Renewable energies

Photovoltaic energy solutions

Reliable innovation. Personal solutions.

www.ormazabal.com
As more renewable energy capacity is installed, a successful interconnection to the transmission network become a must, conditioning the power reaches to the grid without interfering with the overall performance of the system.

Focusing on the deployment of these energies and keeping a strong commitment to sustainability allow us to offer proven solutions which comply with these interconnection requirements.

Contributing to a more sustainable world and compromised with safety, reliability and efficiency, Ormazabal is the natural partner for the development of solar energy projects.

Jorge González, Ormazabal Managing Director

Highlights

- We have about 13 years of experience in solar energy projects (First supply in 2002)
- More than 650 photovoltaic plants installed worldwide
- Since 1995 supplying MV GIS cubicles for renewable generation
- Products & Services provided in Renewable Energy projects in over 25 countries around the world
- Accounting for more than 20 GW installed RES power
- Worldwide recognized provider of inverter integration and grid interconnection solutions
- Pioneer in extensible GIS switchgear
- World’s top 36 kV MV GIS switchgear manufacturer
- Over 1,390,000 switchgear are distributing electricity in five continents
- World’s biggest prefabricated transformer substation manufacturer
- Protecting about 50% of world-wide installed off shore wind power (source EWEA Jan 2015)
Since 2002 Ormazabal supplies MV solutions for solar generation. Our products and services are provided in over 25 countries. A consolidated experience for solar energy projects that speaks for itself accounting for more than 4 GW installed worldwide and over 650 photovoltaic power plants.

We offer utility-scale plants engineering and products from solar energy transformation and monitoring to communication along with security systems.

Photovoltaic energy solutions supplied by Ormazabal with about 13 years of experience in solar sector provide the maximum continuity and stability of service, in addition to the highest optimization of initial investment costs.

Ormazabal offers high efficient solutions to connect power generated on photovoltaic plants to the electric grid. From the complete power generation transformation and energy interconnection up to the collector substation of energy generated.

Ormazabal is the leading provider of customized solutions to electrical utilities, to electrical end users as well as renewable energy systems applications based on its own technology.

We encourage the development of the electrical sector towards the challenges of the future energy needs. We cooperate with the world’s leading local, regional and global companies in the electrical sector with a strong commitment to innovation towards personal safety, network reliability, energy efficiency, and sustainability.

Our highly qualified and focused team of innovation-motivated professionals have developed our own products and solutions during our more than a century long consolidated history, always by establishing close relationship with our customers aimed at achieving mutual long term benefits.

Velatia is a family-run, industrial, technological and benchmark global group which operates in the areas of electrical networks, electronics and communication networks as well as in the consulting, security and aeronautics component sectors, where safety, efficiency and reliability are valued.

Our customer orientation has led to the development of our extensive network of factories in Spain, France, Germany, Poland, Brazil, Mexico and China, helping to meet our customers’ needs in more than 50 countries.

Other Velatia companies:

Ikusi is characterised for offering turnkey projects that resolve the management needs of infrastructures and security, information and entertainment, communications and operations of such varied markets as Airports, Public Administration and Companies, Traffic, Railways and Health.

An extensive field of action to which we must add remote control systems and solutions, and the design and manufacture of equipment for the capture and distribution of TV signals aimed at TV Operators and the professional distribution sector (electrical and electronic warehouses and installers).
Turnkey Solutions

Products

PV transformer substations
Integrated photovoltaic transformer substations connected to MV networks including:
- Transformer substations in:
  - Concrete enclosure: monoblock or modular
  - Metallic enclosure
    - Ormacontainer: 20' or 40' HC
    - Mbs: Outdoor compact substation
- MV Switchgear
  - Secondary Distribution modular and compact (RMU) GIS up to 40.5 kV / 630 A / 25 kA
  - Primary Distribution modular GIS up to 24 kV / 2500 A / 25 kA and 36 kV / 2500 A / 31.5 kA
- MV/LV transformers:
  - Up to 5 MVA / 40.5 kV
  - Low losses
  - Suitable for outdoor applications
  - Dielectric liquids: mineral oil and biodegradable oil (organic)

Inverters
- Adaptable TS solution according to the inverter features
- TS proven experience with the main inverter manufactures
- Wide power range: up to 2.5 MW
- Inverter area complying with the installation and ventilation requirements from the inverter manufacturer: natural, forced or A/C
- Low voltage boards:
  - DC boards
  - AC boards
  - Auxiliary services

Boards
- String boxes
- N-level boards

Grid connection substations
Concrete or metallic substation housing electrical equipment for the connection to the utility network.
- cms.m: Outdoor switching substation

Surveillance
Engineering, supply, commissioning and operation of:
- Perimeter security: Intrusion detection alarm system with fence sensor cable + DOME cameras
- CCTV. Video Surveillance System with thermal or infrared video cameras
- Video Analysis Software for motion detection.

Monitoring
Customized SCADA solutions for monitoring and management:
- DC Boards inputs: Current, Voltage, Isolation status, alarms, etc.
- Inverters: Current, Voltage, Power, cos φ, alarms, etc.
- Switchgears: Switch status, fuse status, temperature, transformer, etc.
- Network connection substations: Switch status, energy meter: Active/reactive Power, THD
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Services

**Ormazabal** provides our clients with a comprehensive range of services for PV plants based on our key success factor: experience and knowledge of the electrical networks.

**Technical assistance**

- Engineering
- Electrical and mechanical building integration for inverter, transformer and monitoring
- PV plant electrical solution for grid integration
- Security project

**Network operation**

- Automatic reconnection on stable network
- Discrimination of faults: internal or external
- Real time information of the network situation: SMS & Control Centre
- Remote control and monitoring
- Crepuscular powering off and sequential connection at dawn

**Contracting**

**Installation and commissioning**
- Electrical installation checking
- Electrical AC integration commissioning

**After sales support and maintenance**
- Plant operation and security monitoring tools personalization

**Procurement**

- Engineering
- Electrical and mechanical building integration for inverter, transformer and monitoring
- PV plant electrical solution for grid integration
- Security project

**Training**

- Training for power plant operation

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**Automation of MV network**

Integrated photovoltaic transformer substations connected to MV networks including:

- Automatic reconnection on stable network
- Discrimination of faults: internal or external
- Real time information of the network situation: SMS & Control Centre
- Remote control and monitoring
- Crepuscular powering off and sequential connection at dawn

**Network operation**

- Multiservice Local Area Network build with industrial switches and media converters (Communication protocols: Modbus, IP-104, IEC 61850, DNP3...)
- Multi-plan Wide Area Network: virtual private network for remote management of distributed PV plants
- 24x7 multilingual network operation center for remote monitoring

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**Automation of MV Network**

**Surveillance**

**Monitoring**

**Network operation**

**Inverters**

**Boxes and LV boards**

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References

Worldwide presence:
More than 650 photovoltaic power plants and more than 4 GW installed.

**Renault – Gestamp (France)**
60 MW in 6 Renault factories throughout France

**Aura (Mexico)**
30 MW largest PV plant in Latam (Mexico)

**Zouerate (Mauritania)**
3 MW in the desert of Mauritania

**Kalkbult (South Africa)**
75 MW in one of the first large-scale PV plants in Africa

**Fuente Álamo (Spain)**
One example among over 100 PV plants in Spain:
10 MW in Almería

**Other PV plants in:**
- Argentina
- Bulgaria
- Cape Verde
- Chile
- Czech Republic
- France
- Germany
- Italy
- Jordan
- Peru
- Portugal
- Romania
- Senegal
- United Kingdom

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**Our own experience: Ormazabal PV plant**

**What:** 100 kW rooftop PV plant

**Where:** Ormazabal Research and Technology Center (Boroa-Spain)

**Why:** Experimentation in our own facilities:
Knowledge of real problems in a PV Plant → Development of solutions
Connection to own testing grid to know the behaviour of a PV Plant within a network
Development of specific products for PV Market → Improvement our portfolio experience for futures projects

<table>
<thead>
<tr>
<th>Nominal Power Installed</th>
<th>Power Peak installed</th>
<th>Solar Module</th>
<th>Technology</th>
<th>Configuration</th>
<th>Inverter</th>
<th>Annual CO₂ avoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 kW</td>
<td>111.32 kWp</td>
<td>230 Wp</td>
<td>Polycrystalline, Tilted fixed structure</td>
<td>22 panels /string</td>
<td>100 kW</td>
<td>32.56 Tn</td>
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</tbody>
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![Photovoltaic energy solutions](image)
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