

Refining and Chemicals

As the company continued to optimize production management and operational benchmarking and speed up upgrade and transformation, our refining and chemicals business remained a major source of earnings in 2018, with new headway in key projects and ongoing improvement in product mix.

Resource allocation was further optimized and earning estimation was conducted for each product category based on market demand and facility conditions, to ensure high-utilization rate of the company's integrated refining-petrochemical complexes and high-performing refining facilities. In 2018, we processed 162.36 million tons of crude oil, and produced 112.91 million tons of refined products and 5.57 million tons of ethylene in China.

New progress was made in the restructuring of refining operations, with 14 key technical and economic indicators being improved. The diesel-gasoline ratio dropped by 0.09 unit from a year earlier. High-value products accounted for 66.6% in our refined product portfolio, with a 12-million-ton increase in jet fuel and a 225,000-ton decline in heavy-components oil products.



162.36 mmt

Crude runs (Domestic)



112.91 mmt

Refined products output (Domestic)

Construction and Operation of Large Refining & Petrochemical Bases

In 2018, we continued a refined approach to operational management, strengthened production control and process optimization, and improved profit-gaining capability, with 99.66% of our refining and chemical facilities maintaining steady running.

Refining and chemicals operating data (Domestic)

	2016	2017	2018
Crude runs (mmt)	147.09	152.45	162.36
Utilization rate of refining units (%)	80.9	80.8	83.1
Refined products output (mmt)	99.32	103.51	112.91
Gasoline	37.97	40.98	45.90
Kerosene	9.32	10.18	12.54
Diesel	52.03	52.35	54.46
Lub oil output (mmt)	1.16	1.64	1.60
Ethylene output (mmt)	5.59	5.76	5.57
Synthetic resin output (mmt)	9.20	9.40	9.17
Synthetic fiber output (mmt)	0.06	0.06	0.05
Synthetic rubber output (mmt)	0.76	0.81	0.87
Urea output (mmt)	1.90	1.44	0.83
Synthetic ammonia output (mmt)	1.53	1.36	1.05

We launched a number of key projects under the company's transformation and upgrading initiatives for refining and chemicals operations and won significant progress. Liaoyang Petrochemical's revamp and expansion project for Russian crude processing went on stream; Huabei Petrochemical's 10 Mt/a upgrading project was completed; an integration project kicked off at Guangdong Petrochemical; refining plant restructuring project started at Daqing Petrochemical; ethylene unit optimization and renovation started at Dushanzi Petrochemical and Lanzhou Petrochemical respectively. Alkylation projects advanced at an accelerated pace, with seven units being operational at Daqing Petrochemical, Harbin Petrochemical and Lanzhou Petrochemical, etc.

Liaoyang Petrochemical's Revamp and Expansion Project for Russian Crude Processing

On the basis of its existing 9 Mt/a capacity, Liaoyang Petrochemical revamped five existing units and newly built 11 installations for residual hydrogenation and catalytic cracking to ensure the highly efficient use of Russian crude oil. The project became operational in September 2018 with a capacity to produce 2.6 million tons of gasoline and 3.3 million tons of diesel fuels per year. The project has contributed to a diesel-gasoline ratio down to 1.27, which can be further reduced to 1.06 by an increase in jet fuel output, and achieved a 570,000-ton increase in aromatic hydrocarbon production, with the technical indicators and energy efficiency further improved.

Upgrading of Refined Products

We complied and released the *Guidelines for the Conversion to National VI-Compliant Vehicle Fuels* in accordance with the national and local regulatory requirements, in a bid to bolster efforts in product mix restructuring and quality improvement. As of 2018, all of our refineries had been revamped and ready to produce National VI-compliant products.

Development of New Chemicals

We sped up R&D of new chemical products and kept enhancing market competitiveness. We launched 81 new types of product with a total output of 970,000 tons and sold 29.01 million tons of chemical products for the full year. R&D advances include the development of ultra-high fluidity polypropylene, certification of PE100 and PE-RT pipe materials, and long-cycle production of medium-MFR impact-resistant and low-MFR co-polymerized polypropylene.



Liaoyang Petrochemical's revamp and expansion project for Russian crude processing