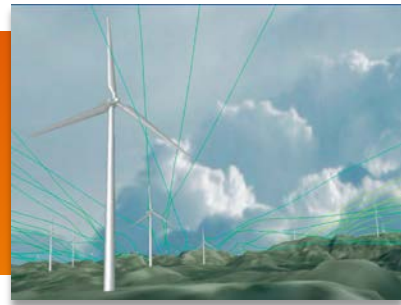


WIND RESOURCE AND ENERGY YIELD ASSESMENT



CIRCE carries out studies on wind resource and energy yield assessment that allow precise estimates of wind farms production, minimizing unpredictability for investments.

CIRCE has more than 20 years of experience in the wind industry, doing R+D and technological transfer tasks that encompass practically the entirety of a Project's life.

The wind resource and Energy yield assessment line of work tries to obtain an energy estimate for future projects, reducing the unpredictability associated to the variability of the resource and the calculation procedure, supplying investors and developers sound data to be able to develop their Project with better assurances.

While executing these tasks CIRCE uses the main software of the field as well as, thanks to our experience, other self-developed tools adapted to different lines of work.

Main work lines

- POTE0: Energy assessment of wind farms
- IEC: Site suitability studies. Site verification according to IEC 61400-1
- GESCAM: Customised campaign management

Software Comercial de Referencia

- WAsP, Windfarmer, WindPRO, Openwind
- WindSim, Meteodyn
- Windographer, Surfer, Globalmapper
- WindAsT (Self-developed)

Self-developed (WindAsT)

- Design parameters in accordance to IEC 61400-1: Reference wind speed, Turbulence intensity, Terrain Complexity
- Estimate for different versions of IEC 61400-1
- Includes Independent Storms Method
- Effective TI estimate for large wind farms
- Import format expansion
- Terrain estimate according to IEC 61400-12-1

POTE0 Energy yield assessments

Wind resource and energy yield assessment for future wind farm sites

Description

- ✓ Wind Farm Energy Assessments
- ✓ Optimal wind farms design. Micrositing
- ✓ CFD modelling
- ✓ Implementation of different wake models : wake effect
- ✓ Uncertainty studies. P75-P90 Analysis
- ✓ Energy loss estimates
- ✓ Preliminary wind resource and energy assessments based on virtual data for early phases of development
- ✓ Self-developed TI tools

Notable

- ✓ **Over 700 energy assessments**
- ✓ Licence for main commercial software
- ✓ 4 WindAsT commercial licences sold
- ✓ In-house support for important clients
- ✓ Technical supplier/Auditor: bankability
- ✓ Framework agreements with ENEL GP, IBERDROLA, EDP Renewables



GESCAM

Customised campaign management

Consulting for meteorological masts construction and subsequent customised campaign management

Description
✓ Choice of suitable mast location
✓ Assessment for ideal equipment selection
✓ Optimal measurement configuration design
✓ Remote communication protocol management
✓ Periodic download of meteorological data and incident detection
✓ Verification of suitable mast configuration
✓ Customised mast certification according to Measnet procedure and IEC 61400-12-1

Notable
✓ Full management for over 25 customised met masts
✓ Assurance of quality for over 150 met masts
✓ Self-developed software for data management
✓ ENAC approved laboratory in accordance with IEC 17025 Standard
✓ MEASNET member



IEC

Site Suitability studies

Site suitability through design parameters evaluation according to different versions of IEC 61400-1 Standard

Description
✓ Reference wind speed analysis (Gumbel method, Extreme statistics)
✓ Turbulence Intensity evaluation
✓ Terrain Complexity analysis
✓ Effective Turbulence Intensity estimate. Frandsen Methodology
✓ Wake model correction for large wind farms
✓ Energy loss estimate through wind sector management

Notable
✓ Over 1000 site suitability studies
✓ In-house supplier for SIEMENS GAMESA
✓ Shadow and/or noise studies

Work References

CIRCE has extensive experience executing this type of services, having worked with companies such as:



CONTACT US

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