Continuous Energy Supply

Energy serves as the driving force to support socio-economic development. The energy demand is expected to increase continuously. Petroleum, natural gas, coal will continue to play an integral part in energy supply, with burgeoning renewable energy as important alternative energy.
As China’s largest energy and chemical company, Sinopec shoulders the responsibility to guarantee the nation’s energy security. Thanks to innovation, cooperation and the altruistic contribution from over a million employees, the Company has made persistent efforts in diversifying the energy mix and seeking more energy sources to ensure the economically viable, stable and reliable energy supply for the sustained development of the nation’s economy and the society.
1.1 Strengthening the Resource Basis

In recent years, Sinopec has been continuously increasing the investment into the energy sector to accelerate development at home and abroad. By doing so, we have gained access to not only more oil and natural gas resources, but unconventional and renewable resources as well, thus increasing the gross amount of resources and optimizing the energy mix.

Constantly Expanding Investment

Energy development requires consistent and substantial capital input. The past few years have witnessed constantly increasing investment made by Sinopec in the exploration and production of hydrocarbon resources. Our investment in 2011 reached RMB 71.8 billion from RMB 39.4 billion in 2006, with the aggregate investment from 2006 to 2011 exceeding RMB 366.7 billion.

Making Efforts to Expand Reserves and Production

In 2011, Sinopec continued to implement the resource strategy of "stabilizing output in eastern fields, expanding production in western areas, accelerating development in southern blocks, pushing forward offshore exploration and development, making breakthrough in unconventional resource development, depending on technologies and building up upstream strength". Great efforts were made to increase the hydrocarbon reserves and output in Shengli, Erdos, Sichuan, Tarim and unconventional resources. Relying on innovation in theories, technology and management, we achieved high quality development with good economic benefits.

In 2011, we made 5 breakthroughs, 8 important progresses, 4 significant discoveries and 10 major results. Measured geological reserves added by 39.23 million tons and that of natural gas added by 22.1 billion cubic meters, both registering substantial growth and strengthening the resource basis for Sinopec. Hydrocarbon production in 2011 amounted to 407.91 million barrels.

In 2011, Sinopec produced 42.73 million tons of crude oil and 14.6 billion cubic meters of natural gas in China while the oil production from the western region increased to 8.466 million tons.

Investment in Exploration and Production (RMB 100 million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment (RMB 100 million)</th>
</tr>
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<tbody>
<tr>
<td>2006</td>
<td>394</td>
</tr>
<tr>
<td>2011</td>
<td>718</td>
</tr>
</tbody>
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2006—2011 the Total Number of Investment in Exploration and Production (RMB 100 million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic oil production (10,000 tons)</th>
<th>Domestic gas production (100 million cubic meters)</th>
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<tbody>
<tr>
<td>2006</td>
<td>4,242</td>
<td>85</td>
</tr>
<tr>
<td>2007</td>
<td>4,256</td>
<td>125</td>
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<tr>
<td>2008</td>
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</tr>
<tr>
<td>2010</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>2011</td>
<td>146</td>
<td>146</td>
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The beautiful scenery of Ningdong oilfield
From Victory to Victory, Sinopec Shengli Oilfield Produced 1 Billion Tons of Oil in the Past 50 Years

Shengli Oilfield is Sinopec’s biggest oilfield and the second largest in China. In the past 50 years, the measured geological reserves of Shengli had been maintained more than 100 million tons for 28 consecutive years and the aggregate measured geological reserves amounted to 5 billion tons. The annual oil production averaged at 27 million tons for 15 years in succession and total oil production reached 1 billion tons, accounting for 20% of the national total from 1961 to 2011.

The development of Shengli Oilfield represents the history of pioneering which witnesses the hardships and indomitable spirit of several generations of petroleum workers, represents the history of overcoming difficulties which is achieved through technology progress and management innovation, represents the history of contribution which promotes loyalty to the motherland and giving back to the society and represents a history of talent development in which numerous talents were developed.

Accelerating the Import of Overseas Resources

Faced with the unstable situation in the Middle East and North Africa, Sinopec has pressed ahead with the diversification of its crude import, strengthened international cooperation, explored more sources and mitigated supply risks. We have adopted multiple trade patterns, optimized logistics and transportation and expanded the gross volume of international trade, therefore guaranteeing the stable supply of oil and gas to the domestic market.

In 2011, the gross volume of Sinopec’s crude trade reached 234 million tons, up by 25.8% on yearly basis. Meanwhile, Sinopec accelerated the import of overseas natural gas and signed the 6.3 million-ton/year LNG long-term procurement agreements with relevant suppliers.

Diversifying the Energy Mix

Sinopec has placed emphasis on the development and utilization of new types of energy, including the development of unconventional hydrocarbon resources (CBM, shale gas and shale oil etc.) and biomass energy (bio-diesel and bio-jet fuel) and the clean utilization of coal.

In 2011, Sinopec achieved significant progress in the exploration of unconventional resources. CBM discoveries were made in Yanchuannan, Zhijin and Heshun blocks while shale gas was found in Jiannan (the west of Hubei and the east of Chongqing) and Yuanba (northeast Sichuan). The first horizontal well for shale oil was drilled in the deeply depressed zone in Biyang Depression in Henan Oilfield.

With the successful commercial scale-up of the in-house developed bio-jet fuel technology in 2011, Sinopec became the first company in China which is in possession of the proprietary bio-jet fuel production technology and capable of large scale production.

By 2020, Sinopec is expected to have more than 30 billion tons of coal resources with 40 million to 45 million tons of equity coal production, 4 million tons of oil equivalent of biomass energy production and 4 million tons of oil equivalent of unconventional oil and gas production.
1.2 Shaping an Integrated Value Chain

Before being used in people’s daily life or as the feedstock for further production, oil and gas needs to be processed in refineries and petrochemical plants. While constantly strengthening the resource basis, Sinopec also focuses on research, production, distribution and marketing. With its unique integrated upstream and downstream businesses along the oil and gas value chain, Sinopec is able to provide energy and premium services for the clients.

Sinopec is the largest refiner in China and the second largest in the world. With the three refining and petrochemical bases in the Bohai Bay region, Yangtze River delta and Pearl River delta, Sinopec has constantly fueled the robust economic growth in China. In 2011, Sinopec’s refining capacity of crude oil reached 230 million tons per year with 217 million tons of crude throughput, up by 3.0% year on year.

Sinopec has the most extensive service station network, the largest storage capacity and the longest pipelines for oil products, fueling all types of vehicles including cars, trucks, motorcycles, ships and agricultural vehicles. By the end of 2011, the number of Sinopec-branded service stations reached 30,121, the storage capacity of oil product depots 14.75 million cubic meters, the total length of oil product pipelines 8,681 kilometers and the total handling capacity of crude oil jetties (with the capacity of each above 250,000 tons) 256 million tons per year. In 2011, domestic oil products sales volume was 162 million tons, up by 8.8% year on year. Retail volume exceeded 100 million tons for the first time, up by 14.4% year on year.

Sinopec is the largest producer and supplier of chemical products in China. In 2011, Sinopec’s ethylene output reached 9.894 million tons, up by 9.2% year on year. Sales volume of chemical products increased by 16.8% on yearly basis to 50.8 million tons.

Sinopec Value Chain
1.3 Pursuing Cutting-Edge Technologies

The innovation of science and technology, together with management innovation and the higher quality of its workforce are of strategic significance to the development of Sinopec. With the synergy of its integrated businesses, Sinopec has pressed ahead with the research and development of application, fundamental and forward-looking technologies and provided our clients with diversified products with high performance.

◎ R&D Strategy

Sinopec implements the R&D strategy of “Self-innovation, Key technology breakthroughs, Pioneering new technologies, Differentiation, Green and Low-carbon and Supporting the world-leading performance”. Intensified efforts have been made to develop internationally advanced technologies for new energy, new materials, energy conservation and environmental protection, and by doing so, the Company not only consolidates its leading position in the emerging industries with strategic importance, but also achieves leapfrog growth. At the same time, Sinopec has consistently enhanced the technology capacity for its core businesses including E&P, refining and chemical production, and strengthened fundamental and forward-looking research to improve the indigenous innovation ability and ensure sustainable development.

◎ R&D System

The innovation of the management mechanism is critical to technology innovation. Through internal integration and the reform of the R&D system, Sinopec has preliminarily set up the R&D management mechanism of “One entity, Three platforms, Unified planning and Integrated development”. Meanwhile, with the close collaboration with our industry peers and clients, we have sharpened the R&D capabilities, achieved better research results and realized common development with our partners and clients.

◎ R&D Achievements

Sinopec has developed a crop of internationally competitive core technologies and proprietary technologies for our businesses along the oil and gas value chain. Technology research and development has played an important role in the discovery, development and utilization of energy resources, oil product quality upgrading, optimization of chemical products mix, energy conservation, emission cut and the fight against climate change.

In 2011, Sinopec has successfully commercialized a number of world-class proprietary technologies, including CO₂ capture and reutilization, MTO, PX adsorption and separation, and the liquid-phase recycling hydrorefining for diesel production. Progress was also made in the research and development of forward-looking technologies for bio-mass fuel and carbon capture and reutilization, etc.

In 2011, Sinopec filed 3732 patent applications, 42.8% higher year on year, with 1,290 patents granted, up by 53% year on year. The Company won 13 National Technology Invention Awards and National Science & Technology Progress Awards, including the First Prize of the National Science & Technology Progress Award for “The Research, Development and Commercialized Application of the Production Technology for High-end Products from Naphthenic Base Viscous Oil”. Sinopec also won the Gold Prize of the 13th China Patent Awards for "The Preparation and Application of Fully Vulcanized Powdered Rubber with Controllable Particle Diameter" and 6 China Patent Awards of Excellence.

TheGranted Patents by end 2011

<table>
<thead>
<tr>
<th>National Science and Technologies Award</th>
<th>Technology and Invention Award</th>
<th>Science and Technology Progress Award</th>
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<tr>
<td>1</td>
<td>47</td>
<td>300</td>
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Sinopec Discovered Yuanba Gas Field, the Deepest Large Marine Gas Field in China

Yuanba gas field is the second marine gas field with over 100 billion cubic meters of reserves that has been discovered in the northeast Sichuan after Puguang. With depth over 7,000 meters, Yuanba is also the deepest marine gas field in China. Through the unremitting efforts over a decade, Sinopec achieved the significant discovery of this large gas field which has been buried deeply underground for hundreds of millions of years.

Sinopec successfully carried out exploration in the high-temperature, high-pressure, high-yield, high sulfur content, ultra deep and subtle gas reservoir. During the exploration, Sinopec accomplished 11 of the National Science and Technology Key Projects, 24 of Sinopec’s Science and Technology Key Projects and over 100 other technology R&D projects. A number of key technologies have been developed and improved, enhancing Sinopec’s technology capacity for the exploration in ultra deep, high sulfur content and complex reef gas reservoirs.

The measured geological reserves of natural gas of Yuanba, stated in the report submitted to the state authorities was verified and approved on 16 September 2011. According to relevant experts, the discovery of Yuanba gas field is a milestone in oil and gas exploration and an important achievement of the innovation of mindset, theories and technologies. From 14 to 17 September 2011, 25 correspondents from 18 media including People’s Daily, Xinhua News Agency, CCTV, Xinhuanet and People’s Daily Online etc. went to Yuanba and reported on the exploration and discovery of the gas field.
**CO₂ capture & flooding technology**

CO₂ capture technology was developed and applied in the demo unit. Good result was achieved in CO₂ flooding experiment in which crude output increased by 12,900 tons with 62,400 liquid CO₂ injected.

**Multi-stage fracturing technology for horizontal wells**

Progress was made in the experiments of the staged fracturing technology for horizontal wells, the horizontal section reaching 1,200 meters from 500—600 meters, the number of fractured stages increasing to 12 from 3—5 and the single well output remaining at 10.6 tons per day.

**New S-Zorb technology**

Proprietary process package was developed and successfully applied in 7 refineries, providing technology support for the quality upgrading of oil products.

**Catalytic oxidative treatment technology for PO/SM off-gases**

New catalyst was developed for the catalytic oxidative treatment technology for PO/SM off-gases and solved the problem of PO/SM off-gases emission with this internationally advanced technology.

**Packaged technology for ethylene**

The start-up of the two 1 mtpa ethylene units in ZRCC and Tianjin succeeded at the first attempt, marking the ethylene technology, engineering design, equipment and construction reaching new levels.

**PX adsorption and separation technology**

The 30 ktpa demo unit produced on-spec products with the recovery rate above 97% and product purity reaching 99.7%. This signifies that Sinopec has mastered the whole technology for aromatics production including the technology design, the construction of the plant, and the production of highly effective adsorbents. Sinopec becomes the third company in the world that owns the intellectual property for its aromatics technology.

**S-MTO technology**

The 600 ktpa demo unit which uses the self-developed S-MTO technology came on stream successfully at the first attempt. The world-class S-MTO technology can achieve nearly 100% conversion of methanol and over 80% of the combined selectivity of ethylene and propylene.

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**MTO Project Successfully Came on Stream in Sinopec Zhongyuan Petrochemical, Making a Crucial Step Forward in the Coal-Based Chemical Development**

Coal takes up 94.3% in China’s proved energy reserves while oil and gas account for only 5.7%. “Being coal-rich and short of oil and gas” is the basic reality in China. However, the olefins which consume much hydrocarbon resources are the world’s most important chemical commodities and one of the basic chemical feedstock fueling the economic development in China. Capitalizing on the advantage of its refining and chemical technologies, Sinopec has given priority to the development of coal-based chemical and fully tapped the abundant coal resources.

Sinopec Zhongyuan Petrochemical’s 600 ktpa demo unit, using self-developed S-MTO technology started up successfully at the first attempt on October 10, 2011. The S-MTO technology can achieve nearly 100% conversion of methanol and over 80% of the combined selectivity of ethylene and propylene. This marks that Sinopec’s self-developed methanol-to-olefin technology has borne fruit in commercial use and also represents a crucial step in the development of coal-based chemical.
Conclusion

Guaranteeing the national energy security is our glorious mission. With the persistent efforts of our employees and relying on technology progress, sophisticated management and cooperation, Sinopec has been pressing ahead with the diversification of energy mix and sources as well as further improving its service network to enhance the capability of energy supply.

Oil and gas resources are limited, whereas human potentials are unlimited. We will make utmost efforts to discover more resources and ensure the sufficient, stable, reliable and safe supply of energy for the economic and social development.