

GAS-TO-LIQUID: INNOVATIONAL GAS PROCESSING TECHNOLOGY

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Russia's independent oil and gas extracting companies have been long facing the problems of restricted access to the Russian Federation gas transportation network, the network capacity and geographical situation. These put the issue of hydrocarbons use to the forefront. The problem is urgent, all the more so because it is closely related to environmental protection and reduction of losses of valuable energy resources.

Understanding all the importance of the said issues, the Institute for Financial Studies (IFS) has conducted a complex research into economic efficiency of use of natural gas technologies. The industry analysis has revealed that the most efficient technologies are as follows:

- *Liquefied natural gas (LNG).*
- *Methanol.*
- *Carbon.*
- *Gas-to-Liquid (GTL).*

Let us focus on the GTL technology. First and foremost, unlike carbon and liquefied natural gas technologies, GTL is economically expedient. Secondly, quality synthetic petroleum can be priced 30 percent higher than, for instance, the Brent crude oil. Thirdly, GTL fuels have a number of benefits.

Along with benefits, the GTL technology has some disadvantages. First, if a GTL fuel is priced lower than \$50 per barrel, the project will be cost-ineffective, hence, the low price period will discourage research and development and GTL technology will progress unevenly. Secondly, GTL production facilities cannot be put into operation gradually, stage by stage (like LNG facilities), they must operate at full capacity from the start. Thirdly, due to its quality, GTL petroleum cannot be pumped via Transneft pipelines. It can only be transported by railway, which might turn out more expensive.

During high price periods research and development will be enhanced, and it will have a positive impact on the cost of projects like this. GTL facility construction costs total around \$900 per each ton produced, previously, the cost exceeded \$1,200 per ton.

According to estimates, large-scaled GTL projects can bring good returns on investment. GTL is considered an effective technology internationally. Foreign investors allocate substantial funds for projecting small-scaled pilot facilities¹ of which there are four at the moment.

Only six GTL facilities have commercialized their technology with the last one built in Qatar in 2006. Qatar has abundant natural gas reserves, therefore most GTL projects will be carried out in this country.

Synthetic fuels are expected to enjoy high demand. 70 percent of carbons produced using the GTL technology are converted into diesel fuel.

¹ExxonMobil (Baton Rouge plant) expenses for research and development and the construction totaled around \$600 million, ConocoPhillips (Ponca City plant) – \$400 million, Syntroleum (Tusla plant) – \$200 million.

However, synthetic diesel fuel accounts for only 0.1 percent of the global market. If gas-extracting companies continue to increase diesel production, this share might grow. The GTL technology is in many respects similar to methanol production technology. The difference is that GTL technology is enabled by Fischer-Tropsch (FT) process. FT synthesis research and development accounts for most of companies' spending.

The analysis of the project efficiency revealed good results (compared to LNG and carbon). In our research we used findings obtained in consultations with Russian and foreign producers, design offices and engineering companies. Therefore, input parameters can be regarded creditworthy and reliable. Major efficiency indicators are positive, however, with a 16 percent discount, the payback period will be more than twenty years, which is unacceptable in many cases. With a 12 percent discount, the payback period will be seven to eight years. If producers maintain strong cooperation, efficiency indices may be higher. Alongside production limitations that might arise in the course of the project fulfillment, there are some organizational restrictions; the major one is that a license must be obtained to use the technology. To grant a permit, the licensor may require the company to observe the following conditions:

- Minimum production is 10 to 12 billion cubic meters.
- An engineering company should be employed as an intermediary.
- High probability of additional terms of cooperation.

The licensor's requirement to involve engineering companies means that there is no way to cheapen production. Foreign companies will design the project and supply equipment, and foreign services and equipment are usually more expensive than those domestic. The IFS study showed that the GTL technology is cost-effective and development of the GTL market will lead to a handful of positive results.

However, it is too early to say that Russia will soon run such projects in its gas-extracting provinces. The state does not undertake any measures to stimulate gas-processing development. On the one hand, it urges companies to process 95 percent of LNG, minimize local emissions and increase energy efficiency of the GDP including by reducing losses of feedstock; on the other, it does not grant any tax exemptions to 'enthusiast' enterprises. Without state support, independent oil and gas producers are not able to enhance the processing industry. This will result in environmental degradation, loss of socio-economic profit (taxes and jobs), loss of expensive energy resources, the industry lagging behind and zero chances to form a new 'growth point' for the economy.

If the state tackles this issue, the gas-producing regions and the national economy will see positive results very soon. To reach these objectives, the government should work out measures, especially in the taxation system, to stimulate growth of small-scaled businesses and search for possibilities to develop our own GTL technology that will remove many restrictions that exist presently.

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