

The background of the entire image is a dark blue field filled with a grid of small, light blue dots. These dots are arranged to form a large, stylized 'X' shape that spans the entire frame. The 'X' is composed of two intersecting bands of dots, one running from the top-left to the bottom-right, and the other from the top-right to the bottom-left. The dots are more densely packed in the center of the 'X' and become sparser towards the edges.

solute

Solar
Energy

About SOLUTE

SOLUTE is a multidisciplinary technical engineering consultancy with over 15 years of experience, headquartered in Madrid, with branches in Barcelona, Badajoz, and Toledo.

Throughout our history, we have primarily specialized in the renewable energy sector, particularly in the wind industry, where our capabilities cover all phases of wind farm development. Other sectors in which we specialize include automotive, solar energy, software development, weather forecasting services, and virtual reality, among others. This, along with the development of projects in more than 20 countries and for some of the most important clients in the sectors in which we operate, endorses us as one of the leading engineering consultancies in our country.

Our mission is to provide multidisciplinary solutions on a global scale, through the technical rigor and expertise of our engineers, ensuring the quality and excellence of our work in every project.

We highlight R&D&I as one of the main drivers of SOLUTE, as since the company's inception, we have launched several in-house developed tools, which are now offered as products to our clients. Some of these are Furow, a comprehensive wind resource software; Aphelion, a platform for weather and energy forecasting services applied to the wind sector; and EVE, our suite of virtualization services in industrial environments.

We believe that the best solutions are achieved as a team.

Solar energy and hybrid plants

Solar Energy

Building upon SOLUTE's extensive experience in wind energy and considering the current trend towards the hybridization of renewable plants, our expertise in photovoltaic energy has been significantly strengthened in recent years. We have successfully completed international projects totaling over 3 GW calculated since 2020, collaborating with developers and operators of solar plants.

The services offered by SOLUTE related to the assessment of photovoltaic plants encompass site assessment and selection, resource and meteorological studies, plant design, and production estimates with uncertainties.

The methodology begins with an initial study and analysis of solar resource and meteorological variables using data obtained from databases and site measurements to evaluate the existing potential at the location. These values are then transposed into the calculation plan in subsequent phases.

Subsequently, the most suitable equipment is selected, and the optimal plant design is developed based on the available space. Finally, energy calculation is carried out using specialized software such as PVSyst, considering potential losses of the installation and providing the main sources of uncertainty affecting the project.

The entire calculation procedure and results can be utilized in photovoltaic pre-feasibility studies in the early stages of development, project development, or as a technical document to support the financing process and subsequent economic and LCOE evaluation studies.





Hybrid studies

The development of renewable hybrid plants is a technical capability that SOLUTE has been working on for several years. This is due to global efforts to decarbonize and the growth of renewable energy development on a global scale. Solar and wind energy projects constitute the core of SOLUTE's foundations.

Following this line, as the demand for hybrid plant development increases among companies, the SOLUTE team has also developed services combining experience in wind and photovoltaic projects. This allows for joint energy production studies, synergies, and overproduction between technologies, combined technical, electrical, and civil designs, and economic project evaluations.

These analyses, both technical and economic, are carried out based on the combination of energy productions from each of the technologies. This allows for the optimization of both the size and design of the plants, through comprehensive analysis that determines the power to be installed for wind, photovoltaic, and storage technologies, taking into account existing costs and energy market prices.

The final result encompasses the different variables and scenarios studied, emphasizing the optimal solution reached. The study of the hybrid plant can be useful for conducting pre-feasibility studies, project processing, supporting financing processes, and subsequent economic studies.





Solar and hybrid projects

Preliminary design of hybrid plant (DDT)

- Design review (distribution, geotechnics, assets)
- Preliminary analysis of wind and solar resources
- Review of preliminary production calculation

(Hybrid) Wind farm study

- Meteorological variables study
- Terrain assessment
- Preliminary layout and electrical optimal design
- Losses and production estimation

PV solar plant study

- Site study
- Meteorological study
- Plant design
- Equipment analysis and proposal
- Losses and production estimation

Hybrid plant production

- Joint production study
- Joint performance
- Final electrical and civil design and grid connection
- Joint profitability and economic model

PV self-consumption projects

- Meteorological study
- Solar resource assessment
- Production estimation
- Layout optimization
- Equipment study or proposal
- Economic model

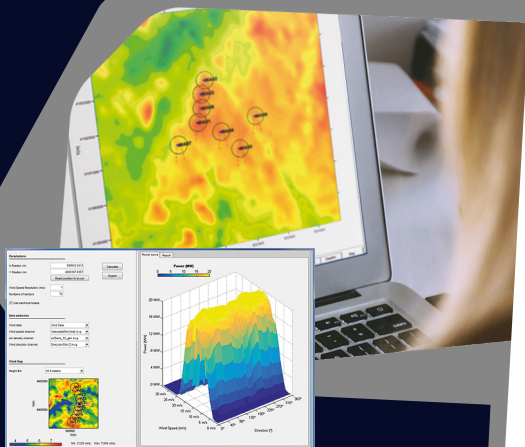
Detailed studies of PV assets

- Mechanical-structural analysis
- Panel aerodynamic analysis
- Estimated lifespan according to meteorological study
- Aerodynamic-structural hybrid model
- Redesign proposal, modifications, or repairs

Our products

Our mission is delivering solutions on a global, multidisciplinary level through our technical rigor and our engineers' knowledge, with R&D as our backbone.

The result of more than 15 years listening to different stakeholders' problems is the development of products for the renewable energy industry, in the shape of software, hardware and services.



solute

furow

WRA and Wind farm design software

Furow is a complete and exhaustive wind energy software, which possesses features directly with wind resource assessment calculations, wind farm modelling and project development at any given stage. Furthermore, its compatibility is flexible while working with other software, therefore, allowing users easy access to share and compare information

- Data analysis
- Wind resource assessment calculation (lineal model & CFD)
- Micrositing



aphelion

Multi-function weather and energy forecast software

Our meteorologists, data scientists, and software engineers are specialized in tools optimization in order to obtain the most accurate forecast for a wide variety of projects and clients.

From a high-resolution forecast, Aphelion offers meteorological and energy forecast as well as climate consultancy within a two-weeks' time horizon. Moreover, these capacities can be useful for both companydriven and particular-driven services.

Hybrid forecast model + Machine Learning

- ▶ Up to four multi-view maps with different models and variables
- ▶ Extensive range weather forecast (up to 16 days)
- ▶ Short-term weather forecast (0-72 hours)
- ▶ Four daily forecast updates and detailed meteograms

Aphelion Wind

- ▶ Automatic software with +5 machine learning architectures and ad-hoc features
- ▶ Wind farm and wind turbine forecast
- ▶ Customizable forecast ranges, updates, granularity, and time resolution
- ▶ ML models can calculate uncertainty estimations for production assessment scenarios (p90, p10, among others)

EVE

Enhanced Virtual Environments

Virtualization and digitalization services for industrial sectors

- High detail 3D laser scanning
- Virtual tours with embedded technical information
- Maintenance tasks digitalized in tablet device for field guidance
- VR platform for operation and emergency instruction
- Multi device and multiplayer options



Predictive maintenance platform for renewable farms

Deep Learning on the Edge and IA algorithms combined for an optimization of the maintenance interventions in renewable energy farms

- Asset sensorization and monitoring
- Remote cloud monitoring
- Predictive maintenance IA algorithms
- Big data techniques for traceability, accessibility and analysis
- Real-time processed on edge data uploaded to servers (IoT+edge computing)



Comprehensive wind turbine inspection

TSR Inspector

TSR Wind customers' cloud software platform for inspection data processing and management.

EOLOS

External blade inspection robot with high resolution photo camera, capable of climbing any metal surface by permanent magnets

CERBERUS

Remote inspection of blade interiors by small mobile robot with 3 high resolution video cameras to access impossible places for technicians.

KRATOS

Bidirectional magnetic coupling robot designed to climb any metal surface and follow the welding cords using an NDT ultrasound equipment



solute

www.solute.es



www.aphelion.com.es

furow

www.furow.es

Avda. Cerro del Águila 3
28703 San Sebastián de los Reyes
Madrid - Spain

tf +34 91 658 8204

fx +34 91 652 5181

Ctra. de l'Hospitalet, 147 Edif. Lisboa 3ºA
08940 Cornellà de Llobregat
Barcelona - Spain

tf +34 93 707 0690

