




**ABENGOA**

Energy

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.

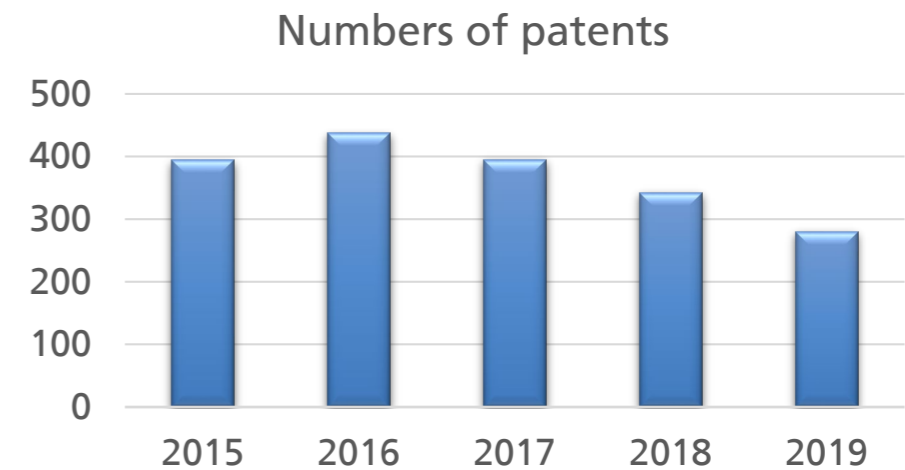


+ 1.7 million of m<sup>3</sup>/day of desalinated installed capacity and 2.6 million m<sup>3</sup>/day under construction.



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.

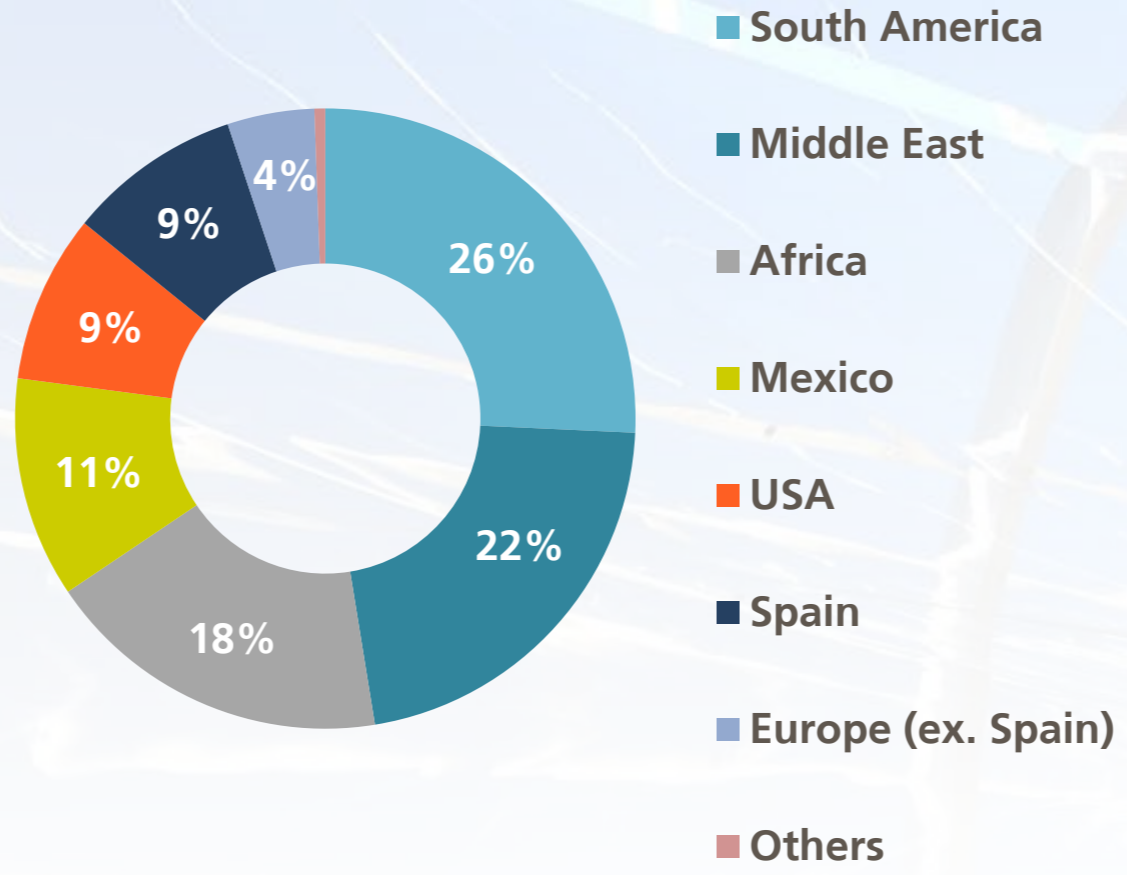


280 patents at the end of 2019.

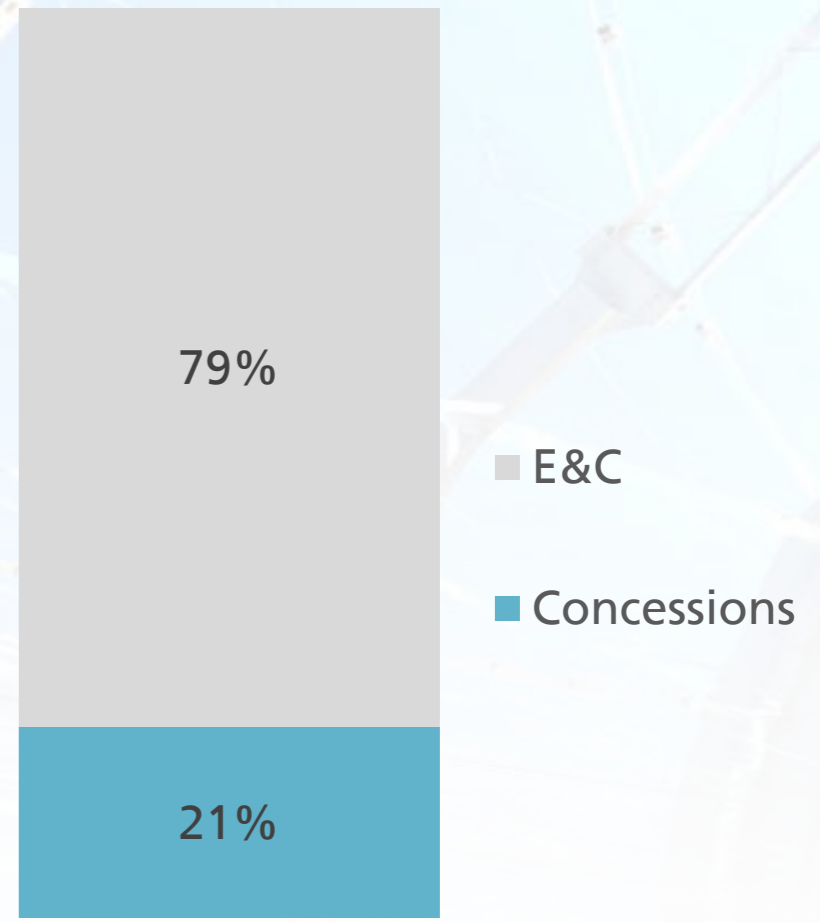
# Main indicators

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.





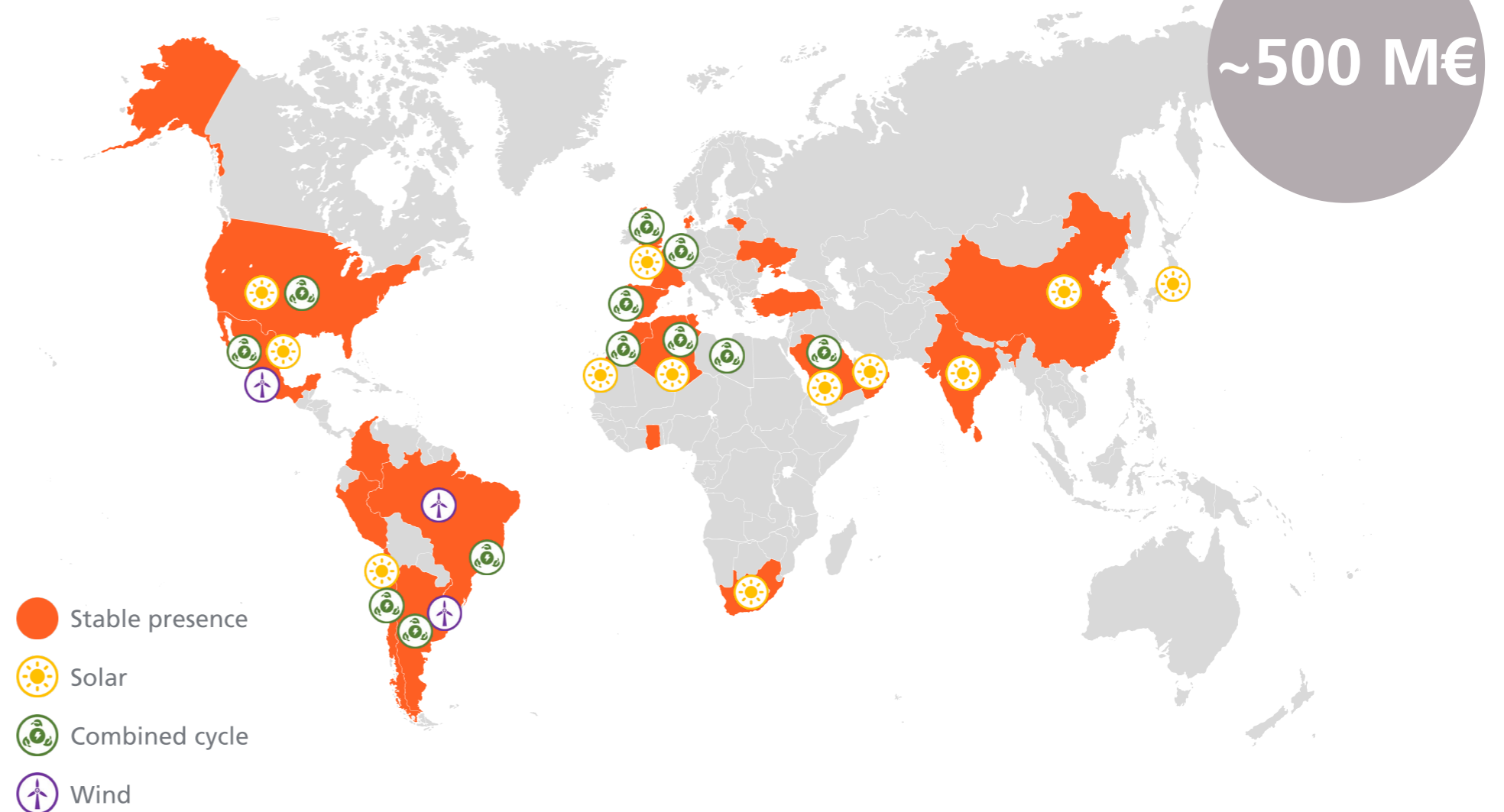
# Abengoa **2** Energía

# Energy

Abengoa has wide experience in the **power generation** sector thanks to the development of **open cycle** and **combined cycle technologies, cogeneration, wind farms, solar thermal, photovoltaic, energy recovery from waste and biomass plants.**

This experience provided us with high **design** capacity and **hybridization of generation technologies** to offer the best solution to our customers.

## Backlog (Q1 2020)










(\*) All Abengoa's activities are developed in Spain



Khi Solar One solar thermal tower plant. 50 MW (South Africa)

# Our business in **Energy**

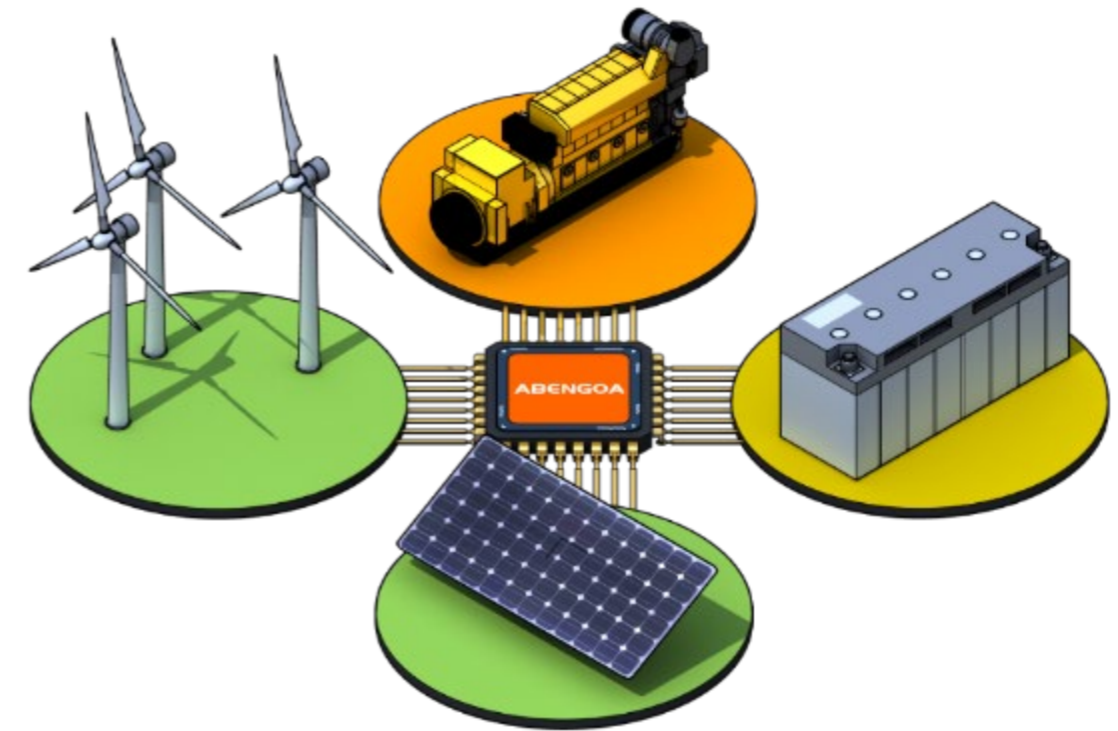
Abengoa is a **world leader** in **solar thermal technology** and an **international reference** in the construction of **conventional** and **renewable energy generation plants**.

	<b>Solar thermal</b>	<ul style="list-style-type: none"> <li>▪ Solar thermal tower and solar thermal parabolic trough collectors technology. Solar process heat.</li> </ul>	<ul style="list-style-type: none"> <li>• More than 130 MW in operation in tower technology.</li> <li>• More than 1,600 MW in operation in parabolic trough collectors technology</li> </ul>
	<b>Conventional generation</b>	<ul style="list-style-type: none"> <li>▪ Combined cycles, cogeneration, open cycle.</li> </ul>	<ul style="list-style-type: none"> <li>• More than 9 GW of installed capacity.</li> </ul>
	<b>Photovoltaic and wind</b>	<ul style="list-style-type: none"> <li>▪ Photovoltaic plants, onshore wind farms.</li> </ul>	<ul style="list-style-type: none"> <li>• More than 500 MWp built in photovoltaic.</li> <li>• More than 480 MW built in wind.</li> </ul>
	<b>Storage</b>	<ul style="list-style-type: none"> <li>▪ Electrochemical batteries, hydrogen, thermal storage in salts.</li> </ul>	<ul style="list-style-type: none"> <li>• More than 6.000 MWht in commercial operation.</li> </ul>
	<b>Biofuel</b>	<ul style="list-style-type: none"> <li>▪ Biofuel production plants (bioethanol, biodiesel and jetfuel).</li> </ul>	<ul style="list-style-type: none"> <li>• More than 2.500 Ml/year of biofuel.</li> </ul>
	<b>Energy recovery from waste and biomass</b>	<ul style="list-style-type: none"> <li>▪ Electric and thermal energy production plants.</li> </ul>	<ul style="list-style-type: none"> <li>• More than 50 completed projects.</li> </ul>
	<b>Hydrogen</b>	<ul style="list-style-type: none"> <li>▪ Production of hydrogen and generation of energy.</li> </ul>	<ul style="list-style-type: none"> <li>• More than 20 developed projects.</li> </ul>

**Hybridization of technologies**

# Our business in **Energy**

**Abengoa** is a specialist in the development of **manageability** and energy quality solutions from renewable sources and their **hybridization** with conventional technologies



# Key projects in **Energy**

**Nuevo Pemex (\*)**  
México



Cogeneration plant  
300 MW

**First cogeneration  
project in a Pemex  
(Petroleos Mexicanos)  
refinery)**

**Waad Al Shamal**  
Saudi Arabia



Combined cycle solar-  
gas 1,390 MW + 50  
MW

**Largest hybrid  
solar-gas plant in  
the world**

**Noor Energy I**  
United Arab Emirates



Fourth phase. Parabolic  
trough collectors plant  
3x200 MW + 12 hours of  
storage

**Largest solar complex in  
the world**

**Cerro Dominador (\*\*)**  
Chile



Photovoltaic plant of 100  
MW + solar thermal plant of  
110 MW + 17.5 hours of  
storage

**The largest solar thermal  
plant in Latin America**

**Fulcrum**  
United States



Biofuel plant for the aviation  
sector from Municipal Solid  
Waste (MSW)

**First plant that produce  
biofuels from MSW in  
USA.**

(\*) Owner Atlantica Yield

(\*\*) Owner EIG Global Energy Partners



**3** Products and  
main  
references

# 3.1 Solar thermal



Solucar solar complex. 300 MW (Spain)

# Abengoa in **Energy**

Abengoa has **its own solar thermal technology**.  
International leader with **30% of worldwide installed capacity already under operation**.

## Parabolic trough collectors technology



+ 1,600 MW in operation and 650 MW under construction

## Tower technology



+ 130 MW in operation and 110 MW under construction

## Hybrid solar-gas technology



1,000 MW in operation and 1,390 MW under construction

It occupies **fourth position** in the solar generation category in **ENR's 2020 Top International Contractors ranking**.

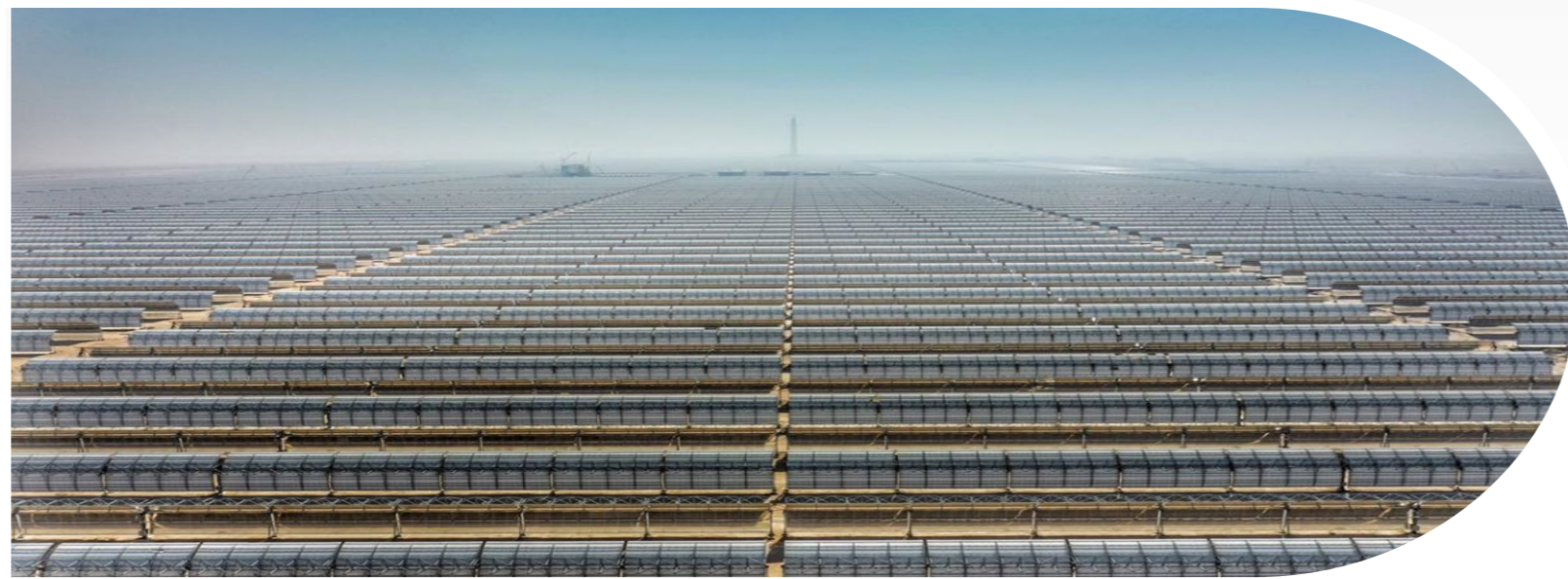


**Solar**  
ENR Top International Contractors 2020 ranking



**+1,600 MW in operation and 650 MW under construction in parabolic trough collectors technology**

## STEP Noor Energy I 600 MW



- Location: **Dubai. UAE.**
- End client: **Dubai Electricity and Water Authority (DEWA).**
- Under construction.
- Three solar thermal parabolic trough plants of 200 MW each one.
- 12 hours of molten salt storage.
- It is integrated into the largest solar complex in the world, the Mohammed bin Rashid Al Maktoum Solar Park, owned by DEW.

- **Solana (\*) and Mojave (\*)**
  - Location: USA.
  - 280 MW x 2 plants with storage.
- **Mojave is the largest parabolic trough plant in the world.**



- **Xina and Kaxu (\*)**
  - Location: South Africa.
  - 100MW x 2 plants with storage.
- **The largest solar complex in Africa.**



- **Parabolic trough plants in Spain (\*)**
  - Location: Caceres, Ciudad Real, Cordoba, Seville.
  - 50 MW x 13 plants.



- **Royal Tech Yumen project**
  - Location: China.
  - 50 MW.



(\*) Owner Atlantica Yield

+130 MW in operation and 110 MW under construction in solar thermal towers technology

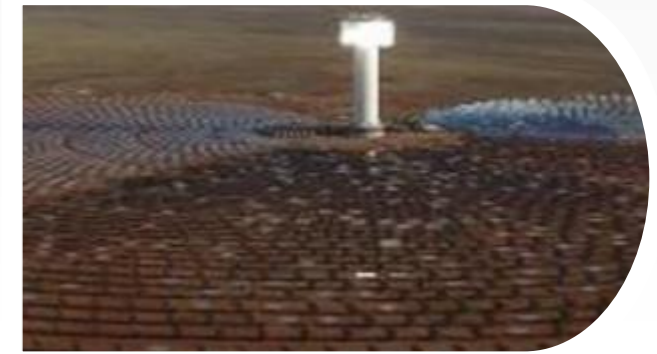
## STET Cerro Dominador 110 MW (\*)



- Location: **Chile.**
- End client: **EIG Global Energy Partners.**
- **It is the largest solar thermal plant in Latin America.**
- Under construction.
- Solar thermal tower plant with an installed capacity of 110 MW.
- Molten salt storage capacity of 17.5 hours.

## Khi Solar One

- Location: South Africa.
  - 50 MW.
- **First plant in Africa to have completed over 24 consecutive hours of operation with solar power successfully.**



## PS10 (\*\*) and PS20 (\*\*)

- Location: Spain.
  - 11 MW and 20 MW.
- The first commercial tower plants in the world.



## Luneng Haixi project

- Location: China.
  - 50 MW.



(\*) Owner EIG Global Energy Partners

(\*\*) Owner Atlantica Yield

1,000 MW in operation and 1,390 MW under construction in hybrid solar-gas technology

## ISCC Waad Al Shamal 1,390 MW + 50 MW solar field



- Location: **Saudi Arabia.**
- End client: **Saudi Electricity Company.**
- **Largest hybrid solar-gas plant in the world.**
- Under construction.
- Hybrid solar-gas plant.
- Parabolic trough solar park of 50 MW.
- Combined cycle plant of 1,390 MW

### Ain Beni Mathar

- Location: Morocco.
- 470 MW (20 MW solar field).



### Agua Prieta

- Location: México.
- 408 MW (14 MW solar field).



### Hassi R'Mel

- Location: Algeria.
- 150 MW (20 MW solar field).
- **First IPP hybrid solar-gas in the world.**



### El Tesoro Mine.

- Location: Chile.
- 10 MWt.
- **The world's largest industrial solar application.**



# 3.2

## Combined cycles and cogenerations plants

+ 5 GW combined cycle installed  
and close to 1.2 GW in cogeneration



**Cogeneration**  
ENR Top International Contractors 2020 ranking

## CCGT Centro Morelos 640 MW



- Location: **México.**
- End client: **Comisión Federal de Electricidad.**
- Three gas turbines, a steam turbine and a wet cooling system with wastewater treatment.
- Four main transformers, a conventional 400 kV substation (Huexca), a 25.7 km long double circuit transmission line, which will interconnect the Huexca plant substation with the 400 kV Yautepec substation.

## CCGT Waad Al Shamal

- Location: Saudi Arabia.
- 1.390 MW + 50 MW solar field.
- **Largest hybrid solar-gas plant in the world.**
- Under construction.



## CCGT Salta

- Location: Argentina.
- 630 MW.



## COG Nuevo Pemex 300 MW (\*)

- Location: México.
- 300 MW.
- **First cogeneration project in a Pemex refinery.**



## COG A3T Complejo Nuevo Pemex

- Location: México.
- 220 MW.
- **The second largest efficient cogeneration plant in Mexico after Nuevo Pemex Cogeneration, both built by Abengoa.**



(\*) Owner Atlantica Yield

# 3.3 Photovoltaic



+ 800 MWp built or under construction, in more than 30 projects, in 6 different countries in photovoltaic technology

## PVSP Mount Signal 265 MW



- Location: **California (USA)**.
- End client: Silver Ridge Power.
- The plant covers 801 hectares.
- More than three million photovoltaic modules that rotate on a north-south axis following the path of the sun
- It generates enough solar energy to supply 72,000 homes in San Diego and surroundings.
- It prevents the emission of 356,000 tons of CO<sub>2</sub>/year into the atmosphere.

## Cerro Dominador (\*)

- Location: town of María Elena, Antofagasta, Chile.
  - 120 MW.
  - 392,000 photovoltaic modules.
  - 626 trackers.
- 50 inverter and transformer centers.

## Lone Valley Solar

- Location: California (USA).
  - 37 MW.
- 122,000 305W photovoltaic modules.
  - 6,096 tracker in one axis.
- 15 inverter and transformer centers.

## Puertollano and Barcience

- Location: Spain.
  - 100 and 50 MW.
- 246,240 and 146,970 photovoltaic modules.
  - 8,206 and 4,899 structures.
  - 360 and 28 inverters.
- 14 and 7 transformer centers.

## Francisco Pizarro

- Location: Spain.
- 590 MW (Scope of Abengoa: 189 MWp).
  - 1,500,000 photovoltaic modules.
  - 13,500 trackers.
- 90 transformer centers.



## 3.4 Wind



**+ 480 MW built in Brazil, Mexico, Uruguay and Spain**  
in wind technology

## WF Campo Palomas 70 MW



- Location: **Uruguay.**
- End client: **Invenergy Wind.**
- 35 turbines x 2 MW.
- Annual average energy generation: 263.8 MWh.

### **Peralta I (\*)**

- Location: Uruguay.
- 50MW (25 turbines x 2 MW).
- Annual average energy generation: 177.51 MWh.



### **Talas de Maciel II (\*)**

- Location: Uruguay.
- 50MW (25 turbines x 2 MW).
- Annual average energy generation: 188.4MWh.



### **São Cristovão**

- Location: Brazil.
- 26 MW (13 turbines x 2 MW).
- Annual average energy generation:
  - 113 GWh.





## 3.5 Storage

### STEP Solana 280 MW (\*)

Thermal storage : 4,470 MWht



- Location: **Arizona (USA)**
- End client: **Arizona Public Service.**
- **It is the solar thermal plant built with the largest storage system in the world**
- Solar thermal parabolic trough plants with an installed capacity of 280 MW.
- Molten salt storage capacity of 6 hours.
- 12 salt storage tanks with more than 11,000 m<sup>3</sup> capacity each one.

### STEP Noor Energy I 3x200 MW

- Location : Dubai.
- 2,500 MWht.



### STET Cerro Dominador 110 MW (\*\*)

- Location : Chile.
- 4,900 MWht
- Lithium-Ion Batteries: 3 MWh.



### STEP Xina 100 MW

- Location : South Africa.
- 1,500 MWht.



### Flexitranstore

- Location : Chipre.
- 2 MWh.



(\*) Owner Atlantica Yield

(\*\*) Owner EIG Global Energy Partners

# 3.6 Biofuel



### WTB Sierra Biorefinery 10 Mgal/year

Gasification technology to produce biofuel for aviation from municipal solid waste (MSW).



- Location: **Nevada (USA)**.
- End client: **Fulcrum BioEnergy Inc.**
- **The first plant that, using gasification technology, will produce biofuels from MSW in the United States.**
- Under construction.
- Plant with capacity to produce 10 million gallons of biofuels per year.
- Purpose: aviation sector.

### Rotterdam

- Location: Netherlands.
- 480 Ml/year 360,000 t DDGS (Distiller Dried Grains with Solubles).
- **The largest biofuel plant in Europe.**



### Illinois bioethanol

- Location: Illinois (USA).
- 333 Ml/year, 230,000 t DDGS.



### Paysandu bioethanol

- Location: Uruguay.
- 70 Ml/year, 49,000 t DDGS.



### San Roque biofuel

- Location: Spain.
- 200,000 t biofuel.



# 3.7

Energy recovery  
from waste  
and **biomass**

# Abengoa in **Energy**

Abengoa Abengoa has a wide experience in **the entire chain of waste management processes (classification, reuse and recycling) of more than 9 Mt/year**

## **Glendale plant**

Waste management plant



- Location: **Arizona (USA).**
- End client: **Vieste Energy LLC.**
- Plant that manages 180,000 tons of municipal solid waste (MSW) per year.

## **Alhendín-Otura plant**

- Location: Spain.
- 160,000 t/year of MSW.



## **Tarragona transfer center**

- Location: Spain.
- 98,000 t/year of MSW.



## **O&M contracts**

- Location: various.
- 9.8 Mt/year of MSW management.



### São Luiz and São João biomass plant 70 MW



- Location: **Brazil**.
- End client: **Abengoa Bioenergía Brasil**.
- São Luiz: plant that produces 70 MW of electricity and steam from sugarcane.
- São João: plant that produces 70 MW of electricity and steam from sugarcane.

#### **Westfield Poultry Litter**

- Location: United Kingdom.
- Electricity production (13 MW) from
  - agricultural waste.
  - **First of its type.**



#### **EHN Sangüesa**

- Location: Spain.
- Electricity production (29 MW) from agricultural waste (straw) and wood.



#### **Hugoton**

- Location: USA
- Electricity production (20 MW) from
  - agricultural waste (corn).





## 3.8 Hydrogen



### Torrequeúllar hydrogen service station.



- Location: **Seville (Spain).**
- End client: **Abengoa Hidrógeno.**
- The system consists of a hydrogen production system, its storage and dispensing to vehicles.

### EL30N

- Location: Spain.
- H<sub>2</sub> production through electrolysis.



### Procyon

- Location: Spain.
- Cogeneration plant with fuel cell (300 kWe).



### Bio III

- Location: Spain.
- Bioethanol reforming system to produce 250 Nm<sup>3</sup>/h H<sub>2</sub>.



4

Strengths  
and **value**  
proposition

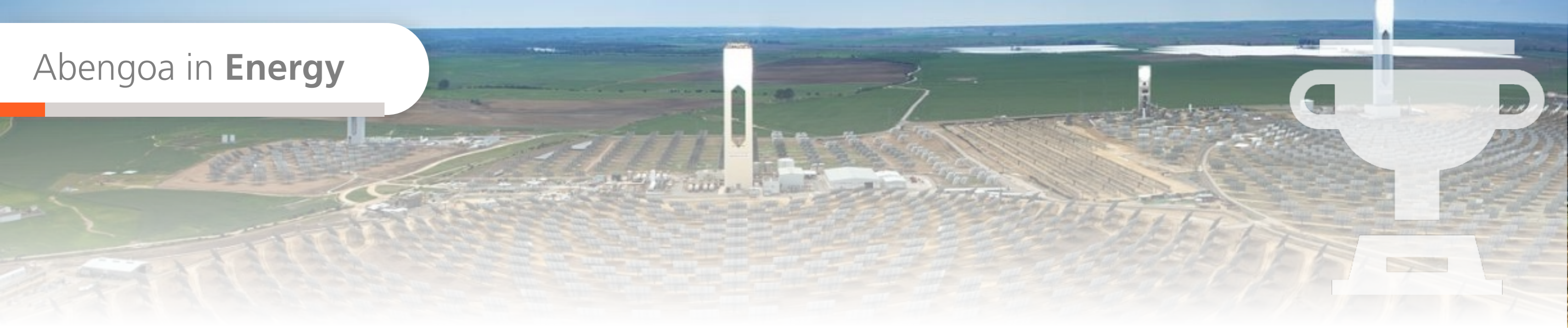
Strengths and **value**  
proposition

**Excellence in technical  
capabilities and  
international positioning**

Experience, references, internationalization and competitiveness: **the basis of our growth**

- 1 Safety and health** comes first.  
Our accident rates are much lower than those of the sector. Frequency index with a reduction in 2020: 2.48.
- 2 Technology**  
Own solar thermal technology and extensive experience in photovoltaic and wind, as well as in conventional power generation. Abengoa has an installed and under construction capacity of more than **13 GW**.
- 3 International recognition**  
Presence in the five continents, with a recognized leadership position in the main world rankings (ENR), with **30% of the worldwide installed solar thermal energy capacity already under operation**.
- 4 Integral management, know how and technical support**  
Integral project management: engineering, purchasing, logistics, construction and commissioning with own resources. Solid, committed and highly qualified team, with extensive experience in EPC and O&M and specialized and competitive know-how, oriented to the satisfaction of our customers. Leadership in engineering and technology.
- 5 Pipeline diversified in geographies and products**  
Wide portfolio of products (photovoltaic, solar thermal, wind, combined cycles, energy recovery, storage). Great business opportunities in the short, medium and long term due to the growing commitment to renewable energy sources.

## Abengoa in **Energy**



Abengoa is **recognized** internationally by institutions specialized in the energy sector

- **2018 CSP Globalization Contribution (CSP Plaza)**
- **2019 CSP Technology Innovation Award (CSP Plaza)**
- **2018 Industry Awards. Xina Solar One solar thermal plant. South Africa (African Utility Week)**



# ABENGOA

Innovative technology solutions  
for **sustainability**

Thank you .