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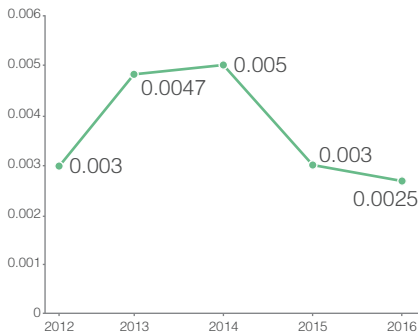
Responsible Operation

- ☑ Safe Operation
- ☑ Environmental Protection
- ☑ Climate Change
- ☑ Products and Services
- ☑ Supply Chain Management

We are always committed to the principle of “Environment prioritized, safety first, quality foremost, people oriented” and the goal of “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 product and service quality management, 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.

Safe Operation

Fatality rate caused by work safety accidents
(person/million working hours)



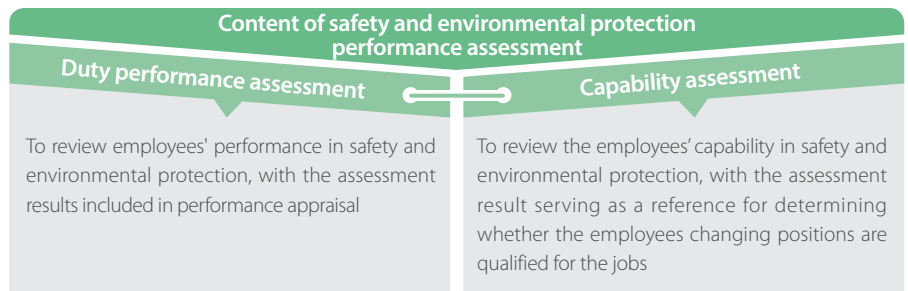
The number of fatalities in production accidents
dropped by

20%

We actively promote the construction of long-acting work safety system and comprehensively enhance work safety management level. All key projects were steadily proceeded as planned. In 2016, CNPC saw a stable improvement in work safety performance, with a continuous decline in the number of production accidents and fatalities. We reported no major safety or environmental pollution accidents in the year.

Management System and Performance Assessment

In 2016, we continued to improve our safety management mechanism, strictly executed the accountability system in which those who fail to fulfill their duties must be punished, and we strengthened the implementation of safety and environmental protection responsibilities of all employees. We carried out evaluation of employees' capabilities to perform safety and environmental protection duties. As a result, the Company-wide safety management system that is clearly graded in responsibilities and covers all staff was continuously improved. We optimized our HSE quantitative auditing standard and fully promoted HSE quantitative auditing, in order to strengthen auditing of leadership performance and process control.



Promote the standardized construction of grassroots stations and competency assessment

Through promoting standardized construction of grassroots stations of all business units, the standardization rate overall reached 41%, in which that of the pipeline segment reached 90%.

Competency assessment on safety and environmental protection was carried out on grassroots managers and key personnel, with emphasis on the assessment of newly promoted, appointed and transferred staff. We linked the assessment results with rewards and penalties, appointments and promotion to create an environment matching competency with posts and the voluntary assumption of responsibilities.

HSE Training

We promoted the application of the HSE training matrix at the grassroots level, and issued a handbook on HSE training matrix compilation and application for grassroots employees facing high risks. We explored the application of the HSE training matrix for grassroots employees through multiple ways, in small scale and with short training hours, in order to improve training effectiveness.

Rectification rate of long-distance pipeline hazards reached 100%

100%

Rectification rate of chemical tank field hazards reached 98%

98%

Safety and environmental technology diagnosis and management assessment were conducted at 12 key subsidiaries and projects; significant problems and major hazards were handled with follow-up measures.

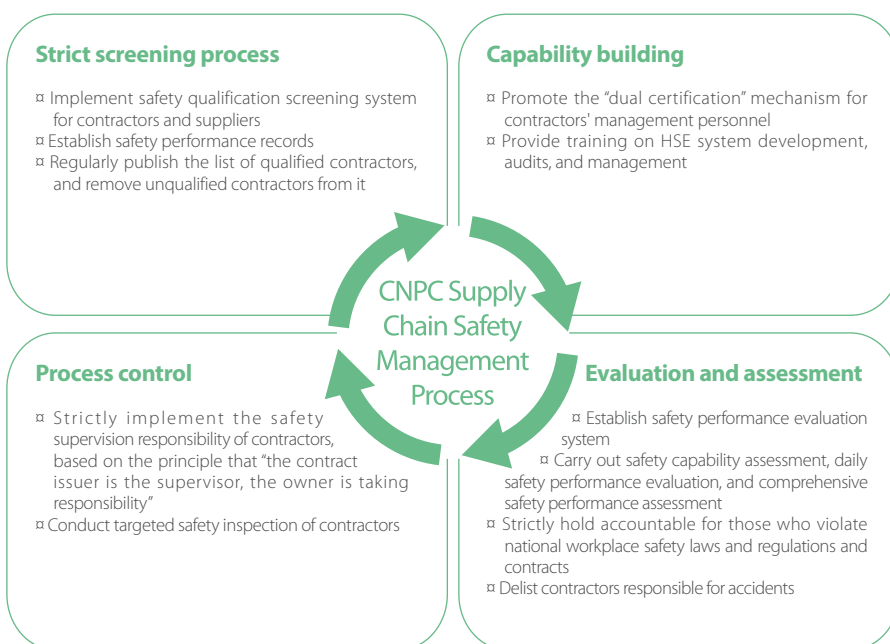
12 subsidiaries and projects

Safety Risk Management

We built a dual-prevention mechanism covering risk prevention and potential hazard control, while improving classified risk control and close-loop hazard management, in order to eliminate safety risks and potential hazards to prevent accidents. We emphasized management of key areas including supply chains, hazardous chemicals and high-risk operations. Safety and environmental protection technology diagnosis and management assessment were carried out on key subsidiaries, key projects and high-risk areas to ensure that major risks are under control. We continued to improve our emergency response capability and attached great importance to anti-terrorism work in overseas projects by putting in place targeted emergency response plans.

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. We provided guidance to our suppliers to ensure their operations and production are in compliance with the law, quality standards and safety regulations. HSE assessment was conducted regularly to prevent and reduce accidents caused by suppliers and contractors. We strengthened contractor training by putting in place unified standards, requirements, as well as rewards and punishments, in order to build a competent and trustworthy contractor team with standard management and outstanding performance. We regularly assessed contractors' HSE performance and those with a record of major accidents were black-listed.



Hazardous Chemicals Management

The Company has kept strengthening safety supervision of hazardous chemicals, and regulating full process management of hazardous chemicals covering production, storage and transportation. We strengthened safety education and training on hazardous chemicals, set up a hazardous chemicals safety technology center, and promoted the construction of information platform on hazardous chemical safety supervision. Inspection and treatment of potential hazards were carried out at chemical tank farms, with the rectification rate of key potential hazards at tank farms reaching 98% for the whole year.

Emergency Management

We have been constantly improving our emergency management mechanism and our emergency rescue capability was improved greatly. In 2016, the Company improved its emergency plan at the headquarters level, conducted emergency drills, and strengthened emergency training. All our subsidiaries were equipped with site emergency plan and emergency card. Substantial progresses were made in regional emergency interaction and emergency materials layout.



Set up oil spill emergency response system covering all lands and waters in China



CNPC Offshore Emergency Response Center has set up an oil spill emergency response system covering all lands and waters of the country, which is capable of providing emergency rescue in case of oil spills in different environments including shallow seas and bay areas. The Company has been improving oil spill emergency plan system in four aspects of emergency preparation, warning and monitoring, emergency handling and joint emergency response, to ensure that the system is more rational, targeted and workable.

Offshore Oil Production Safety

The Company 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 focused on supervision of main offshore construction projects in the process of design, construction and operation, and 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 as well as oil spills and pollution. In 2016, 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 steadily promoted social security management systems, strengthened social security risk prevention and control, continuously enhanced emergency response capabilities. In 2016, there were no fatalities in our overseas projects concerning social security.

- ▣ Kept improving security management system to increase its relevance, practicality and operability.
- ▣ Strengthened supervision and inspection of the security management system's operational efficiency, 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 16,000 employees were trained at 264 training sessions in 2016.

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.



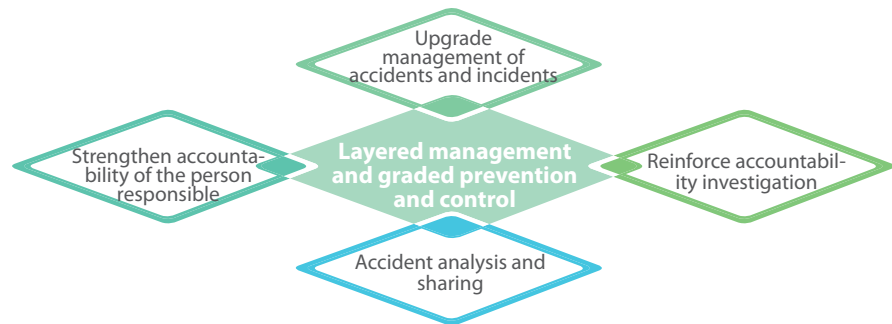
In 2016, we effectively responded to the armed conflict in South Sudan. While maintaining the basic production of the oilfield, we evacuated 348 employees in a safe and orderly manner, ensuring the safety of employees and oilfield property .

Environmental Protection

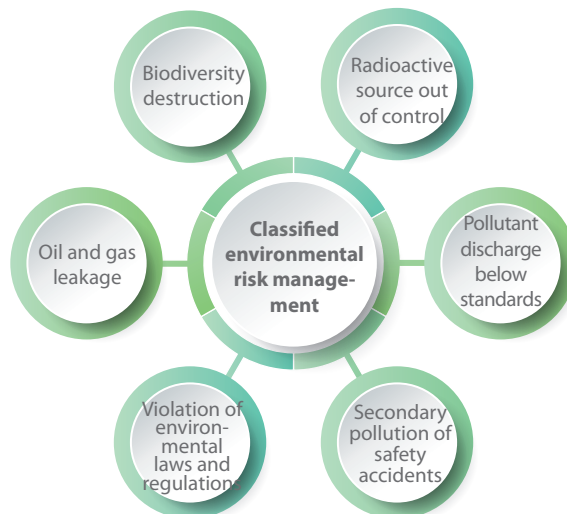
We take the initiative to evaluate the environmental impact of our decisions and activities, and make efforts to reduce adverse effects on the environment and climate. By improving the resource utilization efficiency, implementing the Clean Air Act, promoting energy conservation and emission reduction, 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

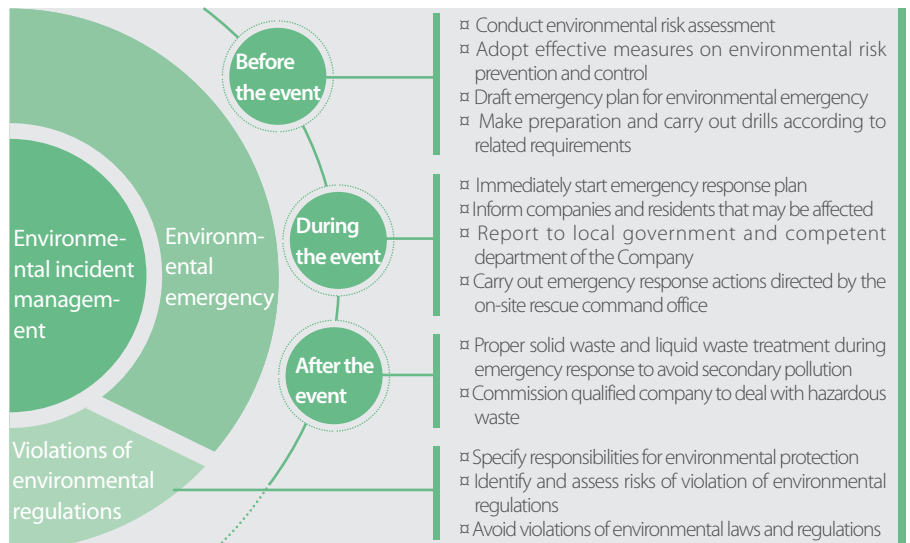
We carried out environmental risk identification and assessment, and implemented a risk prevention and control management model focusing on environmental forecasting, pre-warning and monitoring. We began the environmental risk management at an earlier stage, and established a sound risk management mechanism featuring "management in tiers, prevention and control by levels", in order to ensure overall control over environmental risks. In 2016, no major environmental accidents were reported and all major pollutants reduction targets were achieved.



We carried out classified management of "six major environmental risks", drafted targeted control plans, and organized major subsidiaries to identify potential risks and implement risk control measures, so that management measures can be implemented at every level.



In 2016, we released *CNPC's Administrative Measures on Environmental Incidents* and *CNPC's Regulations on Oil Pipeline Environmental Risk Prevention and Control* to strengthen the management of emergencies and environmental risks, thereby controlling, reducing and eliminating harmful environmental incidents.



For continuing to reinforce our 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.



Real-time environmental risk management via internet technology

We actively integrated internet technology with our ecological conservation practices. The Pollution Sources Online Monitoring System was set up, realizing networking and sharing of ecological data. With 45 functions divided into six modules, the System could accurately monitor, calculate and analyze emission data of each monitoring point in real time; monitor emissions from key sources in real time, assess the operating results of environmental protection facilities; and collect and analyze the alarm data.

In case of an environmental accident, the Pollution Sources Online Monitoring System could be used as the environmental emergency monitoring and decision-making platform. It could receive, analyze and process the emergency monitoring data, video images of the accident and weather conditions, and integrate the functions of GIS space analysis, pollutants migration simulation, environmental alert and consultation on final decisions.

By the end of 2016, 304 key monitoring points of CNPC completed data networking, covering 87 waste water and 217 waste gas discharge outlets in the national monitoring list of key enterprises.

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

CNPC endeavors to improve water utilization efficiency and realize sustainable water utilization throughout various links in our production and operation activities. We improved water management by using wastewater treatment and reclaimed water reuse technologies to reduce freshwater consumption. In 2016, the Company reduced overall freshwater consumption by 1.78% year-on-year, and saved a total of 13.39 million cubic meters of water.



treated wastewater

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

Exploration and Development

- In our oil and gas development, equal importance was given to water pollution prevention & 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 2016, over 100% of oil extraction wastewater in our oil and gas fields was treated, with a reinjection rate of more than 95%.
- 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 2016, the comprehensive qualification rate of the Company's oilfield wastewater reached 100%, and water discharges were reduced by 10% year on year.

Pipeline Operations

- 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.

Refining and Chemicals

- We improved water consumption efficiency by promoting clean production processes, saving water from the source, and optimizing water consumption systems. We increased the concentration times 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.

Reducing water pollution risks through three-tiered pollution prevention and control system

We set up a safe, timely and effective pollution prevention and control system, conducted environmental risk assessment, and adopted necessary prevention measures to control water pollution risks and prevent oil spill accidents. Comprehensive inspection was carried out across the Company, and three-tiered prevention and control mechanism against water pollution accidents was implemented at enterprises located close to rivers and lakes or at places where public water pollution is possible.

Tier 1 prevention and control system

Prevent possible minor pollution risks by setting up cofferdam, tank farm fire dike and supporting facilities

Tier 2 prevention and control system

Prevent possible major pollution risks by setting up rainwater cutting system, waste barrage, anti-overflow and diversion facilities, as well as intermediate accident buffer and supporting facilities

Tier 3 prevention and control system

Prevent possible serious pollution risks by setting up terminal accident buffer and supporting facilities.

In 2016, 1,135 hectares of land were reclaimed

1,135 hectares

In 2016, the Company saved 950,000 tons of standard coal equivalent, accounting for 125% of the planned annual volume

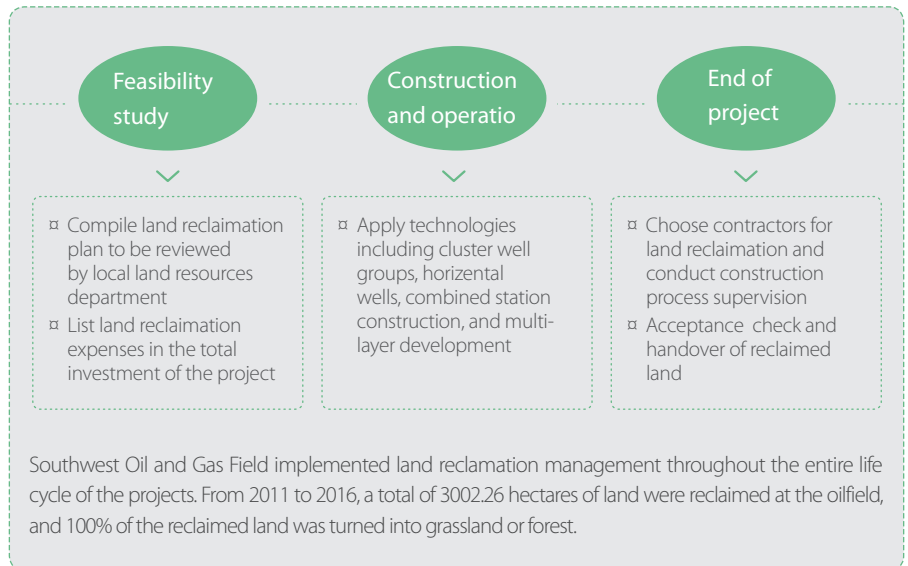
125%

Technology on improving the efficiency of oil and gas field boilers and heating systems raised the overall efficiency of boilers by 5%

5%

Land Resources

The Company attaches great importance to the protection of land resources. 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, and carried out environmental treatment and recovery in mining areas. Changqing Oilfield managed to save 15,000 acres of land in 2016 through measures such as the extensive use of cluster well and horizontal well, optimizing well pattern arrangement, and integrative planning of stations.



Five oil and gas subsidiaries including Daqing Oilfield and seven refining companies including Jilin Petrochemical received the award of the “National Advanced Unit in Petroleum & Petrochemical Industry in 12th Five-Year Plan”.

Dushanzi Petrochemical was selected as the energy efficiency leader of the ethylene industry by the Ministry of Industry and Information Technology, the National Development and Reform Commission, and the General Administration of Quality Supervision, Inspection and Quarantine in 2016.

Comprehensive control of VOC emission was conducted, and the VOC comprehensive control information platform for refining enterprises was set up.

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-developed, 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 2015, the emission intensity per unit of crude oil production of four major pollutants measured by chemical oxygen demand, ammonia nitrogen, sulfur dioxide and NOx decreased by 31.5%, 23.1%, 33.6% and 28.3% respectively, compared with 2010; the emission intensity per unit of crude oil processing decreased by 27.8%, 28.8%, 54.8% and 32.0% respectively, compared with 2010.

In 2016, we implemented 58 projects to reduce emissions, including 49 on waste gas emission reduction, and 9 on waste water discharge reduction. Emissions of sulfur dioxide, ammonia nitrogen, COD and nitrogen oxides dropped continuously.

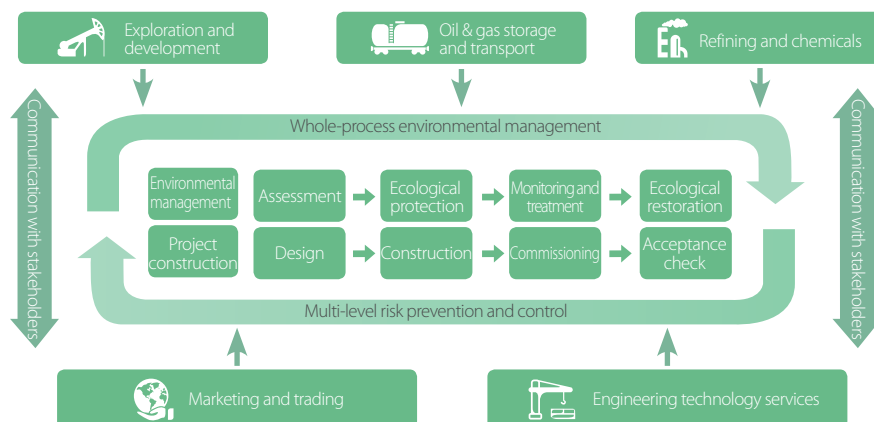
State Key Laboratory of Petroleum and Petrochemical Pollution Control and Treatment

Key areas	Petroleum and petrochemical waste water treatment and reuse	Solid waste recycling	VOC detection and recycling	Field pollution risk prevention and restoration
Research achievement	Packaged technology for upgraded processing of refinery waste water based on advanced oxidation pretreatment - in-situ upgrading - in-depth processing	Packaged technology for resource treatment of drilling waste while drilling	Packaged technology for wet desulfurization and low-temperature denitrification of catalyst regeneration flue gas for catalytic cracking units	Packaged technology for restoration of petroleum hydrocarbon contaminated sites
Research achievement	▣ Solved difficulties such as biological inhibition and poor biodegradability of point source wastewater ▣ Met requirements of new standard for Chemical Oxygen Demand (COD) and ammonia nitrogen ▣ Applied the upgrading of wastewater treatment in subsidiaries such as Lanzhou Petrochemical	▣ Realized drilling waste recycling rate of 100%, and clean drilling operation with zero solid or liquid waste discharge ▣ Promoted in natural gas wells in Sichuan-Chongqing Region, generating RMB 80 million in economic benefits	▣ Emitted SO₂ and NO_x with concentration lower than 50ppm which met ultra-clean emission standards, and denitration catalyst reached international advanced level ▣ Completed desulfurization and denitrification projects at 20 units, saving RMB 130 million for technology introduction and catalyst costs	▣ Applied waste storage sites in Jilin and in several service stations and oil-contaminated coastlines in Hebei, providing technical support for site pollution prevention and control for oil enterprises ▣ Obtained four invention patents, two utility model patents and one software copyright

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.

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



CASE

Green drilling to protect the environment

CNPC integrated environmental protection into the whole well-drilling cycle and took all kinds of measures to protect surface and underground water. During the drilling process, we used eco-friendly mud, strengthened recycling of drilling waste, and conducted standard treatment of waste liquid. By the end of 2016, CNPC recycled 1.05 million tons of drilling waste, and the reuse rate of waste liquid reached 80%.

Eco-friendly mud

- Conducted R&D and upgrading of eco-friendly mud: oil-based mud - water-based mud - eco-friendly mud

Recycling of drilling waste

- Used bio-safety treatment technology for drilling waste
- Adopted solidified disposal and bio-safety treatment to drilling detritus and waste mud, which became useful building materials reaching environmental and building material strength standards

The green drilling philosophy and technology was widely applied in CNPC's global operation. For example, in Chad, the Company used the close-loop treatment system to separate, treat and reuse waste mud, and turned it into mud plate and clean water to be used in well station construction and mud mixing.

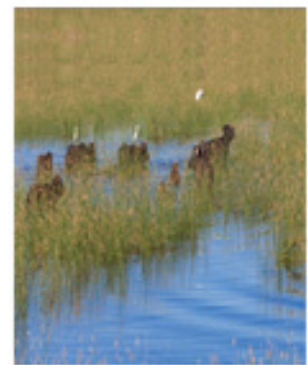
CASE

Wetland protection in North Azadegan project gains recognition from the host country

Paying high attention to local wetland protection, CNPC's North Azadegan project in Iran was the first foreign enterprise to win the award on environmental protection from the country. In order to reduce the impact on wetland by well site road and keep the fluidity of water resources, we reconstructed wetland water flow network to avoid dead lake by building high-standard culverts and road network in the form of "three horizontal and two vertical lines." By the end of 2016, North Azadegan project built 149 culverts in the oilfield wetland, and effectively guaranteed the eco-balance of wetland.



North Azadegan project won "environmental protection award" in Iran

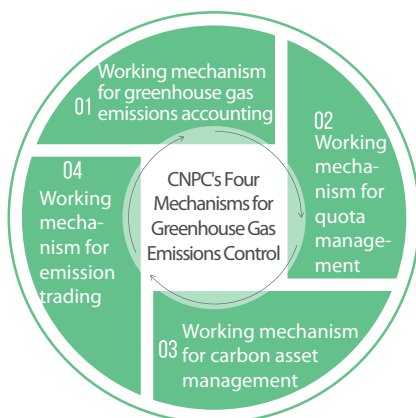
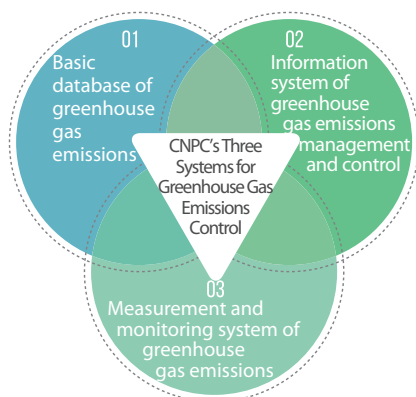


Site of North Azadegan project

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 CO₂ Capture, Utilization and Storage Technology Innovation (CTSA-CCUS)
- ▣ Oil and Gas Climate Initiative(OGCI)



Our overall objectives to address climate change

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 for greenhouse gas emission control

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.

Carbon Emission Management

We paid close attention to greenhouse gas emissions and included climate change tackling in our development plan. In 2016, we specified our objectives, action plans, safeguard measures and key tasks to address climate change. We focused on carbon footprint verification and built basic management databases, in order to lay foundation for carbon emissions accounting and reporting.

Development of Low-Carbon Energy

As an advocate and practitioner of low-carbon economy, we actively developed natural gas, coal bed methane (CBM), shale gas, biomass and other low-carbon energy, produced and supplied clean products, and worked hard to achieve clean production of the products and the consumption process (see P16 Sustained 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 CO₂ flooding and storage, aviation bio-fuel production, refining energy system optimization etc.,

	Achievements	Application Effect/Prospects
Strategies and policies	Research on policies, standards and strategies for low-carbon development	We established the low-carbon data management platform and comprehensive low-carbon evaluation index system, and the statistical and accounting standard for greenhouse gases from upstream and downstream enterprises, providing technical support for greenhouse gas emissions accounting and reporting, as well as carbon emission benchmark value accounting of the Company.
	Research on evaluation index systems for energy saving and emission reduction	We developed evaluation index systems, energy efficiency benchmarking and pollutant emissions reduction benchmarking techniques for energy saving and emission reduction. We also established index database framework for energy efficiency benchmarking and pollutant emission reduction benchmarking. As demonstrated by pilot applications, the index systems showed high practicality and could provide strong support for implementing our energy saving and emission reduction projects.
Technologies	Carbon dioxide flooding technology	The technology was deployed in industrial tests at the Jilin and Daqing oilfields. By the end of 2016, nearly 2 million tons of carbon dioxide was injected and a total of nearly 700,000 tons of oil was produced.
	Biomass energy development technology	Significant progress was made in core technologies for aviation biofuel production, and key technical and economic indicators reached the international advanced level. The packaged technology for aviation biofuel production with independent intellectual property rights are of great significance to the partial replacement of petroleum resources, the reduction of greenhouse gas emissions and the improvement of the environment.
	Energy system optimization technology	The technology has been comprehensively promoted and applied in the Company, saving over 200,000 tons of standard coal per year. Targeting at highly integrated refining and chemical business with intensive IT support, this technology, played an important role in the highly automated and intelligent refining and chemical production process.
	Vent gas (associated gas) recycling technology	The technology enabled the closed gathering, transportation and treatment of associated gas throughout the production process, and was applied in Changqing and other oilfields. It is expected to recover 200 million cubic meters of natural gas each year.
	CBM development technology	We innovated and developed a series of CBM development technologies focusing on high-efficiency discharge and recovery as well as production stimulation. We produced 7 bcm of marketable gas totally, equivalent to reduction of 105 mt of carbon dioxide emissions.
	Geothermal energy utilization technology	We improved standards for the evaluation of geothermal resources in oil provinces, established the geological model for geothermal field development, and developed geothermal resources evaluation software. We optimized abandoned exploration wells, designed direct heat transfer underground, and evaluated the economic efficiency of absorption heat pump technologies.

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 were 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

In 2016, we invested a total of RMB 32,426,000 in public-welfare forestation funds and planted 3.89 million trees

32,426,000 RMB



Forestry Carbon Sequestration

We actively supported 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 22.07 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 2016, green presence in CNPC's production areas reached 289 million square meters, representing a vegetation coverage rate of 26.89%. A total of 647,000 employees voluntarily planted 3.89 million trees in 2016.

We established the China Green Carbon Foundation together with the State Forestry Administration, building an accumulative total of 22.07 million hectares of carbon sink forests, equivalent to the area of 3,090 football fields.

	Location	Area
Forestation projects supported by China Green Carbon Foundation	Shaanxi	6,667 hectares
	Inner Mongolia	6,667 hectares
	Hebei	3,333 hectares
	Anhui	3,333 hectares
	Hunan	6,667 hectares
	Yunnan	26,667 hectares
	Sichuan	13,333 hectares
Forestation projects operated by CNPC through China Green Carbon Foundation	Dingxi, Gansu	1.33 million hectares
	Qingyang, Gansu	1.33 million hectares
	Zezeng, Heilongjiang	5.33 million hectares
	Beijing	1.53 million hectares
	Dingzhou, Hebei	1.33 million hectares
	Wuhan, Hubei	6.67 million hectares
	Lin'an, Zhejiang	466,690 hectares
	Longzhou, Guangdong	2 million hectares
	Shantou, Guangdong	2 million hectares

CASE

Supporting the Paris Agreement and promoting carbon emission reduction in the oil and gas industry



As a responsible energy company, CNPC acts in strict compliance with the Chinese government's requirements on greenhouse gas emission reduction, and actively supports and participates in the international communities' efforts to address climate change. Robust international cooperation is required to combat climate change. In 2015, CNPC joined the Oil and Gas Climate Initiative (OGCI). As a member of the OGCI, CNPC played a leading role in emission reduction in the oil and gas industry by taking the initiative in carbon reduction and sequestration, and pledging to help all participants, governments, industrial sectors and individuals to jointly invest in a future of lower emissions.

"Implementing the Paris Agreement requires the further promotion of energy supply-side structural reform. OGCI provides an ideal cooperative platform for the global petroleum industry's low carbon transformation."

—Wang Yilin, Chairman

Since becoming a member of the OGCI, CNPC has been actively involving in all types of activities within the OGCI framework, and worked closely with member companies such as BP, Total and Shell.



We established the OGCI work leading group to ensure the execution of various endeavors.

The OGCI work leading group is composed of three working groups: Carbon Capture, Utilization and Storage, Low Emissions Roadmap, and Managing Methane Emissions. The working groups carry out joint research with other member companies respectively, and released phased research reports at the CEO Summit in early November 2016.



We actively involved in the preparation of OGCI's new management regulations.

Through telephone communication with the executive committee members from BP, Total, Shell, Saudi Aramco and other member companies, we gained better understanding about the cooperative relations among these companies, and coordinated on important issues to make sure that CNPC's opinions were fully understood and responded to.



We actively participated in the Climate Investments (CI).

We took part in the work of the OGCI Climate Investments preparatory group, followed the work in progress, and invested in demonstration projects in low-carbon areas jointly with member companies. The member companies will invest USD 1 billion over the next 10 years to accelerate development of innovative technologies, and the investment will be made mainly in technology development, demonstration projects and emerging projects.

Products and Services

100% of our production and operation subsidiaries passed third party certification in quality management system

100%

We organized 67 quality training activities with participants of 20,000 person-times.

20,000 person-times

"The experience of quality system maturity assessment of Bohai Drilling Engineering Company" won the award of 2016 national petroleum and petrochemical industry quality benchmark.

Lanzhou Petrochemical and Bohai Drilling Engineering Company won the award of "2016 demonstration enterprise for industrial brand nurturing" from China Petroleum and Chemical Industry Federation.



Following the principle of quality foremost and people oriented, 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 2016, CNPC continued to enhance quality management and improved the quality of products, projects and services, focusing on quality supervision, metrological verification and standard revision.



Quality Supervision and Inspection

We carried out supervision and spot-checks on the quality of the products we produced, sold, procured and used, as well as the quality of construction project in progress. We regularly reported quality hazards and announced quality risks of major projects, and adopted zero tolerance against unqualified products.

- ▣ Promoted business management innovation, and investigated and punished suppliers of unqualified products
- ▣ Carried out comprehensive spot-checks on warehouses of procured products to improve coverage of supervision and spot-checks
- ▣ Released spot-check results in a timely manner

We attached equal importance to physical and behavioral quality. Focusing on identifying major potential quality hazards, we have realized full coverage of supervision and inspection of projects under construction.

- ▣ We combined daily supervision and expert inspection, and strengthened quality supervision of major projects under construction including the Fourth Shaanxi-Beijing Gas Pipeline and the Second Russia-China Crude Pipeline



Formulation and Revision of Standards

Strictly implemented mandatory standards, actively upgraded corporate standards, and participated in formulation and revision of national and industry standards

- ▣ We formulated and revised 74 national and industry standards, and 73 corporate standards in 2016
- ▣ We formulated and implemented self-declaration and disclosure plan for product and service standard to ensure compliant and effective adoption of standards
- ▣ 32 experts took part in international standardization conferences, and led and participated in the formulation and revision of related international standards



Metering Infrastructure Construction

- ▣ Primary standard device of Chengdu branch of the National Oil and Gas Large Flow Metering Station started construction standard test
- ▣ Guangzhou branch received national authorization and started verification
- ▣ Urumqi branch completed commissioning and started construction standard test
- ▣ Oil metering standard device layout moved forward stably



Nurturing Quality Culture

- ▣ We carried out the Quality Month Campaign and supervision of product and project quality, and released QC achievements
- ▣ 62 groups won the national award on excellent quality management, 22 teams won the national award on trustworthy quality, and four subsidiaries won the title of excellent enterprises in quality management team activity

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.



Exploration and Development

- ▣ Made innovation in well pattern adjustment technology for the layer system of ultra-high water-cut oilfields, and researched and developed key tools such as intelligent flow measurement and adjustment instruments, enhancing the waterflooding recovery rate by 1-3 percentage points.
- ▣ Achieved an annual output of more than 4 million tons and enhanced the recovery rate by more than 18 percentage points through the industrial promotion of chemical compound flooding technology.
- ▣ Researched and developed the high-performance recoverable fracturing fluid system, fully soluble composite bridge plugs and other key tools, reducing the cost by 30%.

Refining and Petrochemical Products

- ▣ We promoted the application of independently developed clean National V gasoline and diesel production technology, with production capacity reaching 105.5 million tons/year.
- ▣ Catalyst on fixed bed residue hydrotreating PHR series was successfully tested for commercial production, with better performance in desulfurization, carbon removal and denitrification.
- ▣ We developed 1.03 million tons of new petrochemical products of 84 specifications and models. Important progress was made in automobile fuel tank materials, IBC container materials, special medical materials, and Goodyear materials.
- ▣ Developed production technologies for specialty chemicals such as 20 thousand tons/year of Hexene-1 and highnitrile SAN.
- ▣ Major progress was made in the technology development for olefin polymerization monomer, methanol conversion to olefin, and alkylation of benzyl alcohol, providing technical support for efficient resources utilization, low-cost chemical feedstock production and high-grade lubricant PAO.

Pipeline Storage and Transportation Equipment

- ▣ We developed X80/Ø1422 steel pipe and fitting, and supporting construction equipment; and could carry out X90 pipeline testing section engineering to provide technical guarantee for the construction of the Eastern Route of the Russia-China Gas Pipeline.
- ▣ We saw safe operation of our gas storages, innovated core technologies on evaluation of dynamic seal of gas reservoir storage trap, and developed six types of equipment and products, including well leakage detector.

- ▣ As of 2016, CNPC has completed refined product replacement in oil storage and stations in **31** provinces and municipalities and provided these places with products meeting national V standard.
- ▣ **5017** patent application in 2016
- ▣ CNPC was granted **one** gold medal and **five** awards for excellent patents at the 18th China Patent Award Ceremony jointly hosted by the State Intellectual Property Office of China (SIPO) and the World Intellectual Property Organization (WIPO).

According to the Chinese Customer Satisfaction Manual jointly issued by the Customer Satisfaction Measurement Center under China National Institute of Standardization and the Chinese State-owned Enterprise Research Center under Tsinghua University, our company's service stations ranked first on customer satisfaction in 2016 compared with peers in China.

NO. 1

Satisfaction rate of followup on customer complaints reached 95.9%, up 3.2% year-on-year.

95.9%



communicative, honest and cooperative manner.

Promoting Service Level

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

Optimize Service Network

- ▣ We owned over 20,000 service stations in China, with annual retail capacity of 80.18 million tons. Our sales service covered 31 provinces (municipalities and autonomous regions) and the Hong Kong SAR.

Provide Value-added Service

- ▣ Developed CNPC e-station app to realize mobile payment.
- ▣ Opened CNPC e-station official WeChat account for rechargeable cards and credits store.
- ▣ Promoted Alipay and WeChat pay nationwide; added ways to pay such as QR scanning, face-to-face Alipay, mobile payment and mobile transfer.
- ▣ Promoted full and semi self-service stations in more than 7,300 stations in 27 provinces.

Expand Scope of Service

- ▣ The number of convenience stores selling non-oil products reached 17,000, and 89% of our service stations were equipped with convenience stores.
- ▣ Worked closely with automakers and auto service providers, increased the number of 2S auto service stations, and 300 auto service stations were opened in 2016.

Improve Consumer Satisfaction

- ▣ Took measures such as collecting consumer opinions, conducting customer satisfaction surveys and launching the "Customer Experience Day", and solicited customer opinions in a timely manner to improve service quality continuously.
- ▣ Invited third party to conduct "mystery customer visit" on 31 branch companies, and followed up with rectification measures to improve service quality at grassroots stations.

In 2016, the Company invited 69 customers and journalists, through CNPC E-station, online and offline recruitment, to take part in the self-driving tour themed "CNPC takes YOU on the Silk Road". Through the activity, participants got to know our work at oilfields and refineries, experienced the integrated sales model covering refined oil, fuel cards, convenience stores and lubricants, and enjoyed the intelligent way of consumption at service stations.



Supply Chain Management

RMB 110 billion of procurement expenses in 2016

110 billion

25,435 suppliers in 2016

25,435 suppliers



We actively promote the sustainable development of industrial chain, encourage our partners to jointly fulfill our social responsibilities, and provide the society with high-quality products and services in a respectful, communicative, honest and cooperative manner.

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 2016, we revised administrative measures on material suppliers, unified requirements on supplier qualification management, and carried out inspections onsite, in an effort to strengthen source management of suppliers and improve the quality of procured materials. We constantly optimized our supplier base and selected suppliers around the world through public bidding and qualification review, providing suppliers with equal opportunities and accepting supervision from the general public.

Supplier Management Principles, Systems and Mechanisms

Management principles	Open and voluntary, competition and selection; small quantity but high quality, mutual benefits and win-win; dynamic management and resource sharing
Management mechanism	Unified management; layered responsibility; authorized procurement; separation of supervision and execution
Operating mechanism	Operating mechanism: centralized procurement, separate operation, joint participation and effective supervision

Management Measures

Centralized and two-level management	System construction	Strict access and dynamic management	Unified resource sharing base
□ The headquarters is responsible for managing of material suppliers within the Class-I materials directory. □ The procurement departments of affiliates are in charge of managing the rest.	□ Build a supplier management system framework to regulate supplier evaluation, graded and classified supplier management, and supplier examination □ The formulation of Supplier Management Measures and other regulations	□ Establish performance appraisal system, and implement "survival of the fittest" and dynamic management to weed out unqualified suppliers.	□ Apply procurement management information system, to realize supplier resource sharing and computer-based whole-process management.