

TECHNOLOGICAL DEVELOPMENT

Innovation management

“In recent years, we have created a fully-fledged ecosystem of proprietary software operating in an integrated information space. Now we have a fully digitalised and verified database and tools which make it easy to operate. Our primary task is to make best investment decisions leveraging our own digital technologies for project management. What makes our Company efficient and competitive is that we develop this software internally, capitalising on our key competencies.”

Mars Khasanov
Head of Technologies
Directorate at Gazprom Neft
and CEO of Gazprom Neft
Scientific and Research Centre

From strategic goals to engineering projects is what underpins Gazprom Neft’s approach to innovations. Our Company develops and implements technologies necessary to address challenges as it is working towards its strategic goals.

FOCUS AREAS

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

Our priorities include:

- > increased oil recovery factor at mature fields;
- > development of multiphase fields;
- > development of low-permeability reservoirs;
- > efficient and safe offshore development in ice conditions;
- > catalyst R&D and production to support oil refining.

Projects seeking to develop, test and implement necessary technologies are both ongoing and planned across all focus areas.

UNDERLYING DOCUMENTS

TECHNOLOGY STRATEGY OF THE UPSTREAM DIVISION

In 2018, the Upstream Division’s Technology Strategy included more than 100 projects covering all of its priority areas, including:

- > exploration and resource expansion technologies;
- > well drilling and completion technologies;
- > enhanced oil recovery and well stimulation;
- > development of unconventional reserves;
- > development of oil rims;
- > Electronic Asset Development (EAD);
- > development of carbonate and fractured reservoirs;
- > new-generation infrastructure;
- > capital investments.

TECHNOLOGY STRATEGY DEVELOPMENT IN 2018

In 2018, the Technology Strategy was updated to focus on cross-functional initiatives integral to new major upstream projects.



More details
on the Technology
Strategy

TECHNOLOGY STRATEGY OF THE OFFSHORE DEVELOPMENT DIVISION

In 2018, the Company approved the Offshore Technology Strategy, which focuses on:

- > exploration;
- > monitoring, prevention and elimination of accidents in ice-covered seas;
- > logistics in the Arctic;
- > APG utilization on the Arctic Shelf;
- > offshore field development;
- > safety of offshore projects;
- > introduction of digital technologies.

In 2019, the Company will keep on developing its management system for offshore technology projects. An important contribution will come from Morneftegazproject's Centre for Offshore Competencies, which was launched in late 2017.



Key exploration technologies



Innovative drilling

R&D STRATEGY OF THE DOWNSTREAM DIVISION

The Downstream Division pursues a long-term R&D Strategy. The technologies being developed in partnership with leading Russian R&D centres and educational institutions allow the Company to increase the output of high-margin products depending on technological capabilities of each specific refinery, while also lowering its operating costs.

In 2018, the Company was engaged in around 30 oil refining projects covering its key focus areas:

- > catalyst production technologies, including those for catalytic and hydrogen cracking;
- > advanced oil refining technologies such as hydrodecyclisation, aroforming, etc.;
- > other advanced R&D focused on oil refining.

In 2018, the Company obtained 26 utility patents (including one in the USA) and filed 26 applications with the Federal Service for Intellectual Property (Rospatent) [including 10 international patents and applications] covering key oil refining solutions such as cracking catalyst production, diesel fuel and vacuum gas oil hydrotreatment, solid acid alkylation, and catalyst reactivation for hydrotreatment purposes, all of which help the Company achieve its strategic goals.

In 2018, the Company obtained

26

PATENTS

In 2018, the Company was engaged in around

30

PROJECTS



Innovative petroleum products



Gazprom Neft's R&D focus

ENHANCED OIL RECOVERY

Gazprom Neft develops chemical solutions 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-surfactant-polymer (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.

ESTABLISHING THE BAZHEN TECHNOLOGY CENTRE

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.



Gazprom Neft's Innovative
Development Programme
to 2025

INNOVATIVE DEVELOPMENT PROGRAMME

The Company implements its Innovative Development Programme focused on enhanced oil recovery at mature fields, development of hard-to-recover reserves, continuous improvement of well productivity as well as catalyst development and production for catalytic and hydrogen cracking.

2018 highlights:

- > a pilot project for ASP flooding completed, confirming the tech efficiency;
- > multi-stage hydraulic fracturing proved to be highly efficient in developing the Bazhenov Formation;
- > a platform launched to test technologies at the Bazhenov Formation;
- > well drilling and completion improved with longer horizontal sections and new frac solutions;
- > Company's proprietary solutions introduced into commercial production, including a new version of the cracking catalyst with an active matrix, as well as isodewaxing and oligomerization catalysts;
- > design documentation completed for a high-tech catalyst production facility in Omsk;
- > development of new materials, APG utilisation technologies and oil refining processes is underway.

Gazprom Neft takes a pragmatic approach to developing and implementing new technologies. It acquires robust solutions available in the market and adapts them to its specific assets. At the same time, the Company promotes innovation in the R&D market by encouraging partners to create new solutions and acting as their first customer. It also partners with domestic and foreign players to develop unique solutions unavailable in the market.

The Company relies on the Upstream Division's Technology Strategy and the Downstream Division's R&D Strategy. The former includes more than 100 projects while the latter includes around 30 projects. The 2018 R&D highlights include new materials, APG utilisation technologies, and oil refining processes.

In collaboration with Russian scientists, Gazprom Neft managed to produce an ultrahard material prototype for drill bit cutters while also lowering its manufacturing costs as a result of a six-fold reduction in synthesis pressure and optimised finishing treatment.

Mobile modular units for APG treatment are another promising solution which helps 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.

In collaboration with a Russian developer, Gazprom Neft created Aroforming, a unique technology to co-process low-grade straight-run gasoline (RON 60), alcohols (in particular methanol) and catalytic cracking dry gas into marketable gasoline with RON 90–93. The resulting product is fully compliant with Euro-5 emission standards. Our next step is to roll out the technology.

OIL IMPROVING WELL PRODUCTIVITY

Increasing the efficiency in well drilling and completion is another priority for Gazprom Neft. As the Company develops harder-to-recover reserves, it needs to increase producing rates of new wells and reduce construction costs in order to make these economically viable.

In 2018, the Company drilled long horizontal wells (up to more than 2,000 m long) and multilateral wells with cased boreholes, used hydraulic fracturing (high volume, acid and proppant fracturing techniques), and rolled out the previously tested underbalanced drilling technique.

REFINING CATALYSTS

Gazprom Neft's strategic projects include construction of a high-tech catalyst production facility to meet the needs of the Russian oil refining industry for cutting-edge catalysts used in catalytic cracking, hydrocracking and hydrotreatment.

Gazpromneft Catalytic Systems is Gazprom Neft's subsidiary for catalyst production and sales, which is currently constructing a plant in Omsk with a planned capacity of 21 ktpa of catalysts. Once the plant is fully ramped-up, the Company will become Russia's leading catalyst producer.

For many years, Gazprom Neft's refineries in Omsk and Moscow have been using cracking catalysts developed in cooperation with Russian R&D institutions. In 2018, the Omsk Refinery started using the newest cracking catalyst to enhance the yield of gasoline fraction. Also, it now relies on an isodewaxing catalyst to process winter and Arctic grade diesel fuels. This catalyst contains no precious metals (platinum or palladium), making it much cheaper than similar catalysts. Moscow Refinery introduced its own oligomerisation catalyst with a 2.5 longer service cycle, which helped increase the yield of high-octane blending component by 30%.

Gazprom Neft's patent portfolio

Source: Company data

