




**ABENGOA**

Transmission and Infrastructure

Corporate presentation



Who  
**1** are we?

# Who are we?



**Abengoa (MCE: ABG.B)** is an international company that applies innovative technology solutions for **sustainable development** in the infrastructure, energy and water sectors.

## **Constructing energy infrastructures**

- Generating conventional and renewable energy.
- Transporting and distributing energy.

## **Providing solutions for the integrated water cycle**

- Developing desalination and water treatment processes.
- Constructing hydraulic infrastructures.

## **Being a reference in the transmission and distribution sector**

- Developing transmission lines, electric distribution and railway electrification projects.
- Constructing installations and infrastructures for all types of plants and buildings.

## **Obtaining results in the services area**

- Providing operation and maintenance services for plants optimization.
- Managing private assets efficiently.

## **Furthering new horizons for development and innovation**

- Our 280 accumulated awarded patents since 2008 position us as technological leaders in sectors such as solar thermal technology.
- Renewable energy storage and our bet for energy efficiency and water consumption (water-energy nexus).

# A Viable **Company with Solid Fundamentals**



**Solid business** of engineering, procurement, construction and operation and maintenance in high growth markets



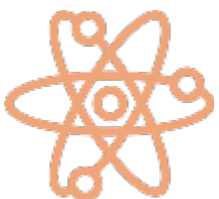
**Global footprint** makes Abengoa's business more resilient and the size of its backlog and pipeline provides revenue visibility



**Credibility** regained with stakeholders



**Leaner organizational structure** and high operational efficiency



**The development** of commercially viable cutting-edge technology has become Abengoa's key competitive advantage



**A more focused business model** and a healthier, sound capital structure, together with a multidisciplinary set of capabilities places Abengoa in a solid position for future value creation



**Formed by a team** of committed and skilled people that have specialized and competitive know-how

# Main Magnitudes



Global presence with a recognized position of leadership in main world rankings (GWI, ENR).



+ 27,000 km of transmission and distribution lines and more than 330 substations worldwide over the last 15 years.



9.3 GW of installed power in conventional generation plants, of which 1.4 GW are under construction.

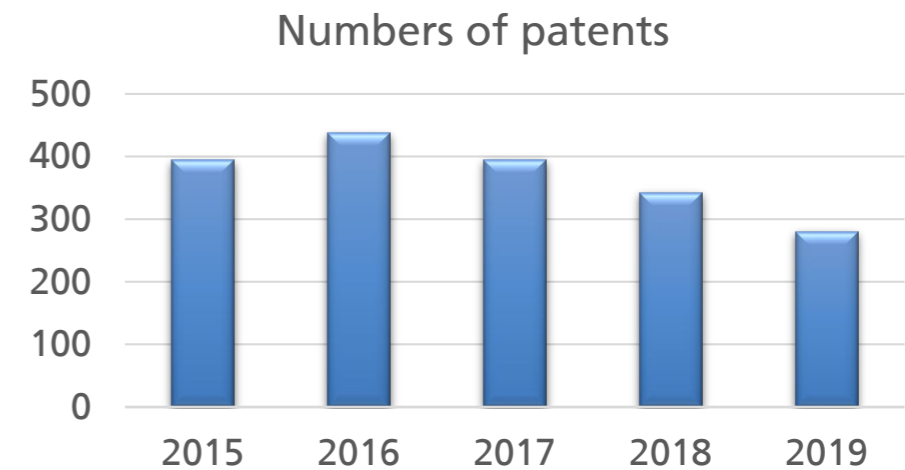


+ 1.7 million of m<sup>3</sup>/day of desalinated installed capacity and 2.6 million m<sup>3</sup>/day under construction.



2.3 GW\* solar power constructed, + 1,000 MW under construction, and 480 MW of wind power.

\* 30% of the worldwide installed solar thermal energy capacity already under operation.

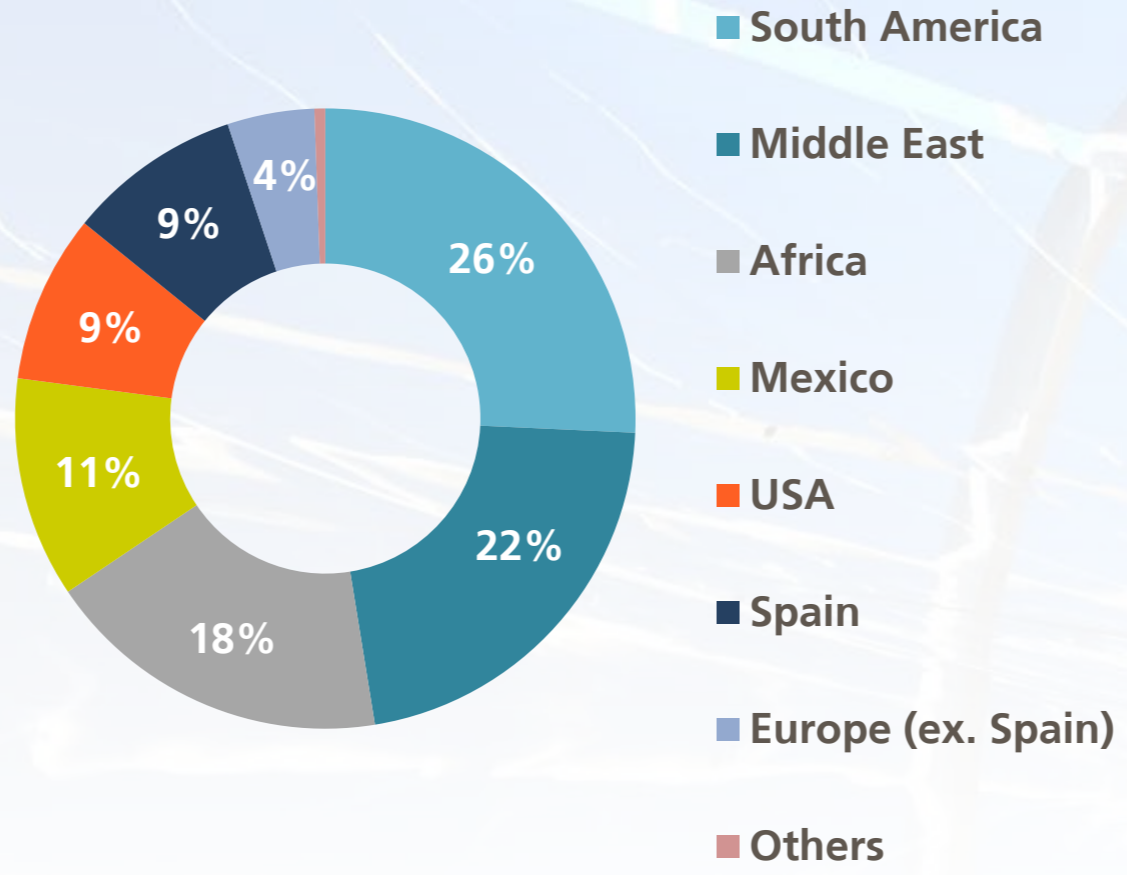


280 patents at the end of 2019.

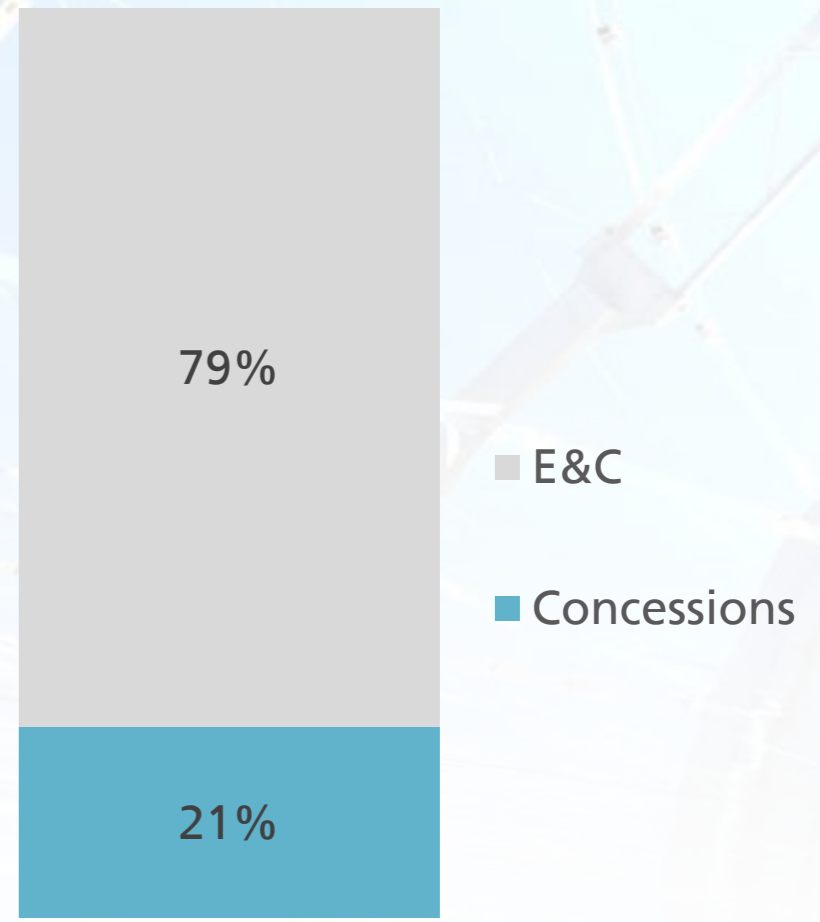
# Main indicators

Results as of close of 2019

## Revenues by geographies



## Revenues by segment



Abengoa Figures	2019
Sales	1,493 M€
EBITDA	300 M€
Employees	14,025

## Main projects under execution

- Waad Al Shamal (Saudi Arabia)
- Noor Energy 1 (UAE)
- Agadir (Morocco)
- O&M solar plants (Spain)
- Salalah (Oman)
- Chuquicamata Humos Negros (Chile)
- Rabigh (Saudi Arabia)
- Fulcrum (USA)

## New Projects 2019

Abengoa has been awarded in 2019 new projects for a total value of €1,107 million, including world's largest reverse osmosis desalination plant in Taweelah. Among them:

	<b>Taweelah</b>	<b>UAE</b>	<ul style="list-style-type: none"> <li>Construction of the world's largest reverse osmosis desalination plant with total capacity of 909,000 m<sup>3</sup>/day.</li> </ul>
	<b>Dubal</b>	<b>UAE</b>	<ul style="list-style-type: none"> <li>Construction of a seawater reverse osmosis desalination plant with total capacity of 41,000 m<sup>3</sup>/day..</li> </ul>
	<b>RWEL Klaipeda-Vilnius</b>	<b>Lithuania</b>	<ul style="list-style-type: none"> <li>Electrification of more than 730 km of railway lines.</li> </ul>
	<b>Switching Substation Río Malleco</b>	<b>Chile</b>	<ul style="list-style-type: none"> <li>Construction of a 220 kV substation in Chile.</li> </ul>
	<b>Seville Airport</b>	<b>Spain</b>	<ul style="list-style-type: none"> <li>Civil works and installations in the expansion of the San Pablo Airport in Seville.</li> </ul>
	<b>Southern Peru Copper Corporation</b>	<b>Peru</b>	<ul style="list-style-type: none"> <li>Construction of a retention dam to hold 40,000 m<sup>3</sup> at 3,500 meters above sea-level, and several singular buildings within the copper mining facilities.</li> </ul>



# Lines of activity

Abengoa organizes its activity in several business areas: Energy, Water, Transmission and Infrastructure and Services, all of which are based on R&D and Innovation.



## Energy

- Conventional and renewable energy generation.
- Proprietary solar technology and leader in worldwide installed capacity.
- 9.3 GW of installed capacity in conventional generation.
- Experts in hybridization of generation technologies to provide clean and dispatchable energy solutions.

## Water

- Specialist in infrastructure for the integral water cycle.
- Excellence in technical capabilities.
- Leader in the international desalination market and a worldwide reference in the construction of hydraulic infrastructures and treatment plants.
- 1.7 million m<sup>3</sup> /day desalinated water capacity and 2.2 million m<sup>3</sup> /day of drinking water.

## Transmission & Infrastructure

- Leader in the international transmission and distribution and infrastructure market for the energy, industry, transport, environment, communications and rail sectors.
- More than 27,000 km of transmission lines and 330 substations.
- 4,500 electrified km and more than 80 traction substations.

## Services

- Service providers for infrastructure in the transmission, water, and renewable and conventional power generation sectors.
- Optimization of O&M, improving management and increasing production.
- 25 years of contracts average life.





## 2 Transmisión and Infraestructure



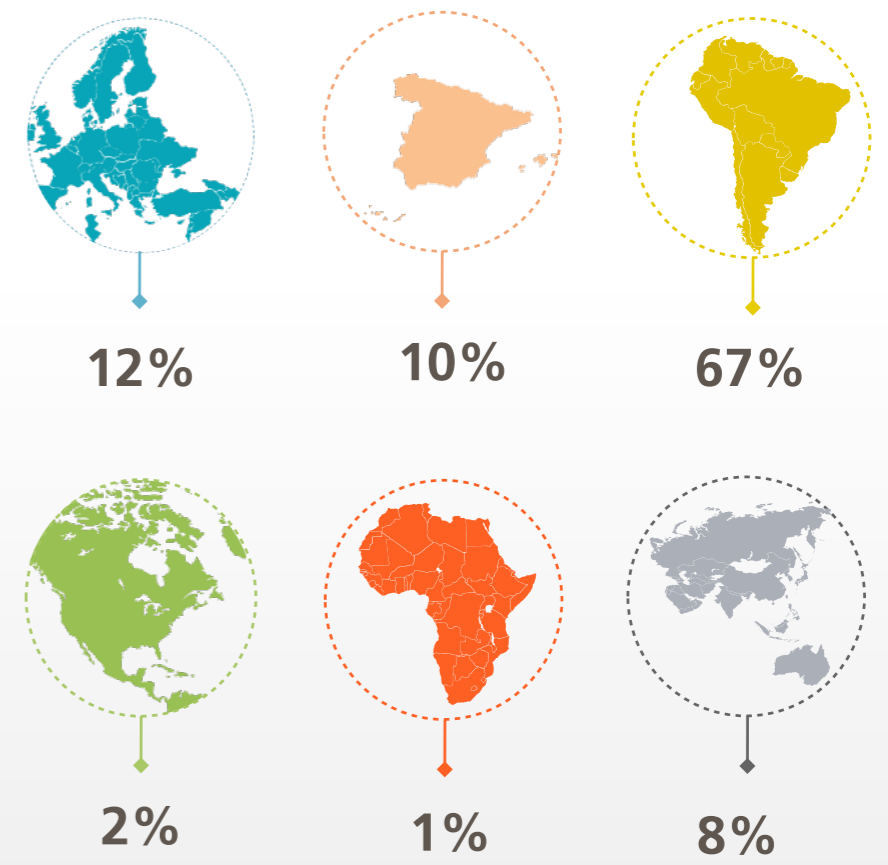
# Transmission and Infrastructure

With more than 70 years of experience, Inabensa is a leading company in **engineering, construction and maintenance of infrastructure** in the energy, industry, environment, transport and communications sectors.

Our differential aspect is the **focus on the client**, providing **tailor-made solutions adapted to the different markets, regulations and specifications of each project**. The capitalization of the **wide experience** accumulated during all the years of existence is another important point to highlight.

## Consolidated sales 2019

**+ 550 M€**



# Our business units



## Transmission and distribution

- Transmission and distribution lines
  - Alternating current AC
  - Direct current DC
  - Underground
- Electrical substations
  - HV & MV Transmission Lines: 27,000km in 20 countries.
  - 330 HV & MV substations, both AIS & GIS, in 15 countries.

+ 200 M€



## Installations and infrastructure

- Electrical and mechanical installations
- Energy renewable plants installations (BOP)
- Maintenance and instrumentation & control
- Industrial plants and Singular buildings
- Communications
- Mechanical and electrical installation in singular buildings in Europe and America.
- All kind of electromechanical and instrumentation at industrial plants.

+ 240 M€



## Railway

- Catenary
- Traction substations
- Technical buildings
- Railway communications
- 4,500 km railway line electrification and 80 traction power substations.
- Self developed catenary, homologated for high speed up to 350 km/h and for conventional lines up to 160 km/h.

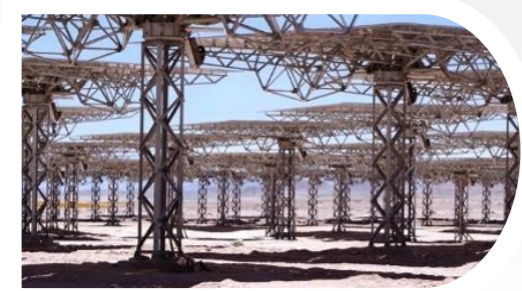
+ 30 M€



## Ancillary manufacturing

- Manufacturing of electronics and built-in electronics equipment
- Low Voltage distribution panels
- Over 3,400 m<sup>2</sup> production center for low voltage switchboards.
- Specialized in the realization of prototypes and first series given its own design capacity, software and hardware.

+ 15 M€



## Steel structures manufacturing

- Lattice Towers for T&D
- Substation Structures
- Telecommunication Towers
- Heliostats / Photovoltaic trackers
- Lattice structures to support wind turbines
- Test station for check towers
- More than 1,5 million tons of fabricated metal structures.
- Test station to check towers up to 72 meters high.

+ 65 M€

# 3 Transmission and distribution

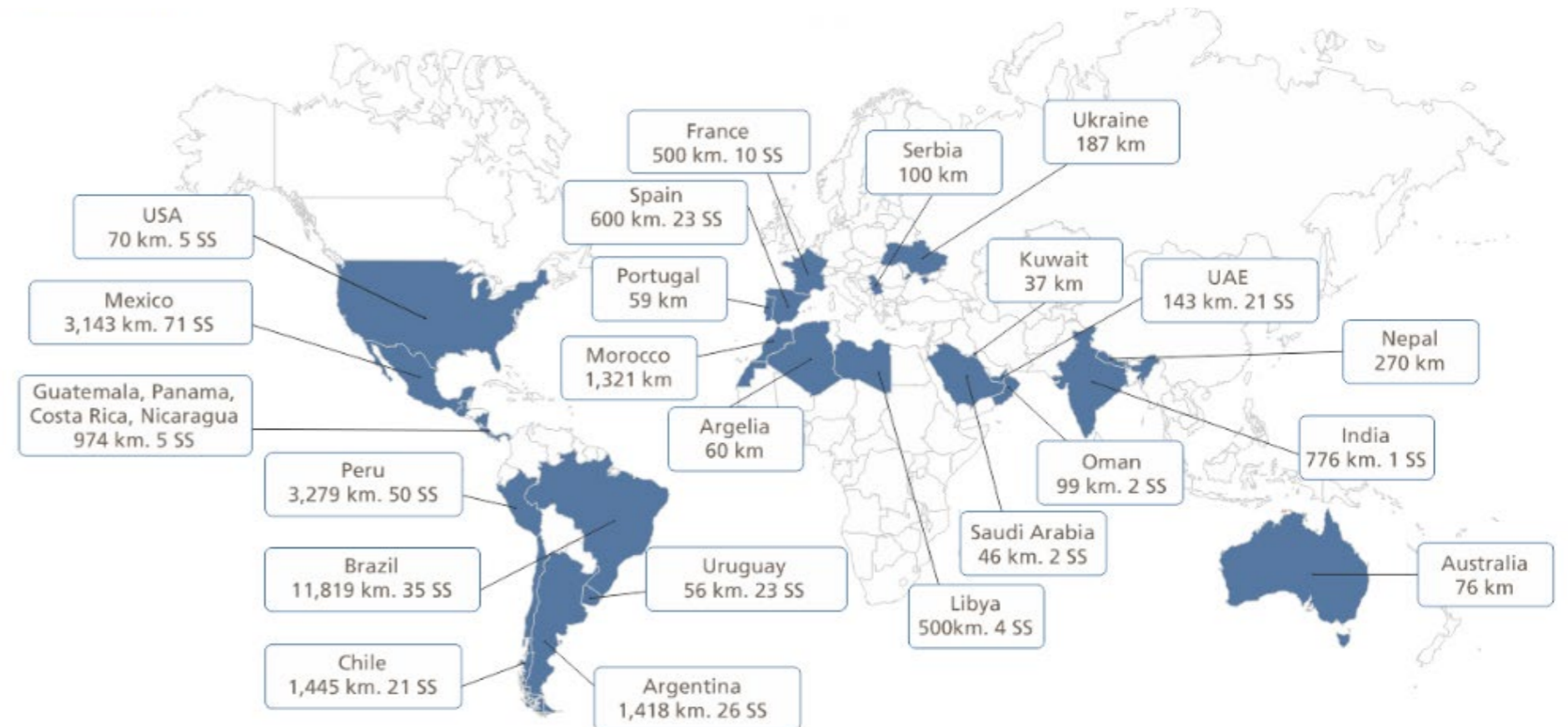


## Transmission and distribution

## International reference in the construction of transmission and distribution infrastructures



- We carry out projects of **medium, high and very high voltage** and we have capacities to carry out integral projects, supply of materials, complete assembly, cable laying, OPGW and live-line working.
- We supply the **complete range of substations in high and medium voltage** for different uses for electric companies, industries, etc; and **gather high expertise and extensive experience from the conventional AIS substations to GIS substations** and all related works.



(\*) References since the year 2004: km of transmission lines and number of substations (SS) built or under construction

## Main references: Transmission Lines

**Interconnection System - 230kV TL**  
(Central America Countries)



**REE TL**  
(Spain)



**TL Faya-Shamkha**  
400 & 220 kV (UAE)



**750 kV TL**  
(Ukraine)



**Framework contract TL with RTE**  
(France)



**800 kVDC TL Bipole**  
Biswantha Chariyali – Agra (India)



**400 kV TL**  
Wadiarabia – Rowies (Libia)



**500 kV TL**  
Chilca-Marcona-Montalvo - ATS (Peru)



**500 kV TL**  
Comahue-Cuyo (South sec.) –  
ET Agua del Cajon (Argentina)



**HTL Iberdrola**  
Alonsotegui – Ortuella (Spain)



**400kV TL**  
associated with El Pacifico (1st  
Phase) (Mexico)



**500kV TL**  
Itacaiunas – Colinas/ Maraba/Carajas- ATE III (Brazil)



# Transmission and distribution

## Main references: Substations

**380/132/13.8kV GIS SS in Riyadh & Jeddah (Saudi Arabia)**



**Al Dreez 132/33 kV SS (Oman)**



**400/138kV SS Transformacion del Noreste (3er Phase) (Mexico)**



**220 kV SS Sierra Gorda (Chile)**



**225/63 kV SS Castellet (France)**



**400kV SS Cerrato - REE (Spain)**



**400kV SS in Zawiya, Sirte, Janzour and South Benghazi (Libya)**



**132kV Hybrid SS Pabellones (Spain)**



**SE Foz Foz do Iguaçu 230/138kV (Brazil)**



**Beaulieu 400/55 kV Traction SS (UK)**



**230/34,5 kV GIS SS Jaco & Coyol (Costa Rica)**



**132/33kV SS Samad & Sinaw and associated TL (Oman)**





**4** Installations & infrastructure



# Installations & infrastructure

**Installations** in all types of **industrial plants, generation plants** and **singular buildings**, covering **design, supply, manufacture, assembly and testing of systems** as well as **operation and maintenance**.



## Activities by sector:

### Industrial

- Automotive
- Cemente
- Metallurgic
- Mining
- Food
- Pharmaceutical
- Paper mil
- Laboratories
- Other industries

### Energy generation

- Nuclear
- Combined cycle
- Cogeneration
- Hydraulic
- Photovoltaic
- Solar Thermal
- Wind
- Biomass
- Biogas
- Hydrogen

### Singular building

- Hospitals
- Prisons
- Conference and exhibition centers
- Courthouses
- Educational centers
- Data processing centers
- Offices
- Shopping Centers
- Refurbishment of buildings

### Communications

### Oil & Gas

- Gas
- Petrochemical
- Refinery
- Packaging, Storage and Distribution

### Others

- Airports
- Military bases
- Urbanization

## Capacities:

- Electric installations
- Instrumentation and control installations
- Mechanical installations
- Facility Maintenance
- Installations in data processing centers
- Air-conditioning and water installations and protection against fire systems
- Deployment of fiber optic networks, and fixed and mobile communications systems
- Communications and control systems for plants and buildings

# Installations & infrastructure

Main references: **Singular Building**

**Herlev Hospital**  
(Denmark)



**Mexiquense Cultural Center**  
(Mexico)



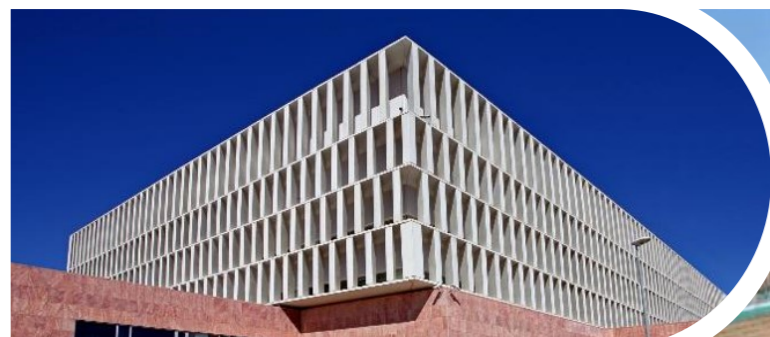
**Manaus Hospital**  
(Brazil)



**Campus de la Salud Hospital,**  
Granada (Spain)



**Malaga City of Justice**  
(Spain)



**Seville Exhibition and Conference Centre**  
(Spain)



**Lagoh Shopping Center**  
Seville (Spain)



**Punta Rieles prison**  
Montevideo (Uruguay)



**Loyola Andalucía University**  
Seville (Spain)



**Financial campus of Santander Bank, Boadilla del Monte**  
(Spain)



**Mutua Universal health care center**  
Malaga (Spain)



**Liege Hospital**  
(Belgium)



# Installations & infrastructure

Main references: **industry and generation**

**Huelva Refinery**  
(Spain)



**SABIC's Innovative Plastic**  
(Spain)



**Renault Factory in Seville**  
(Spain)



**Voice and data systems in Mercadona**  
(Spain)



**Airbus Factories**  
(Spain)



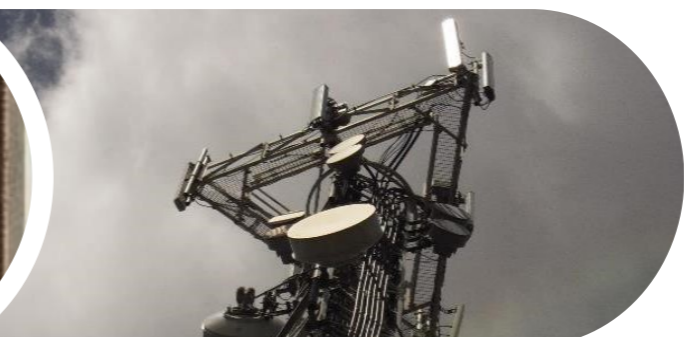
**Almaraz nuclear power plant**  
(Spain)



**Installations in Air Base of Morón**  
(Spain)



**Deployment of mobile telephony, and fiber optic networks**  
(Spain)



**ITER (International Thermonuclear Experimental Reactor)**  
(France)



**Solúcar Solar**  
Sanlúcar la Mayor (Spain)



**Peralta Wind farm**  
(Uruguay)



**Remodeling of the passenger terminal at Seville Airport**  
(Spain)



# 5 Railway



# Railway

Designing, supplying, installing and maintenance of **electrification infrastructures** for both **conventional and high-speed railways, freight, subways, trams and monorails.**

## Capacities:

### Overhead lines

- High-speed (HS) overhead line equipment for 350 km/h alternating current (AC)
- Direct current (DC) overhead line electrification (OLE) for speeds of 160 and 220 km/h and AC OLE up to 160 km/h.
- Renewal of DC and AC OLE and voltage adaptation
- Subway and tram infrastructure



### Communications

- Supply and installing GSM-R infrastructure.
- Communication and control systems for subway, trams and commuter trains loudspeaker, interphone, CCTV, IP telephones, access control, tetra systems, train identification and passenger information systems, and LAN networks



### Substations

- Traction SS and auto-transformer sites for HS lines.
- Traction SS for surface and underground subway, for open line and surface and Automated People Mover (APM) and with compact designed.



### Other activities

- Maintenance of HS and conventional OLE, substations, auto-transformer sites and rigid catenary and tram wire systems
- Ancillary manufacture
- Installations for buildings
- Ancillary installations (HV, LV, lighting and ventilation)



# Railway

## Main references

**High speed train Makka-Madinah**  
(Saudi Arabia)



**High speed lines - Catenaries & SS**  
(Spain)



**Greater Western Region y Southern Region Electrification** (UK)



**Communication and security systems HS La Robla-Pola de Lena** (Spain)



**Ghaziabad-Moradabad and Nallapadu-Digumetta Lines** (India)



**Renovation of catenary Landas-Valenciennes** (France)



**Electrification Vilnius Klaipeda** (Lithuania)



**Maintenance HS Antequera-Granada** (Spain)



**Lines 3 and 6 Metro of Santiago de Chile** (Chile)



**Electrification of Urban Tube in Granada** (Spain)



**Metro Lines in Madrid and Barcelona** (Spain)



**Maintenance HS Madrid-Barcelona-French Frontier** (Spain)



# 6 Auxiliary manufacturing



More than **3,400 m<sup>2</sup>** production center for low voltage switchboards and electronic devices, specialized in the realization of **prototypes and first series** given its own **design capacity, software and hardware...**

### Capacities

- Manufacturing of **low voltage** switchboards
- **Electronics:** prototypes and mass production. In-house design capabilities for both hardware and software
- **Control equipment and equipment with built-in electronics** in cabinets for: telecommunications, VCA systems, racks, ticketing and access systems, power supplies, control and command consoles, test benches and test equipment.

### Sectors

- Conventional energy
- Renewable energy
- Oil&Gas
- Defense
- Aeronautic
- Naval
- Aerospace
- Railway
- Traffic and transport



Production center for for low voltage switchboards and electronic devices. Madrid (Spain)

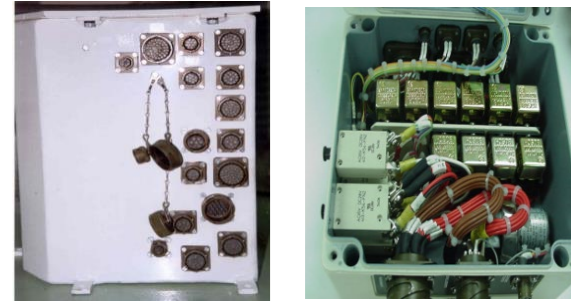




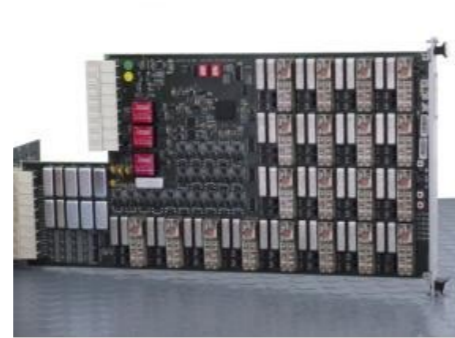
# Auxiliary manufacturing

## Main references

Pizarro Armored Vehicle control panels for MoD / GDELS



Electronics for test bench for SMU for RUAG Space



Access control equipment for trains and metros for Telvent



S-80 Submarine control console for Sainsel



Chassis SDAV, High Speed Albacete Alicante for Alstom Transporte



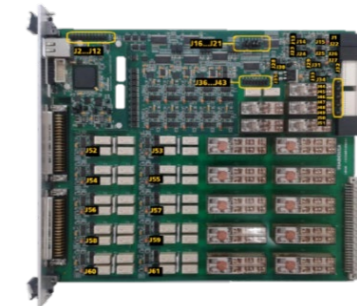
Smart IO, Tram Algiers, for Alstom Transporte



Control panels, Jerusalem tram for Alstom Transporte



Electronic modules for Meteosat and Ariane 5 for EADS Astrium Crisa



Test Bench SW-Bench Miu-T2 Eurofighter for EADS-CASA



Control Momentum Gyro electronics



Ticket vending machine for Telvent



Test bench ATE, Ajax project for GDELS



**7** Steel structures manufacturing



## Productos

### Lattice Towers for T&D

- All types of Towers for upto 1,200 kV.
- AC and DC variants.

### Substation Structures

- All types of frames, columns and beams.
- All types of major and minor support structures.

### Telecommunication Towers

- For mobile telephone network.
- For microwave transmission network.
- Guyed and self supporting for Radio and Television.

### Structures for power generation

- Parabolic trough collectors with solar thermal concentration.
- Heliostats for Thermosolar with Tower Technology.
- Heliostats for Photovoltaic.
- Lattice structures to support wind turbines.
- Structures for fixed PV and for one single axis.

## Test station

- With design capacity and load test at a real scale.
- Maximum tower width to test: 18.5 x 18.5 m.
- Maximum height of the tower to be tested: 72 m.
- Maximum uplift per leg: 750 Ton.
- Overturning moment capacity: 12,000Ton x m.



Structures Test Station

# Steel structures manufacturing

## Main references

**110kV Framework Agreement for ESB (Ireland) – 2,000 Ton**



**400/220kV Framework Agreement REE (Spain) – 28,900 Ton**



**400kV TL Bourdim – Jerada (Morocco) – 12,000 Ton**



**Litgrid - 330kV OHL Alytus District (Lithuania) – 3,780 Ton**



**Medupi-Borutho 400KV OHL (South Africa) – 4,000 Ton**



**Mojave Solar CCP (USA) - 700 uts**



**Kaxu Solar One CCP (South Africa) – 1,200 uts**



**Shams Solar CCP (UAE) – 384 uts**



**Solabén Solar CCP (Spain) – 2,520 uts**



**Ashalim Solar CCP (Israel) – 1344 uts**



**Khi Solar One (South Africa) - 4,130 uts**



**Cerro Dominador PV plant (Chile) – 10,600 uts**



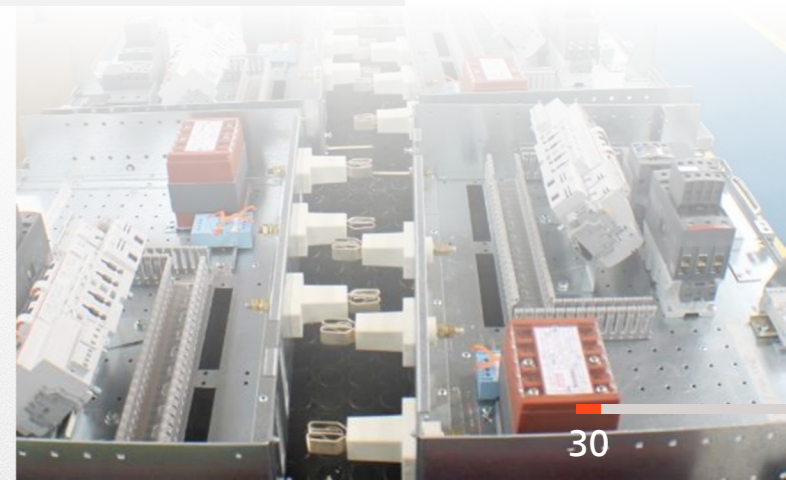
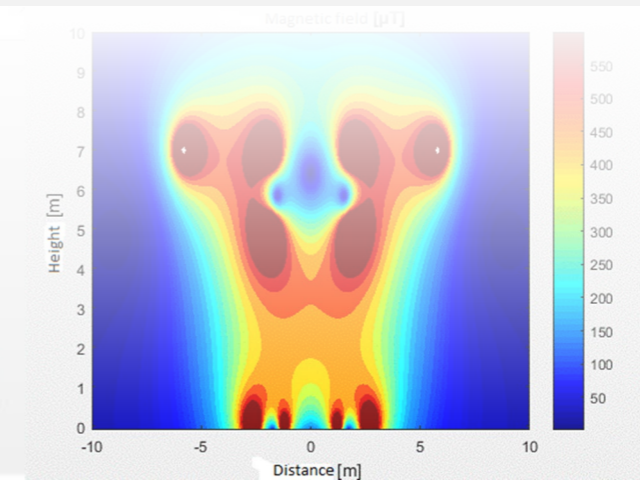
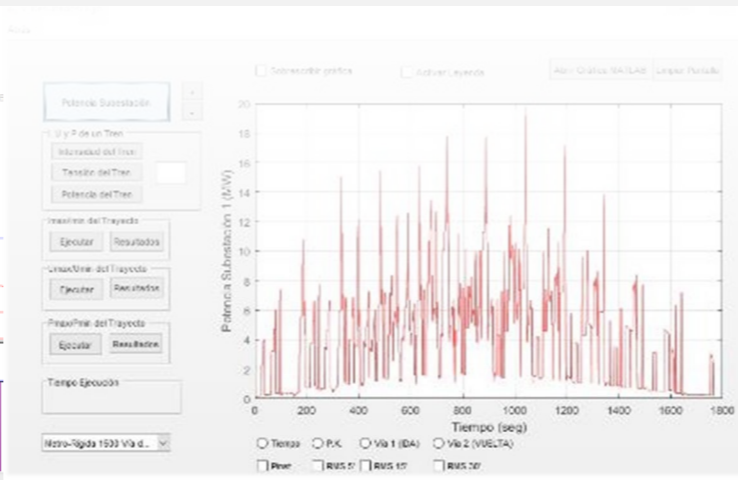
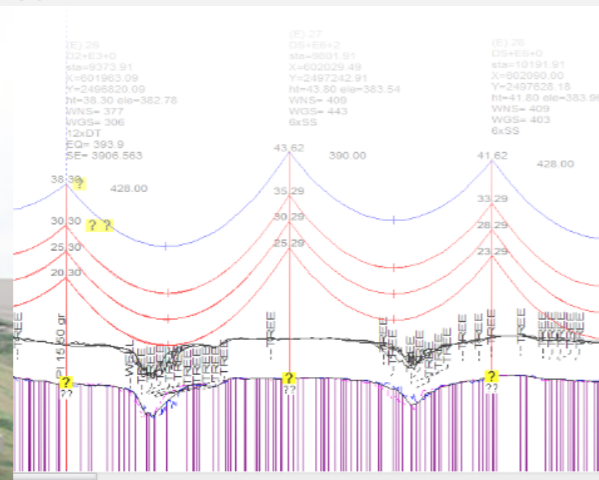
**8** Engineering  
Capabilities



Our **objective** has always been based on **the development of optimized designs that are directly applicable to the real work needs.**

## Design Capabilities

	T & D	I & I	Railway	Manufacturing
Traction substations for any technology (AC & CC)	✓	✓	✓	
Overhead contact line for any technology (2x25 kV AC, 1x25 kV AC, 3 kV DC, 1500 V DC, 750 V DC and Third Rail)			✓	
Electrical transmission lines	✓		✓	
Civil Works, earth works, acceso road desings, etc...	✓	✓	✓	
Mechanical and electrical Works (Auxiliary installations)	✓	✓	✓	✓
Traction simulations and Power demand studies	✓	✓	✓	✓
RAM & Safety studies	✓		✓	✓
Protection & Control systems	✓	✓	✓	✓
Maintenance and test programmes, and Testing and Commissioning	✓	✓	✓	✓
High voltage tower design and Communications				✓
Metalical structures for PV sistemas and substations				✓
Optimization studies to determine number, location and energy power of substations	✓		✓	
Pantograph-catenary interaction studies			✓	
EMC, stray current, induced voltage and step and contact voltage studies	✓		✓	✓
Railway efficient driving and energy storage studies			✓	
BIM/3D modelling and designs	✓	✓	✓	✓
Renewable energy studies	✓	✓	✓	✓





# 9 Strengths

# Main Strengths

- 1 Health and Safety come first**
  - Our accident rates are the very lowest of the sector. Frequency rate with absence 2017: 3.43 (reduction > 70 % in the last four years).
- 2 References**
  - We have extensive references in all our products, sectors and very diverse geographies.
- 3 Internacionalization**
  - Extensive experience in international projects enables us to meet any geography and achieve efficient implementation in short time.
- 4 Homologations**
  - Accreditations and homologations are available with the main public and private companies in the Transmission and Infrastructures sectors.
- 5 Human Team**
  - Highly qualified and experienced, rigorously selected for every country and job.
- 6 Machinery**
  - We have all the necessary machinery to carry out our activity. Stringing trains for railways, HV stringing machines, production center equipment are worthy to mention.



# Main Strengths



## Integrated Management Systems

### Quality:

- ISO 9001 Certification, and according to Pecal/AQAP for the defense sector for more than 20 years.
- Certificate of conformity of factory production control for execution of steel structures **(CE certificate)**.

### Health and Safety:

- **Oshas 18001 certification** for more than 10 years.

### Environment:

- **ISO 14001** Certification from more than 10 years.



## Recognition of projects



- **OETC** Health & Safety & Environment Prize week campaign.
- More than 1.5 million hours worked without lost time injury in the projects Al-Dreez and Samad & Sinaw.



- **Sabic** Europe contractor EHSS Prize.
- More than 1 million hours worked without lost time injury.



- **RTE** Challenge Prévention RTE – Enterprises Prize



- **NetworkRail** Project "Silver Site", supplier "5 stars" according to the RISQS evaluation scheme and "zero accidents" recognition during periods of works of 4-week x 6-shift x 12-hour.





# ABENGOA

Innovative Technology Solutions  
for **Sustainability**

Thank you. ■