

## Achievements

The volume of crude oil processed in 2011 reached 9.2 million tonnes, the highest in the history of Grupa LOTOS' refinery in Gdańsk.

In 2011, LOTOS Group's activities in the operating segment were centred around the finalisation of the 10+ Programme. In December 2010, construction of all the production units was completed. At the beginning of the second quarter of 2011, the last key installation built as part of the programme was launched, and the Gdańsk refinery started working in a complete technological configuration designed as part of the 10+ Programme.

### 10+ Programme

The 10+ Programme was the largest CAPEX project to have ever been undertaken by Grupa LOTOS. Its goal was to increase the throughput capacities and depth of conversion of the Gdańsk refinery, and consequently to improve the Company's competitive position. In 2011, the last two of the 10+ Programme installations - hydrocracking and solvent deasphalting - were launched. In line with the license and construction agreements, test operation of the two installations was carried out, and in June 2011 a 72-hour test run of the entire refinery was conducted. This test was one of the key requirements of the credit facility agreement executed for the purposes of the 10+ Programme. All test runs confirmed the correctness of the assumptions adopted for construction of the installations and implementation of the entire project.

### Other projects

In addition to the 10+ Programme, Grupa LOTOS was implementing other projects designed to enhance the efficiency, safety and technical performance of its assets, while mitigating their environmental impact. The key projects included:

- modernisation of the catalyser regeneration control system on the reforming installation: the purpose of the project was to improve the reliability of the system,
- Computerised Maintenance Management Systems: the purpose of the project was to improve the safety and reliability of the installations' operation by integrating information on the units' technical condition, the manner of implementing preventive measures for particular units, and the cost of such measures. The system provides for optimisation of the costs of maintenance of equipment, and for improving the effectiveness of planning and managing continuity of the refinery's operations.
- modernisation of the 2000 S-20 tank: the purpose of the project was to adapt the tank to and ensure its compliance with the jet fuel storage standards.

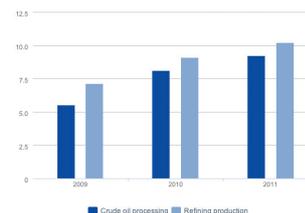
## Refining

The volume of crude oil processed in 2011 reached 9.2 million tonnes, the highest in the history of the Gdańsk refinery.

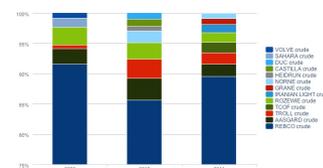
The volatility of refining margins in 2011 and dynamic changes of the market conditions were not conducive to maximising the throughput. The refinery worked at a load factor that was optimum given the market situation.

The main type of crude processed by Grupa LOTOS was Russian REBCO crude, however processing of other crude oil types, particularly those originating from the North Sea, was intensified. With two independent crude distillation lines, the refinery had more flexibility in selecting crude blends, as a result of which it was able to optimise its output. Depending on the market environment, by appropriately selecting the crudes, the refinery maximised its diesel- and gasoline-production capacities, and limited the heavy fuel oil output.

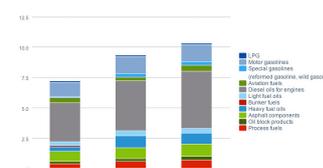
Crude oil processing and refining production (m tonnes)



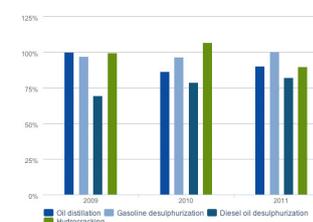
Types of crude oil processed (%)



Refinery's products



Utilization of production capacities of the refinery's main production units (%)



As in the previous years, the crude transported by sea had a considerable share in the total refining volume.

In 2011, Russian REBCO crude continued to have the largest share in the total volume of crude refined by Grupa LOTOS, but a notable portion of the total refining volume was also represented by other crude types, namely Aasgard, Troll, Grane and Norne, produced from wells in the North Sea. Besides those crude types, the refinery processed also one shipment of crude originating from the Middle East - Iranian Light. This way the sources of feedstock were more broadly diversified, which in the context of the Grupa LOTOS's involvement in implementation of national policies had an added benefit of significantly enhancing Poland's energy security.

Apart from crude oil, other production inputs included components and feedstock purchased for further processing, as well as enhancing additives. Fuel components (such as ethanol, ETBE and FAME) and enhancing additives still remain indispensable production inputs.

The increase in the volume of crude processed by the Gdańsk refinery led to a significant reduction of diesel oil imports to Poland. In previous years, Grupa LOTOS was a major importer of diesel oils so as to – through higher supply – build a market for its own product, which was then introduced in 2010. Following the launch of new installations, built as part of the 10+ Programme, it was possible to replace imported diesel oil with diesel oil produced at the Gdańsk refinery of Grupa LOTOS.

One of the major successes in 2011 was reaching a record high share of diesel oils and jet fuel in the total fuels output (the combined share of diesel oils and jet fuel was 56.5%).

Utilisation of the refinery's installed capacity in 2011 was adjusted to the current market situation, and maximising the refining margin volume was the overarching operational objective, reflected in the optimised - from the economic point of view - crude throughput volume.

Another major achievement related to high utilisation (89.9%) of the production capacities of the two hydrocracking installations which are operational. Similarly, the refinery also reported record high utilisation of processing capacities of the gasolines desulphurisation installations (100.1%).

---

## Solomon – comparative study

In 2011, Grupa LOTOS's refinery once again took part in the Solomon Associates comparative study of the refining industry, for the financial year 2010. The fuel refinery was included in the *Europe, Africa & The Middle East Fuels Refinery Performance Analysis*, which in 2011 covered 111 refineries from these geographical regions. The lube refinery of Grupa LOTOS was included in the *Worldwide Paraffinic Lube Refinery Performance Analysis*, which addressed 38 refineries in 2011.

2010 was a breakthrough period for Grupa LOTOS' fuel refinery. For the first time, the Solomon Associates study featured data on new refinery units erected as part of the 10+ Programme. However, due to the start up schedule, two key units, namely the mild hydrocracking unit (MHC) and solvent deasphalting unit (ROSE), were not yet operational in 2010. Therefore, the Solomon study for 2010 does not reflect the full potential of the Gdańsk refinery.

Yet, Grupa LOTOS's refinery scored very high among its peers. Despite limited utilisation of its processing capacity, the refinery managed to retain very high energy efficiency, while several key organizational initiatives brought positive results. Notably, the period between overhaul shutdowns was extended from three to four years. In addition, the overhaul shutdown carried out in 2009 was more efficient than the previous one and took 30% less time to complete, at reduced maintenance costs. All these factors contributed to the significant improvement of the Grupa LOTOS's refinery's position in mechanical availability and maintenance costs.

The Staff 2009 programme was also important for the refinery's efficiency. The programme envisaged hiring and training of personnel to operate the new units. Thanks to organizational changes at the Production Division and the fact that the new built units had their previous equivalents at the refinery, the number of new hires was not substantial, which led to an improvement of employment ratios at the plant.

As the refinery was not fully operational in 2010, maintaining the net cash margin and return on equity at levels similar to those posted in 2008 was a fully satisfactory result.

Extension of the period between overhaul shutdowns had also a positive effect on the performance of Grupa LOTOS's lube refinery (the line where oil bases, slack waxes, and paraffin products are produced). Although the oil unit has not been modernised for years, production technologies are optimised on a regular basis and new products are launched, which leads to improvements of individual ratios. The changes resulting from the start-up of new units built under the 10+ Programme are also of significance for the oil unit's future. The 10+ Programme had no effect on the oil unit's infrastructure, but the integration of new units within the refinery offered new opportunities for the oil unit as well.

---

## Grupa LOTOS meets the National Indicative Target

Methyl esters produced by LOTOS Biopaliwa in Czechowice-Dziedzice play an important role in implementation of the

National Indicative Target. In 2011, the FAME plant operated in a stable manner, and produced 103.6 thousand tonnes of bio-components, thus exceeding the project assumptions. The consumption of materials, chemicals and energy was more advantageous than originally assumed. The quality of FAME produced was markedly higher than the applicable standards.

---

## Research and Development

Following the launch of the mild hydrocracking unit (MHC) built under the 10+ Programme, in 2011 Grupa LOTOS started to produce and market a new product, namely paraffin fraction. Additionally, Grupa LOTOS's R&D efforts focused on developing technologies for the Oil Unit's products. The key R&D achievements in 2011 included:

- R&D work on production of Group II base oils from paraffin fraction,
- production and sale of the first batch of base oils with sulphur residue below 0.5%*m/m*, to be used as feedstock for production of higher quality engine oils,
- upgrade of Group I base oils production technology using the new product – paraffin fraction, which led to improved oil efficiency and enabled production of SAE 30/95 base oil with kinematic viscosity of >90cSt at 40°C. Physical and chemical properties of base oils were improved (viscosity coefficient in particular),
- upgrade of heavy extract production technology using the new product – paraffin fraction, which has higher share of aromatic hydrocarbons, an advantage in synthetic rubber and rubber compounds production,
- launch of regular production and sale of ceresin as a component for production of white ceresin meeting the requirements set by the American Food and Drug Administration (FDA).

In the area of road bitumen production technologies, R&D work was carried out to design production technology for environmentally friendly bitumen-rubber binders for use with road mineral-bitumen compounds. In addition, the efficiency of demulsification of oxidation waste at LOTOS Asphalt's production units was reviewed with a view to improving its quality.

In 2011, development work also focused on oil products produced by LOTOS Oil. The most important lubricant-related R&D activities included:

- completion of research into ways of improving the quality of oils for passenger cars, in reliance on the Company's own base oils, to meet the ACEA 2008 specification, and commencement of research to meet the ACEA 2010 specification – the research and Approval procedures are scheduled for completion in 2012,
- commencement of research into ways of improving the quality of oils for trucks, in reliance on the Company's own base oils, and obtaining of Approvals – the research is scheduled for completion in 2012,
- completion of compliance tests of industrial transmission oils – made with the Company's own base oils – with the Flender/Siemens MD issue 13 specification. It was the first mineral oil to meet the Flender/Siemens MD quality requirements,
- introduction of six new engine oil types (incl.: LOTOS Quazar S 0W-20, LOTOS Quazar K/FE, LOTOS Synthetic Plus),
- extension of 40 Approvals for lubricant oils,
- obtaining of 16 Approvals for new oils.

---

Related content:

**Progress in implementation of strategic objectives**      **Glossary of industry terms**