Contact: info@applus.com

Wind Resource Assessment

Our wind resource assessment service evaluates the wind energy potential of a designated area for wind energy project development. Our experts at Barlovento Applus+ analyze data on wind patterns and climatic conditions that have been collected during wind measurement campaigns or provided by the client to optimize turbine placement and estimate wind energy production, adhering to industry standards.

Our experts study wind farms' feasibility, considering all aspects to guarantee their effectiveness and profitability in the future: wind resources, site assessment, micrositing, environmental factors, economic aspects, operation and maintenance specifications, and execution schedule.

THE Applus+ SOLUTION

Wind resource assessment stands as the pivotal phase in wind farm planning, as it estimates the wind climate and the potential energy yield of wind turbines. It is the basis for gauging initial feasibility, projecting cash flows, and securing financing.

The process unfolds in the following stages:

- Initial assessment using mesoscale data and/or existing data.
- Detailed site analysis and characterization, which implies performing a detailed wind resource assessment with wind measurement campaigns carried out for at least one year.
- Long-term data validation to determine that the production estimates are descriptive of the site.
- Definition of the wind turbine positions, accesses, electric infrastructure, etc. and evaluate the feasibility of the wind farm.
- Wind turbine model selection according to standards (IEC and MEASNET)
- Calculation of the energy yield using flow models (linear and CFD models).

- Assessment of the technical, environmental, and operational wind farm losses according to industry standards and internal expertise.
- Evaluation of total uncertainties and probability to exceed.
- Generation of hourly data series of energy production for the wind farm
- Comprehensive cash flow projections. We combine validated production estimates with revenue forecasts.

Barlovento Applus+ employs its own methodologies based on international standards that have been tested within international forums (IECRE and/or MEASNET) to ensure the highest quality, reproducibility, lowest uncertainties, and prompt results delivery.

We provide extensive experience covering, among others:

- Most relevant stakeholders in the wind sector worldwide (developers and end-users, OEM's)
- Different regions all around the world (Europe, LATAM, MENA, Australia...).
- Wind farm due diligence: More than 70 GW in wind energy already operating, besides others still in the project phase or involved in administrative procedures.
- Site assessment of more than 6,500 wind farms worldwide.

As members of the MEASNET Site-Assessment Expert Group, Barlovento Applus+ Site-Assessments comply with the MEASNET guideline *"Evaluation of site-specific wind conditions. Version 3. September 2022."* We also actively participate in international working groups and forums aimed at developing international standards and schemes, such as IEC and IECRE forums.

Target customers

Wind resource assessments and energy yield assessments are performed during the different phases of the project, from the development stage (preliminary assessment, measurement campaign definition, site assessment, bankable energy yield assessment…), when they play a critical role in developing successful wind farms, to the operational one (performance verification, causes of deviation in energy production, lifetime extension, repowering, hybridization, noise analysis, shadow flicker analysis, visual impact assessment…).

Key customer benefits

Wind consultancy services in the development and operational phases of a wind project help to mitigate the risks, increasing wind energy production and cost-effectiveness.

The energy yield assessment ensures the viability and bankability of the project by providing evidence of:

- Performance of the wind project in the long term compared to the previous forecasts during the development stages.
- Identification of risks at an earlier stage.
- Appropriate selection of the wind turbine model according to IEC classification and the location of the wind turbines.
- Compliance with local or international regulations (IEC, MEASNET).

Post-construction wind resource analysis provides an energy yield reassessment of operating wind farms, providing valuable information about:

- Long-term reassessment of the wind farm's energy production.
- Life extension analysis.
- An analysis of the potential repowering of the wind farm.
- Deviation analysis in operational wind farms.