

# Scientists developed hydrogen engine for the Arctic

In severe frost, batteries run out quickly, and it is problematic and harmful to the environment to ship diesel fuel to the Far North. The Russian Hydrogen company, together with scientists from the SibFU School of Petroleum and Natural Gas Engineering, chose hydrogen fuel to solve this problem.



The development was carried out within the framework of the Sidera interdisciplinary research and production center for innovative technologies, created to work in the field of hydrogen technologies. The advantage of a hydrogen engine for the Arctic is that it does not require the shipment of diesel fuel, and hydrogen can be released from associated gas, which is released during oil production. Also, this type of fuel is more environmentally friendly and can be used for its own generation.

Currently, the issue of creating fuel cells for unmanned aerial vehicles used for geological exploration in Arctic conditions is being worked out. As the developers note, in conditions of severe frosts, the UAV batteries simply cannot withstand long operation.

The Sidera project has also made unique developments for the oil industry. A special electromechanical system "Baikal" was created. This device can be used in the Arctic, where a zero load on the environment is needed. The equipment is a pipe of several meters, consisting of three elements — an engine, a special multiplier and various nozzles. According to the director of the School of Petroleum and Natural Gas Engineering R. Ayupov, nozzles can be used for a variety of works in wells.

Thus, with the help of a nozzle in the form of a thermal carrier, deposits on the walls of wells are eliminated, which helps to avoid accidents and unforeseen shutdowns. With the help of an ultrasonic device, which can be used as a special nozzle, there is an impact on the oil reservoir and the debit of the well increases. It is also possible to connect a microwave emitter, which is very important for fields with high viscosity oil.

Now all these operations are carried out with bulky equipment that can destroy the walls of wells, and also requires many operations, each of them can cost several tens of millions of rubles. The new development has already been tested at wells, and the option of its production in the School is now under the consideration.

Drilling fluids based on plant materials are also being developed in the laboratories of the School, which makes them environmentally friendly. There are very few such developments in the country. Almost every field has its own unique composition, comparable to human DNA, and the School's specialists have an individual approach for the development of drilling fluids for them, using mathematical modeling and computer technologies.

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