

Sun, wind, and hydrogen: New Arctic station will do without diesel fuel

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Credit: Moscow Institute of Physics and Technology

The Moscow Institute of Physics and Technology (MIPT) has initiated a project of the Russian Federation called "Arctic Hydrogen Energy Applications and Demonstrations" (AHEAD) in the Arctic Council's Sustainable Development Working Group (SDWG). The project is

supported by the Russian Ministry of Science and Higher Education, the Ministry of Foreign Affairs, the Ministry for the Development of the Russian Far East and Arctic, the governor of Yamalo-Nenets Autonomous Okrug, and the EnergyNet infrastructure center of the National Technology Initiative.

Together with its Russian and foreign partners, MIPT undertakes to build a year-round fully autonomous International Arctic Station (IAS) in the Land of Hope, in the foothills of the Polar Urals. The [station](#) will have a modular structure and rely on renewable energy sources and hydrogen fuel, without burning diesel. The autonomy of the station will be provided by the energy of the sun and wind, and hydrogen obtained in the cleanest way. The station, dubbed Snowflake, is scheduled to begin operation in 2022.

The objective of the IAS is to test, improve, and promote solutions in the field of environmentally friendly technologies of the future for [life support](#) and the maintenance of remote settlements and facilities in the Arctic region. This includes solutions for telecommunication, medicine, biotech, clean agriculture, robotics, the internet of things, smart home and smart settlement, 3-D printing, advanced materials and construction technologies, and artificial intelligence systems that improve the living and working conditions in the Arctic.

"With the government's support, MIPT is initiating an ambitious international [project](#) in the Arctic Council, which Russia will preside over in 2021-23," said MIPT Rector Nikolay Kudryavtsev. "That project envisages a carbon-free Arctic station, which would host visitors from all over the world: researchers, engineers, talented science students, and even high schoolers. They could all make working visits to the station year-round to test and demonstrate technologies that would be a part of our life tomorrow."

"We are making the International Arctic Station an open platform that is convenient for all foreign partners willing to participate," the rector went on. "We will also not limit ourselves to power engineering, but also creating opportunities for R&D in telecom, medicine, biotech, robotics, the [internet of things](#), artificial intelligence, and more."

According to Yury Vasiliev, the executive director of the MIPT Institute of Arctic Technologies, the construction of the station will be a challenging endeavor for Russian and foreign scientists. The total cost of the project is about 10-12 million euros.

"The main building of Snowflake will be a panoramic view dome, connected with a range of other modules. Two of them will host laboratories, and two more provide accommodation, with about 30 single rooms for researchers and guests to feel comfortable. Other modules will house a kitchen, a dining room, a library, and leisure areas, including a gym and a sauna. Three more separately standing domes will form a hydrogen complex for the production and storage of compressed gas," said Vasiliev.

"An all-terrain vehicle will run year-round between the station, Salekhard, and its airport, with a gas station for electric vehicles and a helipad for emergency assistance on the way," he added.

The authors of the project paid serious attention to preserving the lifestyle of indigenous peoples and bringing new clean technologies to the Arctic.

Provided by Moscow Institute of Physics and Technology

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