment.

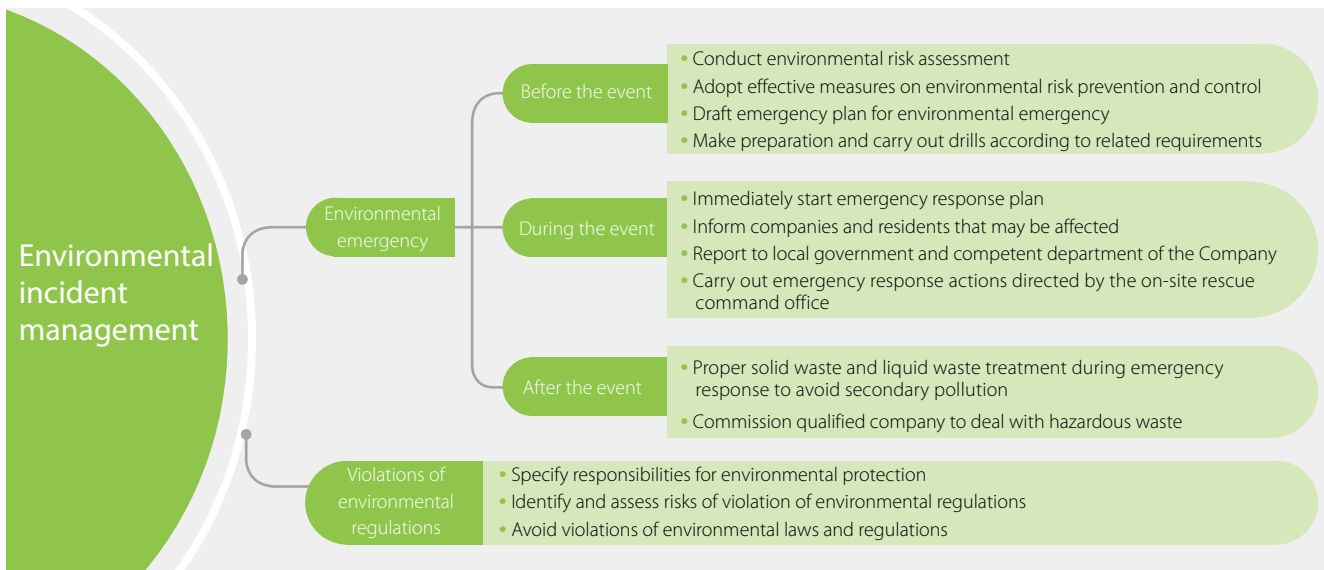
### Strengthening Risk Prevention and Control

Improving the environmental management mechanism. We carried out environmental risk identification and assessment, and implemented a risk prevention and control management model focusing on environmental forecasting, pre-warning and monitoring. We began the environmental risk management at an earlier stage, and established a sound risk management mechanism featuring "management in tiers, prevention and control by levels", in order to ensure overall control over environmental risks. In 2017, no major environmental accidents were reported and all major pollutants reduction targets were achieved.



### Strengthened HSE compliance management of construction projects

- Developed rules and regulations on environmental protection of construction projects
- Regulated responsibilities, management procedures and requirements for safety and environmental protection of construction projects
- Operated the management information platform for safety and environmental protection in the process of design, construction and operation of construction projects





### Case Study Sichuan Petrochemical Promotes Green Development

CNPC Sichuan Petrochemical Co., Ltd. (hereinafter referred to as "Sichuan Petrochemical") strictly complied with environmental regulations. Internally, it strengthened requirements and kept updating HSE software and hardware; externally, it strengthened communication, so that the public could know and supervise the HSE measures taken by the Company.

**Strengthened control at source.** At the very beginning of project construction, Sichuan Petrochemical put environmental protection in the first place and earmarked more than 10% of the total investment for environmental protection. The environmentally-friendly full hydrogenation process was used to replace the traditional coking process, and measures such as the use of natural gas and other clean fuels and circulating filtration and recycling systems were taken to prevent and control pollutants at source.

**Strictly prevented water pollution.** Sichuan Petrochemical established a four-level prevention and control system to prevent water pollution. Material pipelines were laid on the ground to prevent possible leaks from polluting groundwater; the leakage contaminant collection system was installed, and 193 pumping wells for groundwater monitoring were drilled around the plants, within the installations and peripheral drainage lines to monitor leaks in real time; based on the characteristics and changes of the seepage field and the transformation relationship between groundwater and surface water, strict groundwater defense lines for plant boundaries were set up; a complete drainage system and a sewage treatment system were established, and the wastewater reuse rate reached 73%. In 2017, the average concentration of COD in the effluent of the company was 20.58 mg/L and the average concentration of ammonia nitrogen was 0.24 mg/L, both below the limits of relevant national standards.

**Strengthened information disclosure.** Sichuan Petrochemical carried out its business in an open and transparent manner. It invited the public to visit production facilities and made clear its HSE measures and performance; in partnership with the local government, it launched the campaign of "eco-industrial tourism of the most beautiful villages", to invite the public to the plants to see the production process in petrochemical enterprises. Through LED screens and online platforms, the environmental authorities released realtime data of ambient air quality within the plants every day. Sichuan Petrochemical published monitoring data about the ambient air and sewage in the plants every day on its official websites and microblogs, introduced the green production process of refined products through the official microblogs, and provided the public with multiple channels for environmental information.

Continuing to enhance environmental monitoring capabilities. We completed the installation and data networking of online monitoring equipment for waste water and waste gas, and performed real-time monitoring and alarm of discharges from major pollution sources. In order to strengthen supervision and evaluation of subsidiaries, we set up an environmental monitoring network featuring "three-tiered environmental monitoring, environmental emergency monitoring and online monitoring of pollutants", which ensured treatment at the source, and control over the production process.

### Case Study Comprehensive Treatment of Volatile Organic Compounds (VOCs) Pollution

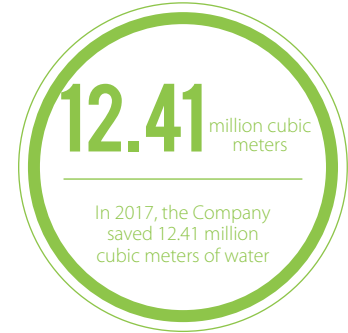
We make unwavering efforts to promote the application of Internet technology and big data in environmental protection. In 2017, we developed and established the VOCs management and control platform, managed and controlled VOCs emissions from refining companies from 12 source items, tracked the progress of comprehensive VOCs treatment, and built a large database for VOCs emission statistics.

## Sustainable Use of Resources




We attach great importance to the protection and rational utilization of resources. We strengthen the protection of water, conservation of freshwater and rational use of land, and strive to improve energy and material utilization efficiency to minimize resource consumption.

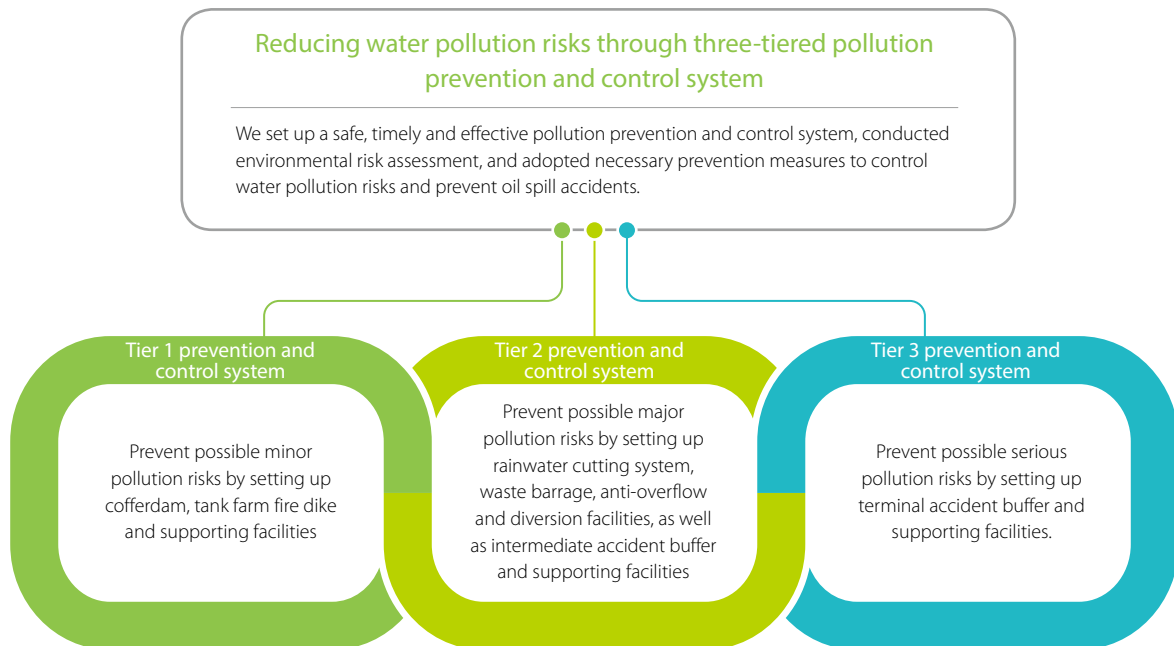
### Water Resources

We endeavor to improve water utilization efficiency and realize sustainable water utilization throughout various links in our production and operation activities. Through strengthening water conservation management, water-saving technological transformation and wastewater treatment and recycling technology and other measures, we worked to reduce the use of fresh water. In 2017, we saved 12.41 million cubic meters of water.



## Eco-environmental Management in Full Life Cycle throughout the Industry Chain

|  Exploration and Development  |  Pipeline Operations   |  Refining and Chemicals  |
|--|---|---|
| <p>In our oil and gas development, equal importance was given to water pollution prevention &amp; control and water recycling. After the oil-water separation and filtration treatment of the recycled wastewater, oil recovery and water reinjection were both realized, preventing groundwater and surface water contamination. By the end of 2017, over 100% of oil extraction wastewater in our oil and gas fields was treated, with a reinjection rate of more than 95%.</p> <p>We carried out water system maintenance and revamping, improved the water qualification rate, optimized operation programs, and upgraded wastewater discharge and treatment processes to reduce production water discharge, and promoted the application of new technologies for water treatment to maximize water conservation. In 2017, the comprehensive qualification rate of the Company's oilfield wastewater reached 100%, and water discharges were reduced by 5% year on year.</p> | <p>We focused on managing the impact on water resources by construction projects and the risk of leakage accidents during pipeline operations. Environmental impact assessments (involving water environment) were conducted, and water conservation and protection concepts and awareness were assimilated into construction activities.</p> | <p>We improved water consumption efficiency by promoting clean production processes, saving water from the source, and optimizing water consumption systems. We increased the concentration time of circulating water to reduce water supplement, and strengthened steam condensate water recovery to realize water saving. In addition, we emphasized wastewater treatment and reuse to reduce wastewater discharge and improve the industrial water recycling rate; and enhanced underground pipelines to get lower groundwater leakage rate.</p> |



## Land Resources

On the principle of scientific siting, efficient use, proper protection, and timely restoration and through innovation in land-saving technologies and management models, we made careful and intensive use of land during production, strictly controlled land use growth, made good use of land through various ways, actively reclaimed land, carried out environmental treatment and recovery in mining areas, and enhanced land use efficiency. In 2017, we saved 1,180 hectares of land, about 7,867 square kilometers.

### Sustainable Utilization of Land Resources of CNPC in 2017

|  | Measures  | Achievements in 2017                   |
|--|---|--|
| Economical and intensive use of land     | <ul style="list-style-type: none"> <li>Optimize engineering design through technological innovation</li> <li>Made good use of land</li> </ul>                           | 1,180 hectares of land saved           |
| Land reclamation                         | <ul style="list-style-type: none"> <li>Guarantee reclamation funds</li> <li>Fulfill reclamation responsibilities by various means including self-reclamation</li> </ul> | Some 15,000 hectares of land reclaimed |
| Withdraw from inefficient or unused land | <ul style="list-style-type: none"> <li>Return land not in use or with insufficient use to the government</li> </ul>   | 20,500 hectares of land returned       |



## Energy

We have been striving to reduce the consumption of fossil fuels and increase energy efficiency by reducing energy intensity. We paid high attention to energy conservation at the source, and carried out energy-saving assessments of newly-built, revamped and expanded projects. We promoted the application of energy-saving technology and equipment to boost the efficiency of heating furnaces in oil and gas fields and optimize refining and chemical energy systems. We reinforced energy use management in the production process, and conducted monitoring and evaluation of energy and water-intensive devices and equipment.



## Waste and Pollutants

We strictly monitored and controlled discharges of waste and pollutants in the production process, strengthened waste management, and reduced discharges of pollutants in the air, land and water.

In 2017, we formulated the *Plan on the Upgrading of Pollutant Discharge Compliance*, and proposed 12 major directions for the management of environmental protection, covering all elements of water, air, noise, and solid waste, as well as the whole process of exploration and production, refining and petrochemical, natural gas and pipeline, and engineering technology.

## Energy Management and Control

In 2017, We carried out demonstration projects of energy management in Changqing Oilfield and Jinzhou Petrochemical, and organized major energy consuming subsidiaries to formulate and implement action plans for energy management to increase energy efficiency and lower energy consumption.



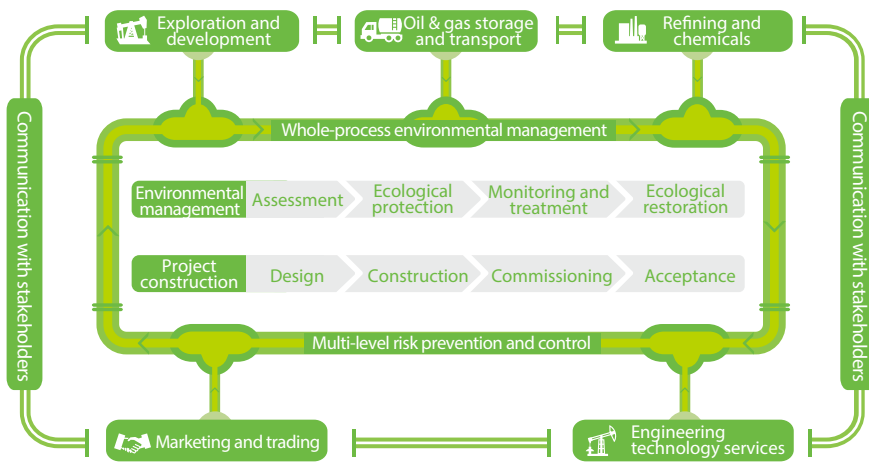
## Conservation of Biodiversity and Natural Habitats

We are devoted to reducing the potential influence on ecological environment and biodiversity during production and operation, and take full precautions to avoid environmental impact and work hard to restore the environment to its original state in case of any adverse impact. We make an all-out effort to identify and address environmental pollution and ecological damage, and reduce the impact on the ecological environment by various means, including reducing noise and emissions. We do our utmost to reduce the occupation of cultivated land, protect water and land, and restore vegetation. Various measures are taken to restore the ecological environment in the working areas and protect biodiversity. In 2017, we formulated the *Action Plan for Ecological Conservation*, and implemented six major projects for ecological protection.



- Regard ecological security as a prerequisite for human survival, a foundation for sustainable economic and social development, and a guarantee for the safety of ecological products
- Respond to the development goal of "protect, restore and promote sustainable use of terrestrial ecosystems, and halt and reverse land degradation and halt biodiversity loss" set in the *UN's 2030 Agenda for Sustainable Development*
- Make every effort to support China's fulfillment of its responsibilities and obligations under international conventions such as the *Convention on Biological Diversity* and the amendment to the *Measures for the Administration of Environmental Protection of Construction Projects*, further regulating independent environmental acceptance of construction projects

## Eco-environmental Management in Full Life Cycle throughout the Industry Chain



## Principles, Objectives and Measures for Ecological Protection

|   |  |
|---|--|
| Basic principles of ecological protection | <ul style="list-style-type: none"> <li>• Protection first: exercise ecological space management and control, and implement the requirements for enforcing red lines for ecological conservation, setting the threshold for environmental quality, imposing a ceiling on resource utilization, and implementing a negative list of environmental standards for market access.</li> <li>• Scientific coordination: strengthen supervision over the full life cycle and all factors of development and construction.</li> <li>• Green development: minimize the ecological impact of development and construction activities.</li> <li>• Cooperation and sharing: coordinate with host countries (regions) where projects are operated to jointly achieve sustainable development.</li> </ul> |
| Main objectives of ecological protection  | <ul style="list-style-type: none"> <li>• To ensure the compliance of industrial layout and project siting with ecological space regulations and control and red line requirements.</li> <li>• To effectively protect biodiversity, improve ecological quality, enhance ecological functions and effectively guarantee ecological security within the scope of development and construction activities and their impact.</li> <li>• To achieve sustainable development of business in harmony with the country (region) where the business is located, establish a green, harmonious relationship between enterprises and local communities, strive to be a "good corporate citizen", and achieve sharing of green development fruits.</li> </ul>   |
| Major measures                            | <ul style="list-style-type: none"> <li>• To implement the requirements of ecological space utilization control.</li> <li>• To strictly exercise construction project ecological protection management.</li> <li>• To intensify efforts on ecological construction and restoration.</li> <li>• To promote green, harmonious relationship between enterprises and local communities.</li> <li>• To improve ecological protection management system.</li> </ul>   |

## Climate Change

We respond to the "Paris Agreement" adopted by the 2015 United Nations Climate Change Conference, embrace the goal of limiting global warming to less than 2 degrees Celsius by the end of this century. To this end, we actively responded to climate change, devoted ourselves to low-carbon development, and shared the practice of greenhouse gas control with industry peers and all sectors of society.

- Our overall objectives

Implement the strategy of low-carbon development, actively develop clean energy, establish carbon emission control mechanism, and effectively control greenhouse gas emissions.
- Our action plan

Actively develop and utilize natural gas, coalbed methane and shale gas, and implement demonstration projects for carbon capture, utilization and sequestration. Promote energy conservation, enhance energy efficiency and substitution of clean energy for other fuels, and strengthen the comprehensive utilization of greenhouse gases. Enhance the recovery and utilization of vent gas and associated gas, and promote control of greenhouse gas emissions in the refining process. Carry out international cooperation to combat climate change and participate in the work of the Oil and Gas Climate Initiative (OGCI).
- Our measures

Develop management rules and work plans and establish the control and management system for greenhouse gas emissions, strengthen capacity for greenhouse gas emission control, increase capital investment, and promote innovation of low-carbon technologies.
- Our key tasks

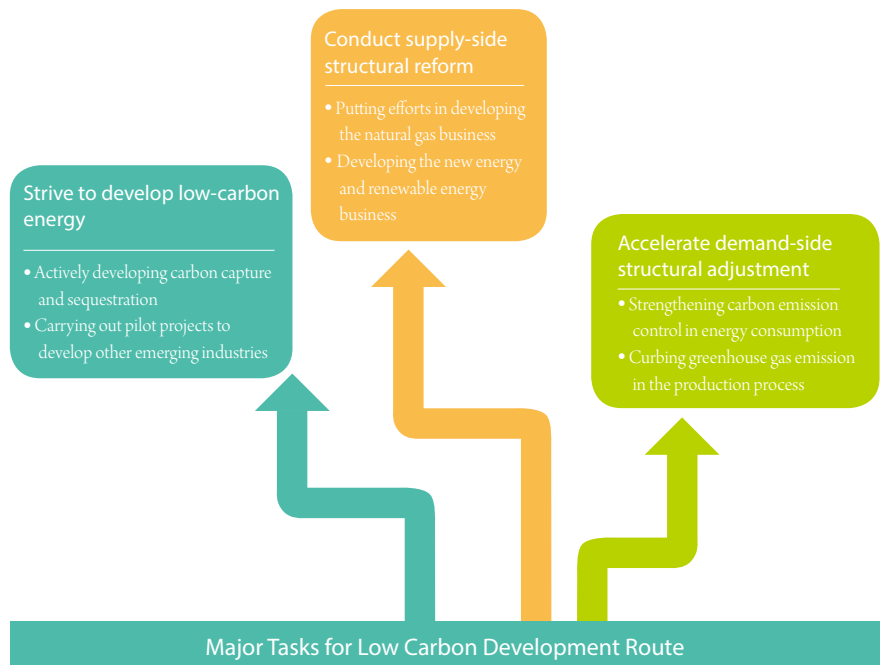
Carry out greenhouse gas emission accounting, exercise carbon emissions quota control, take measures to control greenhouse gas emissions, regulate greenhouse gas emissions reporting, and strengthen international cooperation to combat climate change.

Plans and initiatives for greenhouse gas emission reduction and control supported and participated in by CNPC

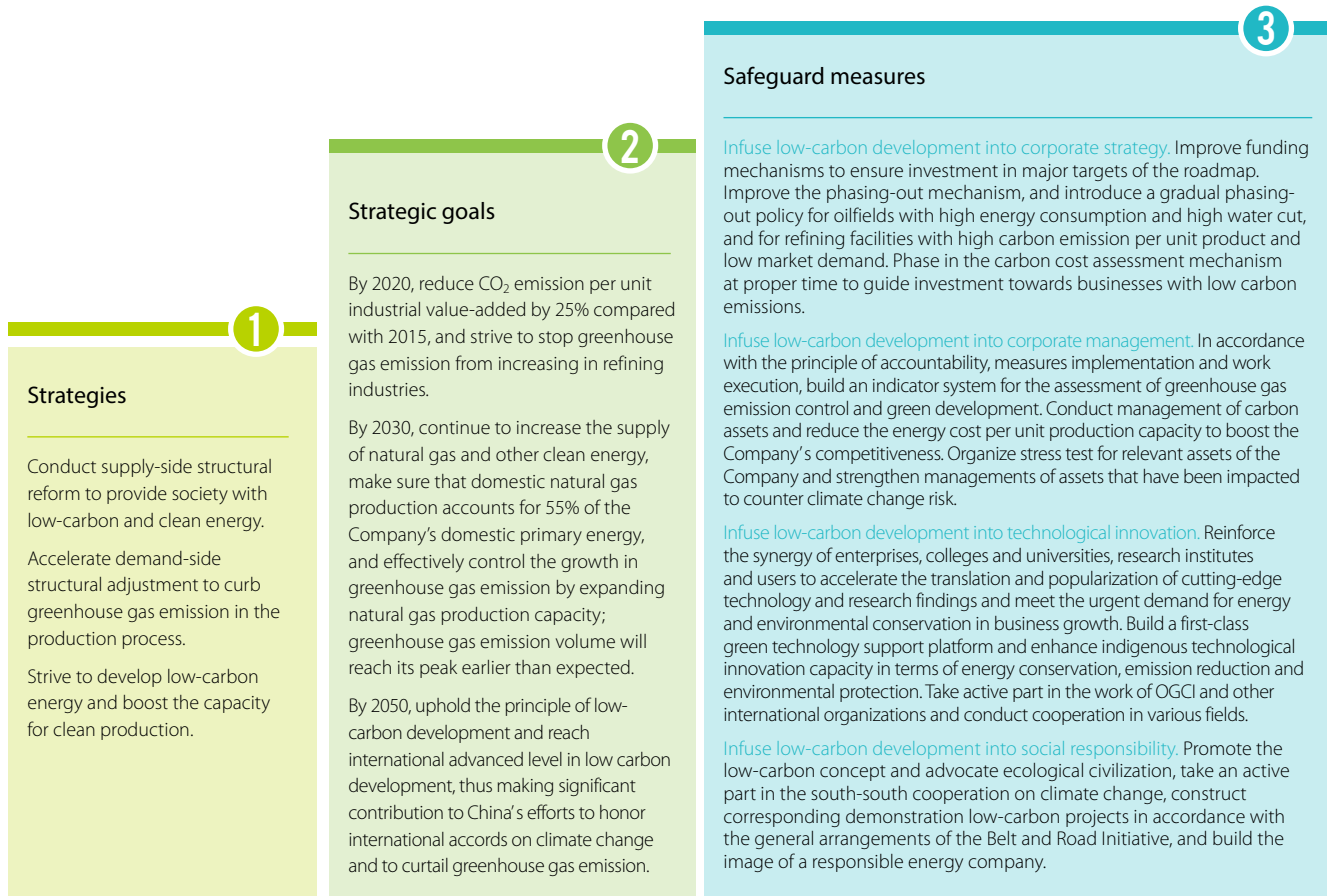
- Paris Agreement
- China's National Program to Address Climate Change
- National Plan on Climate Change (2014-2020)
- China Technology Strategic Alliance for CO<sub>2</sub> Capture, Utilization and Storage Technology Innovation (CTSA-CCUS)
- Oil and Gas Climate Initiative(OGCI)

## Carbon Emission Management

We paid close attention to greenhouse gas emissions and included combating climate change in our development plan. In 2017, in accordance with the relevant planning and work program for greenhouse gas control, we formulated the *Roadmap for Low-carbon Development*, and set goals and tasks for low-carbon development. Meanwhile, we conducted accounting of greenhouse gas emission according to relevant national technical specifications.



## CNPC Low Carbon Development Route



## Case Study OGCI Actions in 2017

We were solemnly committed to the effective control of methane emissions in the natural gas industrial chain, took active part in the Oil and Gas Industry Climate Initiative (OGCI), coordinated with BP, Shell, Total and other partner companies as well as all sectors of the community in their positions and initiatives in combating climate change, and carried out relevant cooperation. We participated in the drafting of *OGCI-2040 Low Emissions Roadmap*, conducted survey on methane emission along the industrial chain of the oil and gas industry, and jointly formulated with other companies the assessment standard for CO<sub>2</sub> storage capacity of the oil and gas industry.

## Case Study Green Finance Promotes Energy Consumption Transformation

In July 2017, Kunlun Financial Leasing Co., Ltd. directly under CNPC granted the first loans in an amount of RMB 60 million to State Power Investment Corporation Limited to fund the construction of a waste-to-energy plant in Bazhou City, Hebei Province. This project is one of the key green financial projects of the company. Kunlun Financial Leasing Co., Ltd. will provide RMB 200 million for the purchase of environmentally-friendly power generation equipment for the project. Once completed, the project can treat 1,200 tons of domestic waste every day at the new airport in Beijing and Xiong'an New Area in Hebei Province.

In response to the initiative of green finance proposed in China's "13th Five-year Plan", we actively participated in the construction of clean energy and environmental protection projects such as hydropower, wind power, photovoltaic power generation, and waste power generation. We successively invested clean energy projects in cities such as Chongqing, Guiyang, and Zhangpu, reduced the proportion of coal-fired power generation in the consumption mix, and provided the energy guarantee for the building of a new countryside and the development of special tourism. By the end of 2017, the Company had provided financing leasing services for 7 clean energy projects, aiming to reduce CO<sub>2</sub> emissions by millions of tons per year.

The Company will, following the investment strategy of giving top priority to the development of oil and gas while developing hydropower, nuclear power, wind power and photovoltaic power generation, keep intensifying its efforts to expand green finance business in the clean energy market. It is expected that green finance will become one of the pillar businesses of the Company by 2020.

## Development of Low-Carbon Energy

We actively develop natural gas, coal-bed methane, shale gas, biomass energy and other low-carbon energies, constantly promote the exploitation of geothermal energy, solar energy and other renewable energies, and studied the exploitation of natural gas hydrate and other resources, in order to play a positive role in improving China's energy structure. The company attaches great importance to producing and supplying clean products, and works hard to achieve clean production of the products and clean consumption process (see Chapter 1: Sustainable Energy Supply for details).

## Development and Application of Low-Carbon Technologies

With science and technology playing a significant role in controlling greenhouse gas emissions and addressing climate change, we carried out special studies on R & D of low-carbon technologies, established major projects in key technologies for low-carbon and clean development, and engaged in technological research on CO<sub>2</sub> flooding and storage, aviation bio-fuel production, refining energy system optimization, etc.

## Carbon Emission Reduction during Production

While supplying society with clean oil products, we paid high attention to optimizing the structure of energy consumption by ourselves. We also cared about carbon emissions and carbon footprint during production and operation. In Huabei Oilfield, Tarim Oilfield and other areas, we used renewable energies such as geothermal energy and solar energy to reduce carbon emissions during production.

## Market-based Mechanism for Carbon Saving

We actively participated in carbon trading activities to achieve carbon emissions reduction targets through market-based mechanisms. We are the co-founder of the Tianjin Climate Exchange (TCE), the first comprehensive emissions trading institution in China. The energy saving and emissions reduction projects developed by TCE could save more than 200,000 tons of standard coal annually, equivalent to over 500,000 tons of carbon dioxide emission reduction.

|      |   |
|------|---|
| 2009 | Completed China's first carbon neutral deal based on standardizing carbon verification  |
| 2010 | Certified the first carbon emission reduction (CER) at the energy efficiency market   |
| 2011 | Completed the first voluntary emission reduction deal in China based on the PAS2060 carbon-neutrality standard  |
| 2012 | Built a financing vehicle dedicated to energy-saving service companies jointly with financial institutions including Shanghai Pudong Development Bank and Industrial Bank, as well as the ESCO Committee of the China Energy Conservation Association |
| 2015 | Completed the largest CCER (Chinese Certified Emissions Reduction) transaction in China, with a trading volume of 506,125 tons  |
| 2016 | Established the China Carbon Market Capacity Building (Tianjin) Center to help enterprises in non-pilot areas enhance their capacity in low-carbon development and carbon market participation  |
| 2017 | Technically prepared the initial emission right verification and quota management according to China's planning for the establishment and operation of the carbon emission trading system   |

## Forestry Carbon Sequestration

We actively support carbon sink forest construction and forestation activities in China. We established the China Green Carbon Foundation together with the State Forestry Administration, building an accumulative total of over 20 million hectares of carbon sink forests. Meanwhile, we set up the Forestation Committee to ensure continuous forestation in our production areas and living quarters. As of late 2017, green coverage in CNPC's production areas reached 293 million square meters, representing a vegetation coverage rate of 43.97%. A total of 649,000 employees voluntarily planted 2.1785 million trees in 2017.

### Zero Coal

We formulated the *Measures for Strengthening Actions on Comprehensive Air Pollution Control in Autumn and Winter in 2017-2018 in Beijing-Tianjin-Hebei and Surrounding Areas*. In support of these measures, we also enacted the *Special Supervision Plan and Plan for the Control of Pollution Sources for Stability and Compliance with Standard*, and took strict implementing measures and strengthened supervision and inspection. By the end of 2017, all of the 285 coal-fired boilers had been phased out or replaced by clean energy in the Beijing-Tianjin-Hebei region and surrounding areas. No coal was used, low nitrogen transformation was carried out on gas-fired boilers in Beijing, oil and gas recycling in gas stations and VOCs treatment in refining companies were fully enhanced.

**Case Study** 10 Large-scale Carbon Sink Bases were Established in Changqing Oilfield

Changqing Oilfield operates in five provinces (autonomous regions): Shaanxi, Gansu, Ningxia, Inner Mongolia and Shanxi. About 70% of its oil and gas areas are located in the deserts and sparsely populated mountains, where, with a fragile ecological environment, environmental protection is essential.

Following the concept of "improving the local environment whenever building an oilfield", Changqing Oilfield invests tens of millions of RMB each year in establishing and maintaining large-scale carbon emission reduction bases and restoring vegetation on abandoned well fields and roads in the well area. In most areas of the oil and gas area, a green landscape featuring green belts along the road and lawns at the station has taken shape.

Over the past decade, Changqing Oilfield created about 3 million square meters of green land and planted more than 250,000 trees every year. As of late 2017, 10 large carbon sink bases had been built. It is estimated that the 66,667 hectares of carbon sinks established by Changqing Oilfield in Qingyang, Gansu Province alone can absorb more than 2.3 million tons of carbon dioxide every year, which will play an important role in local environmental protection and ecological restoration with the ability to release more than 1.7 million tons of oxygen for sequestration and carbon reduction.



## Products and Services

Following the principle of people oriented, quality foremost, safety first, environment prioritized, we strengthen the quality management system and improve process quality control to create brand products. In addition, we continue to improve product, project and service quality.

### Quality Control

In 2017, CNPC continued to enhance quality management and improved the quality of products, projects and services, focusing on quality supervision, metrological verification and standard revision.

| Main Work                          | Content  |
|------------------------------------|--|
| Culture of quality-awareness       | Conducted quality promotion, supervision and popularization of relevant knowledge  |
|                                    | Organized open house day in our labs, and 140,000 employees took part in a knowledge competition on overall quality management   |
|                                    | 40 groups won the national award on excellent quality management, 27 teams won the national award on trustworthy quality, and four subsidiaries won the title of excellent enterprises in quality management |
| Quality supervision and inspection | Supervised and conducted spot-checks on the quality of supplier's products on key projects   |
|                                    | Conducted targeted spot-checks during key time periods of quality upgrading on Beijing VI and National IV general diesel, and National VI Standard oil products in "2+26" cities                             |
|                                    | Conducted group spot-checks on key projects such as the Second Russia-China Crude Pipeline and the Fourth Shaanxi-Beijing Gas Pipeline   |
|                                    | Conducted spot-checks on 1,347 batches of purchased products   |
| Metering verification              | Medium and low-pressure primary standard device of Chengdu branch of the National Oil and Gas Large Flow Metering Station passed construction standard test  |
|                                    | Urumqi branch of the National Oil and Gas Large Flow Metering Station completed its construction and passed national test  |



100%

100% of our production and operation enterprises had their quality management system certified by a third party certification agency

## Product Management

We provide consumers with products according to legal provisions and industrial standards in responsible way. While providing products, we put emphasis on the influence on consumers and guarantee product safety. Meanwhile, we actively communicate with consumers, publish product safety risk evaluation results and make great efforts to protect consumers' legal interests.

## Quality Products and Services

### Providing Quality Products

By strengthening technological innovation and promoting product quality upgrading, we provided applicable solutions for our industry as well as safe, reliable, high-quality and environmentally-friendly products for our customers.

The "quality management experience of Lanzhou Petrochemical and China Huanqiu Contracting & Engineering Co., Ltd." won the title of quality benchmark for China's petroleum and chemical industry in 2017.

## Refined Products and Chemicals

- Completed National VI refined product upgrading in "2+26" cities in Beijing-Tianjin-Hebei area and National V ordinary diesel upgrading nationwide
- Ethylene production increased by 170,000 tons year-on-year
- Synthetic resin increased by 200,000 tons year-on-year and synthetic rubber increased 50,000 tons
- Produced polyethylene, polypropylene and synthetic rubber and new chemical products under 70 brands
- Promoted more than 30 new products including metallocene linear polyethylene, low-melting point polypropylene and PERT pipes

## Promoting Service Level

We constantly improve consumer experience and provide consumers with satisfactory and efficient services.

### Service Network

Our service covered 31 provinces (municipalities and autonomous regions) and the Hong Kong SAR.

We owned over 20,000 service stations in China, with an annual retail capacity of 79 million tons.

We explored the cooperation model of "oil (gas) station construction+ targeted poverty alleviation", established joint ventures with the local government. In 2017, newly built oil (gas) stations totaled 550, with 2.97 million tons of supply capacity added.

We provided services to 11 million consumers every day.

### Value-added Service

Expanded retail APPs, credit stores and other services.

### Consumer Satisfaction


Took measures such as launching the "Customer Experience Day", to improve service quality continuously.

Invited third party to conduct "mystery customer visit", and followed up with rectification measures.

### Scope of Service

95% of our service stations were equipped with convenience stores, and the number of convenience stores selling non-oil products reached 19,000.

Worked with automakers and auto service providers, increased the number of 25 auto service stations, and 119 auto service stations were opened in 2017.



★★★★★

CNPC ranked first in the industry in the "China Total Brand Value Management Grand Awards 2017 (TBV)" in terms of China Brand Power Index (C-BPI) and China Net Promoter Score (C-NPS). Meanwhile, it was also granted the award of China Total Brand Value Management Grand Awards 2017.



★★★★★

According to the 2017 China Customer Satisfaction Index (C-CSI), an index compiled by brand rating and consulting institute Chnbrand, CNPC's aggregate score came out on top in terms of three key satisfaction indicators for gas stations: customer loyalty, overall satisfaction level and elements satisfaction level.

# 97.1

The average score for customer service was 97.1 points, an increase of 1.7 points over last year

Case Study
Travel with CNPC on the Silk Road

In 2017, the Company held two self-driving tours "Travel with CNPC on the Silk Road". Through interactions with journalists and customers, we provided an in-depth experience of the "smart lifestyle" at our service stations.

## Supply Chain Management

We actively promote the sustainable development of the industrial chain. Therefore, we work in a respectful, communicative, honest and cooperative manner to facilitate our partners to carry out cooperation in product innovation, technological advancement, green, environmentally-friendly, and sustainable development, and procurement supply chain management, equipment management, and manufacturing business, encourage our partners to jointly fulfill our social responsibilities, and provide the society with high-quality products and services.

Through public bidding, we provided suppliers with fair, transparent and competitive opportunities. A unified supplier database was established for open tenders, fair competition and online transactions. The "Open, controlled, fully documented, and permanently traceable" process could ensure the quality of procured products and services. We have also established a complete supplier quality management mechanism which covered quality approval, quality inspection, supervision and spot-checking, and on-site supervision of the manufacturing of major products. Through the use of information technology and Internet tools, we implemented supervision and inspection of different units, different positions and different stages in the same process of the same business, to minimize dishonest behavior. Moreover, at various stages of supplier access, supplier assessment, strategic supplier development, materials and service procurement, tender invitations and tender evaluations, we clearly stated specific requirements in terms of business ethics, human rights, HSE, quality standards and public responsibility, in order to jointly build a responsible supply chain of petrochemical products.

In 2017, we kept optimizing business processes and standards, achieved integrated business management and control and IT-based processes from top to bottom; to strengthen dynamic supplier management, we carried out supplier inspections on-site. We also selected suppliers around the world through public bidding and qualification review, providing suppliers with equal access and accepting supervision from the general public.

### Supplier Management Principles, Systems and Mechanisms

| Management principles   | Management system   | Operating mechanism   |
|---|---|---|
| Open and voluntary, small quantity but high quality, dynamic management, resource sharing, global sourcing, mutual benefits and win-win | Unified management at two levels, integrated management of domestic and foreign resources | Separation of management from sourcing, implementation by sections, joint participation and effective supervision |



### Supplier Management Measures

|   |  |
|---|--|
| Centralized, two-level management           | <ul style="list-style-type: none"> <li>The headquarters is responsible for management of suppliers of materials within the Class-I materials directory.</li> </ul>   |
| System construction                         | <ul style="list-style-type: none"> <li>Build a supplier management system framework to regulate supplier evaluation, assessed and classified management, and supplier evaluation management.</li> <li>Formulate supplier Management Measures and regulations for supplier management standardization.</li> </ul> |
| Strict access, dynamic management           | <ul style="list-style-type: none"> <li>Establish performance appraisal system; implement survival of the fittest and dynamic management to weed out unqualified suppliers.</li> </ul>  |
| Establish a unified shared resource library | <ul style="list-style-type: none"> <li>Apply materials procurement management information system to realize supplier resource sharing and computer-based whole-process management.</li> </ul>  |

