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**Local content in manufacturing**

The Renewable Energy Sources (RES) support program in Russia has always been focused on local content in industrial technologies: mastering competencies to manufacture RES equipment is a key result of investments in the shaping of the industry. The second stage of the support program is aimed at enhancing the local content of high-tech components.

The State Atomic Energy Corporation Rosatom (Rosatom) has acquired all the competencies for further expansion of local content. Application of technologies localized in Russia is an integral part of JSC NovaWind's development program. Currently, NovaVind JSC is an anchor customer for Russian industrial enterprises – suppliers of products and services in the wind power industry. The company has already undertaken significant efforts – the current level of local content of our plants, according to the established rules, makes up 68%. As part of the wind power industry support program under the Renewable Energy Sources Capacity Supply Agreement, it is planned to increase the local content of generating facilities up to 75-80%, as well as to continue building up competencies and references in the wind power industry, export of equipment, works and services, increasing the competitiveness of Russian products in the global markets.

Within the framework of the two support programs, the country's industrial competence will be shaped in Russia – a new knowledge-based innovative renewable energy industry with significant multiplier effects for the country's economy and a high export potential for equipment and services.

**JSC NovaWind Plant in Volgodonsk**

As part of the WPP local content program, production of hub, nacelle, generator and cooling system for 2.5 MW WPPs was launched in Volgodonsk at the production facilities of the State Atomic Energy Corporation Rosatom (Atommash plant). The State Atomic Energy Corporation Rosatom (Rosatom) has not only gained competence in a completely new industry for the country, but also addressed the problem of WPP components and assemblies serial production on the territory of the Russian Federation.

Investments in production amounted to over 1 billion rubles. As part of the preparation of the plant's infrastructure, the building and crane facilities were reconstructed to meet the specifics of WPP construction.

The total area of the plant is 30 thousand sq.m. Serial production capacity is
up to 120 turbines per year. Number of jobs is more than 320.

**The process layout of the plant includes five main sections:**

1. WPP generator stator.
2. Rotor and main bearing of the WPP generator.
3. WPP generator.
4. WPP nacelle.
5. The hub and platform of the WPP tower base.

Each section in turn consists of posts, the number of which depends on the complexity of the operations performed and the structure of the equipment.

Generator is the most complicated technical unit of a WPP. Arrangement for the production of such a unit requires a high degree of industrial development, and most importantly, generators have a high export potential in new markets.

**The unique character and advantages of direct drive technology:**

1. Direct drive permanent magnet characterized by simple and efficient transmission chain, low mechanical loss;
2. High efficiency of power yield: direct drive wind power plant does not have a gearbox, which reduces transmission losses and increases the efficiency of power yield, especially in low wind speed conditions: the effect is more significant, which is relevant for the Russian Federation;
3. High reliability: gearbox is a component with a high failure rate in WPP operation. Direct drive technology eliminates the need for a gearbox and its accessories, simplifies the transmission structure and increases the reliability of the unit. At the same time, the plant operates at low speed with fewer rotating parts and higher reliability;
4. Low operation and maintenance costs: using direct drive technology can reduce the number of wind turbine components, avoid regular oil changes in the gearbox, and reduce operation and maintenance costs.

In 2020, serial production of components and assemblies of NovaWind WPPs reached their design capacity.

Wind power in the circuit of the State Atomic Energy Corporation Rosatom (Rosatom) is the most important industry that stimulates demand in related sectors. Thus, the long-term demand for permanent magnets generated by the wind power industry for the production of WPP generators is a fundamental factor in the formation of the Russian rare-earth metals industry.

Implementing its local content program, JSC NovaWind pays considerable attention to building local supply chains: about 70 Russian companies have already joined the industrial cooperation within the framework of the NovaWind WPP production project, which translates into more than 2000 new jobs: the task of local content in production of WPP tower (LLC VetroStroyDetal), nacelle cover, steel structure, WPP rotor and stator pole laminations, large-size generator parts has been implemented.

NovaWind, as the project integrator, not only formed the efficient chain of suppliers, but also contributed to the development of new competencies of companies in the circuit of the State Atomic Energy Corporation Rosatom (Rosatom). For example, LLC Rusatom MetalTech (enterprise of Rosatom's Fuel Company TVEL, a divisional integrator in the Metallurgy business line) has mastered a unique technology for production of magnets for generators. In 2027, a large-capacity full-cycle production of permanent rare-earth magnets with a capacity of 1,000 tons is planned for launching in Russia, reaching the planned capacity in 2028, with the possibility of increasing the volume of production above 3,000 tons after 2030. The goal of the project is to provide high-tech domestic enterprises with a full and uninterrupted supply of high-quality magnetic products to fulfill the tasks of developing the Russian wind power and machine-building (including automotive) industries.

On June 15, 2023 on the sidelines of the St. Petersburg International Economic Forum, the Composite Division of the State Atomic Energy Corporation Rosatom (Rosatom), the Government of the Ulyanovsk region and the Ulyanovsk region Development Corporation entered into an agreement to implement the investment project for the production of wind turbine blades in the Ulyanovsk region. The key customer for the production of wind blades is JSC NovaWind, the wind power division of the State Atomic Energy Corporation Rosatom (Rosatom).

It is planned to start production of composite wind blades by December 2024 on the basis of a ready-made workshop in the Ulyanovsk region. More than 7.5 tons of wind blades with a length of about 50 meters will be manufactured on the platform. The production scale will supply the region with new jobs – more than 400 jobs – and will allow to expand the line of composite products made from the product of the composite division of the State Atomic Energy Corporation Rosatom (Rosatom). The production capacity of the shop is designed to produce 450 blades per year at peak load.

The Composite Division of the State Atomic Energy Corporation Rosatom (Rosatom) is the largest producer of composite materials in Russia. It has large-scale facilities from raw materials to finished products. It unites 16 industrial enterprises, where the only in the country complete production chain has been built: from oil refining products to finished composite products for various industries.