

## We invest in state-of-the-art technologies

[OG14]

### Deep oil processing technologies

Our innovative projects completed so far focused on developing technologies for manufacturing products which ensure higher margins on the processing of crude oil. However, sales volumes of those products are smaller than our output of fuels and range from a few to a few dozen thousand tonnes per year.

Therefore in 2016, as in the previous year, as part of the EFRA Project we invested in cutting-edge deep oil processing technologies to increase our production of high-quality fuels.

Advantages to be gained by the LOTOS Group following completion of the EFRA Project:

- Our refinery will be able to add heavier (and thus cheaper) crudes from, e.g. Canada or Venezuela, to its feedstock mix.
- They will be processed into the highest quality fuels and coke that will be used in power generation.
- A unique solution will be applied at the DCU (the main component of the EFRA process line), which will make the Gdańsk refinery one of the most environmentally-friendly refineries in the world. An innovative Triplan technology used as part of the EFRA Project will make the DCU – globally considered to be a unit with a harmful impact on the environment - at our refinery a completely enclosed system.
- As early as in 2018 Grupa LOTOS will increase its volumes of high-margin products.

### Phasing out unprofitable and environmentally unfriendly products

#### EFRA The end of heavy fuel oil

The main objective of EFRA is to ensure a more efficient use of heavy residue, which is the heavy end of crude oil now used to make heavy fuel oil or bitumens. When the project works are completed and the new units come on stream, each tonne of heavy residue will be processed into some 700 kg of fuels and 300 kg of coke. As part of the EFRA Project, as of 2018 the LOTOS Group will phase out heavy fuel oil from the production process as it yields negative margin and is not environmentally friendly.

#### UCOPure – purified oil

The UCOPure project, implemented by Grupa LOTOS in a consortium with Polymemtech Sp. z o.o., focuses on developing a new technology for processing unreacted oil from hydrocracking. **The aim of the project is to develop a new, world-class innovative technology making it possible to earn higher margins** by treating the unreacted oil stream into a product of much higher quality, which will be converted in further stages of the production process into main refinery products such as fuels.

- **UCOPure** is the only technology in the world that employs integrated **filtration** to remove **PAH** – heavy polycyclic aromatic hydrocarbons from unreacted oil from hydrocracking, and involves development and preparation of membranes and filtration systems used in the process.

The project is co-financed by the National Centre for Research and Development under the INNOCHEM sectoral programme. The consortium of Grupa LOTOS and PolymemTech Sp. z o.o. came fifth in the INNOCHEM competition, having scored 20 out of 22 points to be won.

### **Durable bitumens – MODBIT HiMA**

In 2016, LOTOS Asphalt developed and commercialised **highly polymer-modified bitumens** – MODBIT HiMA.

- ➔ Such bitumens are used in the construction and maintenance of roads, airports and other hard surfaces.
- ➔ They are recommended for bitumen-aggregate mixtures used in highly durable layers of perpetual pavements which require > **high resistance to aging** > **resistance to fatigue and low-temperature cracking** > **and resistance to rutting**.
- ➔ The content of SBS 25/55-80, 45/80-80, and 65/105-80 polymers in those bitumens **is more than double that in modified bitumens** typically used in the wearing course of roads.