

INNOVATIONS

The Company develops technologies that help address challenges as we move towards our strategic objectives.

“From strategic goals to engineering projects” is the principle that underpins Gazprom Neft’s approach to innovations. Our Company develops and implements technologies to tackle challenges on the way to achieving its strategic goals.

In 2018, the portfolio of the Upstream Division’s Technology Strategy included over 100 projects across all priority areas, such as exploration technologies focused on resource base development, well drilling and completion, oil recovery enhancement, capital construction, etc.

In 2018, the Company approved the Offshore Technology Strategy with the following priority areas:

- > prospecting and exploration;
- > accident monitoring, prevention and management in ice conditions;
- > logistics in Arctic conditions;
- > Arctic APG utilisation;
- > offshore field development;
- > safe offshore development;
- > introduction of digital technologies.

The technologies being developed in partnership with leading Russian R&D centres and educational institutions enable the Company to increase the yield of high-margin products best suited to each specific refinery while also lowering its operating costs.



More details on the Technology Strategy



Key exploration technologies



Innovative drilling

Technological development

Technological development is a focus of Gazprom Neft’s Strategy 2030. Technology advancements will enable the Company to efficiently deliver its large-scale upstream projects and consolidate leadership in strategic areas.

Our priorities include:

- > higher recovery rate at multiphase fields;
- > development of multiphase fields;
- > development of low-permeability reservoirs;
- > efficient and safe offshore development in ice conditions;
- > catalyst development and production to support oil refining.

In each and every priority area, projects are ongoing or planned to develop, test and implement necessary technologies.

KEY COMPONENTS OF THE COMPANY'S INNOVATIONS INFRASTRUCTURE:

- > **Scientific and Research Centre** provides analytical, methodological and R&D support to the Upstream Division's key production and technical functions.
- > **Bazhen Technology Centre** is a subsidiary that serves as an open industry platform and aims to bring together the efforts of all stakeholders in order to create a viable technology to develop the Bazhenov Formation.
- > **Centre for Offshore Competencies** is planned to be utilised by the Company to integrate its key competencies in developing and operating offshore projects.
- > **Technopark of Industrial Automation**, established in Omsk as part of the Company's import substitution strategy, acts as a unique platform for research and development, pilot testing and high-tech solutions for the automation of refineries.
- > **Technopark of Corporate Information Technologies**, based in St Petersburg, aims to establish direct interaction between developers and manufacturers of IT solutions for the oil and gas industry. Gazprom Neft provides its participants with a platform to evaluate and test prospective solutions and innovations.
- > **House of Innovations**, launched in St Petersburg in 2018, is a cross-functional space for project work using end-to-end technologies and data. The House of Innovations brings together leading experts in neural networks, digital platforms, industrial Internet of things, blockchain technologies, augmented and virtual realities and other Industry 4.0 innovations.

ENHANCED OIL RECOVERY

Gazprom Neft develops chemical solutions for enhanced oil recovery at depleted fields in Western Siberia. This becomes especially important as mature fields dominate the Company's asset portfolio. A pilot project for alkaline-surfactantpolymer (ASP) flooding was completed at the Zapadno-Salymskoye field in 2018.

The oil recovery factor added 17 pp, which evidences the technology is highly effective. Our primary task is to reduce chemicals costs to improve economics of chemical flooding projects.

Technologies for developing the Bazhenov Formation

The Company intends to develop hard-to-recover and unconventional reserves, including the Bazhenov Formation, in order to offset naturally declining production at conventional fields. This strategic project aims to create a technology stack to develop the Bazhenov Formation. It is considered to be of national importance for the Russian Government and the industry. In 2018, Gazprom Neft put into operation high-tech wells producing at high initial rates. This testifies that multi-frac can make a real difference for the Bazhenov Formation. Frac modelling for the Bazhenov Formation was performed using a unique simulator developed in cooperation with

Russian R&D institutions. The Company set up the Bazhen Technology Centre to operate the national project. It serves as a platform uniting efforts of the government, researchers, industry players and businesses to create innovations enabling the development of unconventional reserves of the Bazhenov Formation. Technology developers and equipment manufacturers will be able to leverage the pilot platform to test and fine-tune their solutions for further implementation at the Company's fields. More importantly, the technologies in the making and new competencies will be applicable to other hard-to-recover reserves across Russia.

Technologies for APG treatment

One of the Company's promising innovations are mobile modular units for APG treatment, which help separate and recycle heavy APG components, addressing the issue of crude oil being taken away with gas and wet hydrocarbons being flared, as well as gas transportation complications. New units are five times smaller than conventional ones. The solution is set to offer multiple benefits in terms of better environmental protection, considerably lower costs related to infrastructure construction and maintenance, and higher efficiency of gas-consuming equipment.



Digital transformation at Gazprom Neft: New technologies help customise approach to industrial assets

DIGITAL TRANSFORMATION

Digital transformation is one of the Company's priorities. Across all segments of our operations, we are building next generation systems of process management. These ensure:

- > end-to-end integrated management for maximum value creation;
- > digital twins to optimise operating modes and maintenance plans;
- > cognitive systems to support decision making by operators.

Projects involve all stages of the value chain from upstream to downstream.

In 2018, Gazprom Neft established the Digital Transformation Directorate, a new unit responsible for effectively implementing IT projects and unlocking synergies in order to bring the Company's key competencies to a new level.

As part of digital transformation, the Company created centres for competencies in machine learning, AI, augmented and virtual realities, product design, agile software development, etc. The Upstream Division is running the Cognitive Geology and Cognitive Engineering projects and operates the Centre for Capital Construction Management, while the Downstream Division now includes the Efficiency Control Centre and the Omsk and Moscow Refinery Production Control Centre. Also, Gazprom Neft started developing EvOil, a digital platform for production processes, and the Corporate Platform for Analytics and Data Management.

Digital model of the Achimov Formation

In 2018, Gazprom Neft developed the industry's first digital model of the Achimov Formation, a set of oil-bearing strata located above the Bazhenov Formation in the central part of the West Siberian basin. The complex structure calls

for innovative exploration and production techniques. New algorithms for big data analytics were used to process a vast array of geological data. The digital twin of the Achimov Formation will form the basis for the development strategy.