Wind Energy in the Nordic Countries

WIND ENERGY IN THIS REGION IS A SECTOR WITH GREAT POTENTIAL BUT ALSO UNIQUE CHALLENGES. HARSH CLIMATIC CONDITIONS, COMPLEX TECHNICAL REQUIREMENTS, AND ENVIRONMENTAL RESTRICTIONS MAKE PROJECT IMPLEMENTATION IN THIS PART OF EUROPE EXTREMELY DEMANDING. PIOTR MADERA, KEY ACCOUNT MANAGER AT WINDHUNTER_SERVICE, DISCUSSES HOW TO EFFECTIVELY MANAGE SUCH PROJECTS.

Technical and Construction Requirements

In the Nordic countries, heavy structures with above-average durability and impressive heights are used for wind measurements. For projects in countries like Sweden or Finland, measurement masts can reach heights of 200 meters or more. These structures must withstand extreme loads caused by icing, snow, and much stronger winds, which increase in speed as the mast height grows.

If the structure is not adequately adapted to the prevailing weather conditions, there is a risk of collapse. Another challenge is the elevation above sea level. At heights above 600 meters, weather conditions change dynamically (similar to mountainous areas). In such cases, it is necessary to use additional icing reports prepared by experts.

Maintaining masts that are 180–200 meters tall is also a demanding task. In winter, many locations are difficult to access due to heavy snow. Many projects are situated deep in forests. In cases of icing, climbing the mast is not possible, and additional restrictions may include wind speeds exceeding 10 m/s or low temperatures that make normal operations impossible.

Logistics and Terrain Challenge

Transporting components to remote locations often requires the use of helicopters. Preparing the terrain frequently involves clearing parts of forests, using pyrotechnics to break rocks, or organizing heavy equipment such as excavators with hammers.

The specific ground conditions in the region, where a thin layer of soil covers solid rock, often necessitate the use of chemical anchoring. This involves drilling and securing the mast's guy wires inside the rock using special glue or cement.

Logistical challenges can be accompanied by connectivity issues. It is necessary to ensure that SIM cards provide sufficient coverage. If they do not, satellite communication should be considered, notes the expert.

Power Sources for Sensors in Extreme Conditions

Securing sensors against freezing is crucial and requires heating systems, which significantly increase energy consumption. Limited sunlight during winter negatively affects the efficiency of traditional solar-powered systems. To address this, windhunter_service has developed alternative solutions, such as power containers equipped with diesel generators. These ensure stable operation of measurement systems even in complete darkness.

Seasonality and Work Organization

The climate of Northern Europe determines the project timeline. Masts are usually built from spring to the end of October. In winter, due to short daylight hours, harsh weather, and high icing risk, completing such projects becomes practically impossible.

As a result, work schedules must be precisely planned, and all logistical and technical activities must be tightly coordinated.

Experience as the Foundation of Success

With years of experience in Nordic projects, windhunter_service has proven that wind measurements can be effectively performed even under extreme conditions. Thanks to advanced technologies, flexibility, and collaboration with local experts, our company successfully supports the development of renewable energy in one of the world's most challenging regions, emphasizes Piotr Madera.