




# ABENGOA

## Services

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).

# Una compañía viable con una **base sólida**



**Sólido negocio** en ingeniería, suministro, construcción, operación y mantenimiento en mercados de alto crecimiento



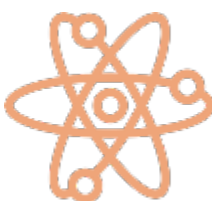
**La huella global** aporta resiliencia al negocio de Abengoa y el tamaño de su cartera de proyectos proporciona visibilidad de los ingresos



**Credibilidad** de los stakeholders



**Estructura ligera** con alta eficiencia operativa



**El desarrollo** de tecnología pionera y comercialmente viable se ha convertido en la ventaja competitiva clave de Abengoa



**Un modelo** de negocio más concentrado y una estructura de capital sana y robusta, sumados a un conjunto multidisciplinar de capacidades, sitúan a la compañía en una posición sólida para la creación de valor.



**Equipo humano**, comprometido y capaz, poseedor de un know-how especializado y competitivo.

# 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.

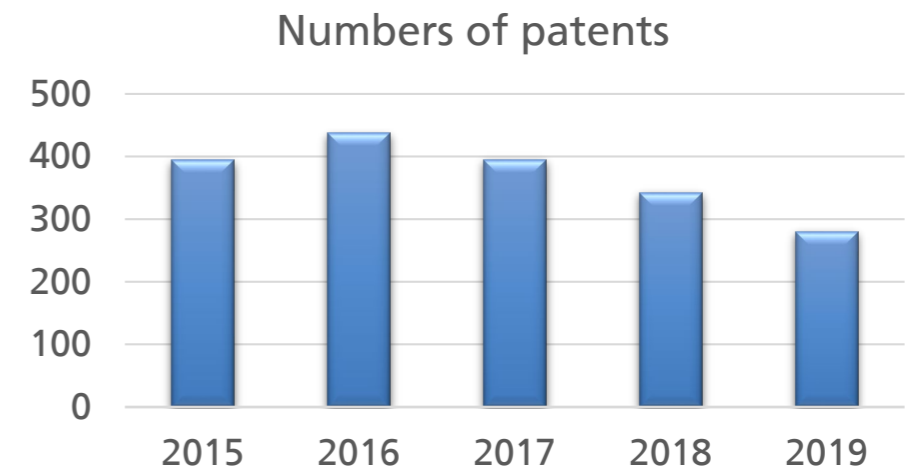


+ 1.7 million of m<sup>3</sup>/day of desalinated installed capacity and 2.6 million m<sup>3</sup>/day under construction.



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.

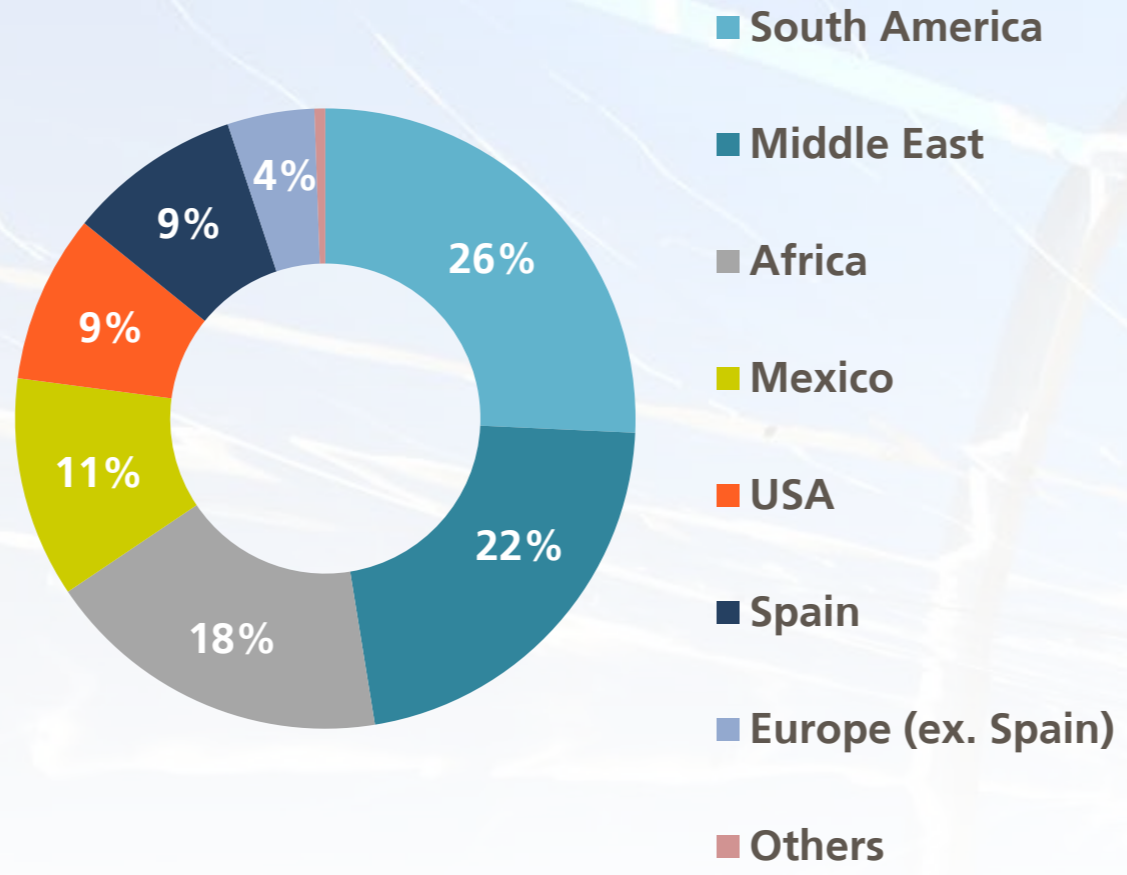


280 patents at the end of 2019.

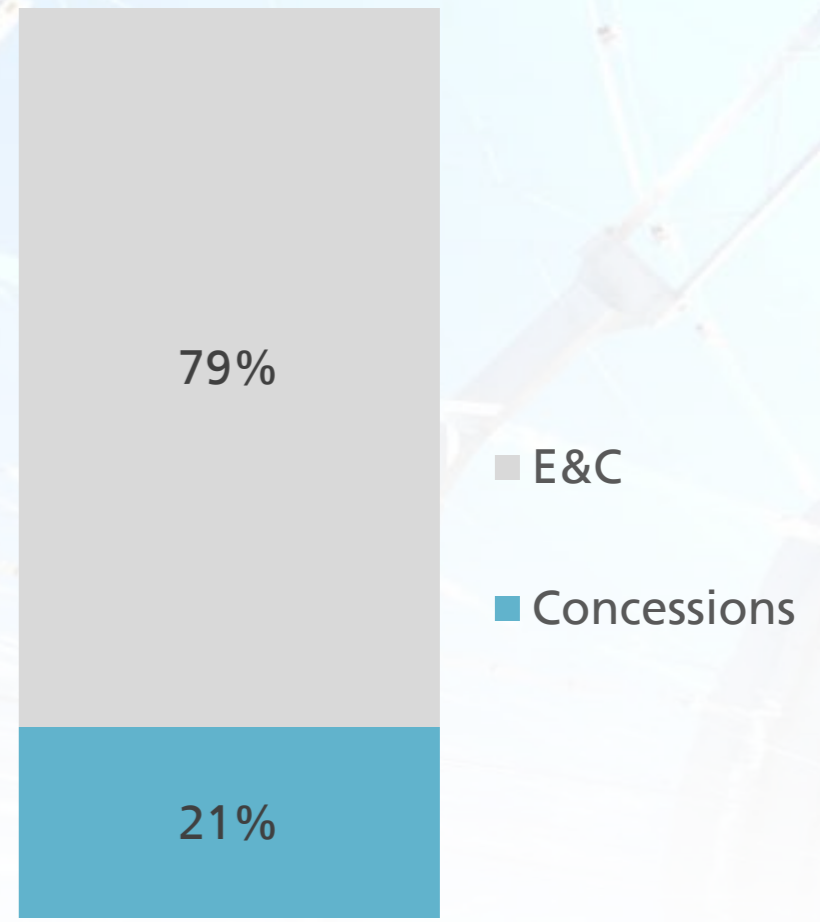
# Main indicators

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** Services

# Services



The vast experience (more than 18 years) and involvement in the **development, industrialization, operation and maintenance** stages, where we are global leaders in **solar thermal O&M**, allows Abengoa to have a large backlog and pipeline of products and services for different technologies. These optimize **energy and water** plant's operation and maintenance and therefore provides our clients with a high-quality service that results in high rates of availability and improved asset productivity.



Abengoa is a benchmark in the O&M of **solar plants** of which it has a commercial experience of 1,231 MW, of all commercial technologies (photovoltaic, solar thermal, hybrid with conventional cycles).



It operates **desalination plants** all over the world. Currently, it supplies O&M in seven plants, located in Spain, Algeria, India and Ghana.



Abengoa currently operates more than 850 MW in **cogeneration** and **conventional plants**, being a pioneer in the O&M of hybrid solar-gas plants.

Tailores services to meet **your needs**

## O&M

### Adapting our Services to your Requirements

Operation, Routine Maintenance, Preventive Maintenance, Scheduled Maintenance, Condition Based Maintenance, Legal Technical Maintenance, Corrective Maintenance, O&M Consulting Service, **Integral Operation Service**.

### Diferent Concept of the O&M Risk

Abengoa O&M shares with its customer the risk of the O&M power facilities thanks the large experiences in the operation and maintenance business. We can adapt any O&M Contract to the risk profile of each customer.

## Shared Risk

Our goals, as operator, are in the same way of the goals of our customer:

- Optimizing the OPEX.
- Maximizing **availability** of the facility.
- Improving **eficiency** of the facility.
- Diferente kinds of contracts.

### Additional Services development by Abengoa O&M

Abengoa O&M can implement for its customer condition based maintenance using predictive technologies such as thermographic, ultrasound, vibration and electrical quality in a unique platform. Submitting technical report such as health of the asset in order to reduce the O&M cost and to extend the life of the asset in any power facility.

Abengoa O&M can supply and implement to its customer the following services:

1 CMMS Maximo IBM  
Engineering O&M

2 Optimization of the solar field CSP  
Support the mobilization O&M period

## Additional Services

# Main magnitudes

**1.2 GW**

Solar Energy



**842 MW**

Conventional Energy



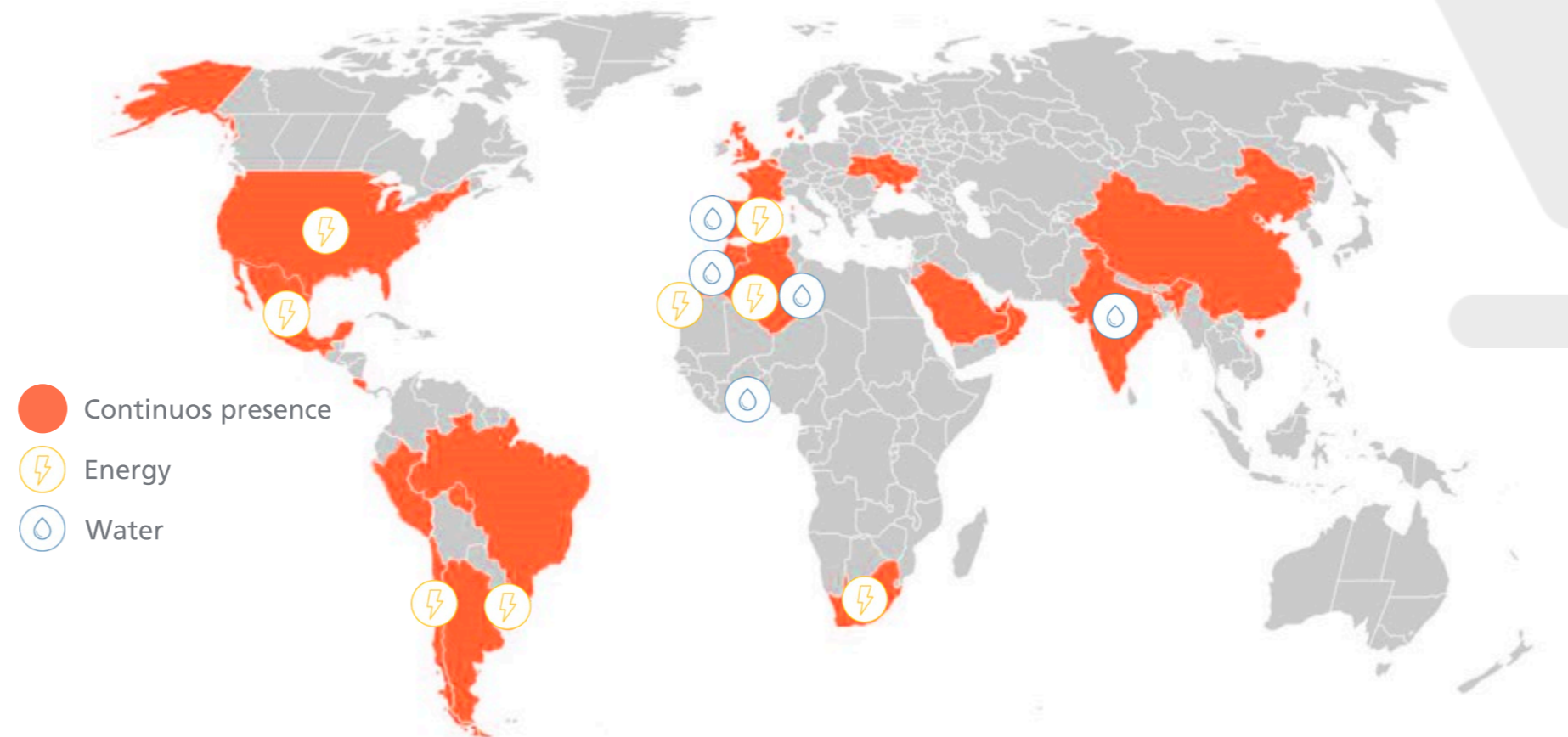
**190 MW**

Wind Energy



**1.05 M m<sup>3</sup>/d**

Desalination





Products &  
**3** References



**3.1** Conventional Power

# Conventional Power

## Ain Beni Mathar

Integrated Solar & Combined Cycle Morocco



### Project Data

- Client: **ONEE (Office Nationale d'Electricité et de l'Eau potable)**
- Power: **472 MW**
- Solar Collector Area: **183,120 m<sup>2</sup>**
- Commissioning year: **2010**

### Project Description

2+2+1 Combined Cycle.  
2x150 MW Gas Turbines.  
2 post-combustion HRSG.  
1x180 Steam Turbine.  
**Solar parabolic trough with 20 MW of total power which covers 5 % of the energy generated.**

## Hassi R'Mel

Integrated Solar & Combined Cycle Algeria



### Project Data

- Client: **SPP1**
- Owner: **Abener Abengoa Solar, Neal**
- Power: **150 MW**
- Solar Collector Area: **183,120 m<sup>2</sup>**
- Commissioning year: **2011**

### Project Description

2+2+1 Combined Cycle.  
2x40 MW Gas Turbines.  
2 post-combustion HRSG.  
1x 80 Steam Turbine.  
**Solar Parabolic Trough with 20 MW of total power, which covers 5 % of the energy generated.**

## Cogeneracion Villaricos

Engine Cogeneration Spain



### Project Data

- Client: **DSM Deretil**
- Power: **21.7 MW**
- Technology: **Engines**
- Start Year: **1999**
- Operation: **2009-2019**

### Project Description

2x10,5 MW Diesel engines.

Cogeneration plant that uses exhaust gases from diesel turbogroups (two fuel engines of 10.350 kW each) to generate superheated steam in a heat recovery boiler to transfer it to the host plant and generating electricity for sale to the grid. Demineralized water is also produced with distillation plant that uses the heat produced in the engines cooling.

## Abent 3T

High Efficiency Cogeneration Plant Mexico



### Project Data

- Client: **Off takers**
- Power: **210 MW**
- Technology: **Combine Cycle**
- Start Year: **2019**

### Project Description

1+1+1 Combined Cycle.  
1x150 MW Gas Turbines.  
1 post-combustion HRSG.  
1x 60 Steam Turbine.

The plant, located in Tabasco (Mexico) consists in a combined cycle with high efficiency cogeneration for a GE 7FA05 gas turbine, a steam turbine and one heat recovery boiler. On top of the sales of power to off-takers, it will supply steam to Pemex through a CNP, as a support to the system





## 3.2 Solar Power

# Solar Power

## Solana

280 MW parabolic trough plant with six hours of storage in the USA



### Project Data

- Client: **Atlantica Yield**
- Ownership: **Atlantica Yield and Liberty Interactive Corporation**
- Power: **280 MW**
- Solar Collector Area: **2,233,958 m<sup>2</sup>**
- Commissioning Year: **2013**
- Operation: **2013 - 2019**

### Project Description

Largest solar thermal plant in the world when it was built.

## Shams

100 MW parabolic trough power plant in the UAE



### Project Data

- Client: **Shams Power Company**
- Ownership: **Masdar and Total**
- Partners: **Total, Masdar**
- Power: **100 MW**
- Solar Collector Area: **600,000 m<sup>2</sup>**
- Commissioning Year: **2013**
- End Year: **2016**

### Project Description

First solar thermal plant in the Arabian Peninsula. Operated in partnership with Total and Masdar.

## Solucar CSP

Solar complex in Spain, with 3x50 MW parabolic trough power plants



### Project Data

- Client: **Atlantica Yield**
- Ownership: **Atlantica Yield**
- Power: **150 MW**
- Commissioning Year: **2006**

### Project Description

One of the largest solar complex in Europe.

## Mojave

Parabolic trough solar power plant in Mojave Desert in the USA



### Project Data

- Client: **Atlantica Yield and Liberty Interactive Corporation**
- Power: **280 MW**
- Solar Collector Area: **1,559,347 m<sup>2</sup>**
- Commissioning Year: **2015**
- Operation: **2013 - 2019**

### Project Description

Solar power thermal plant of 280 MW located in the desert of Mojave, California.

## PS10

### 10 MW Solar Thermal Tower Plant Spain



#### Project Data

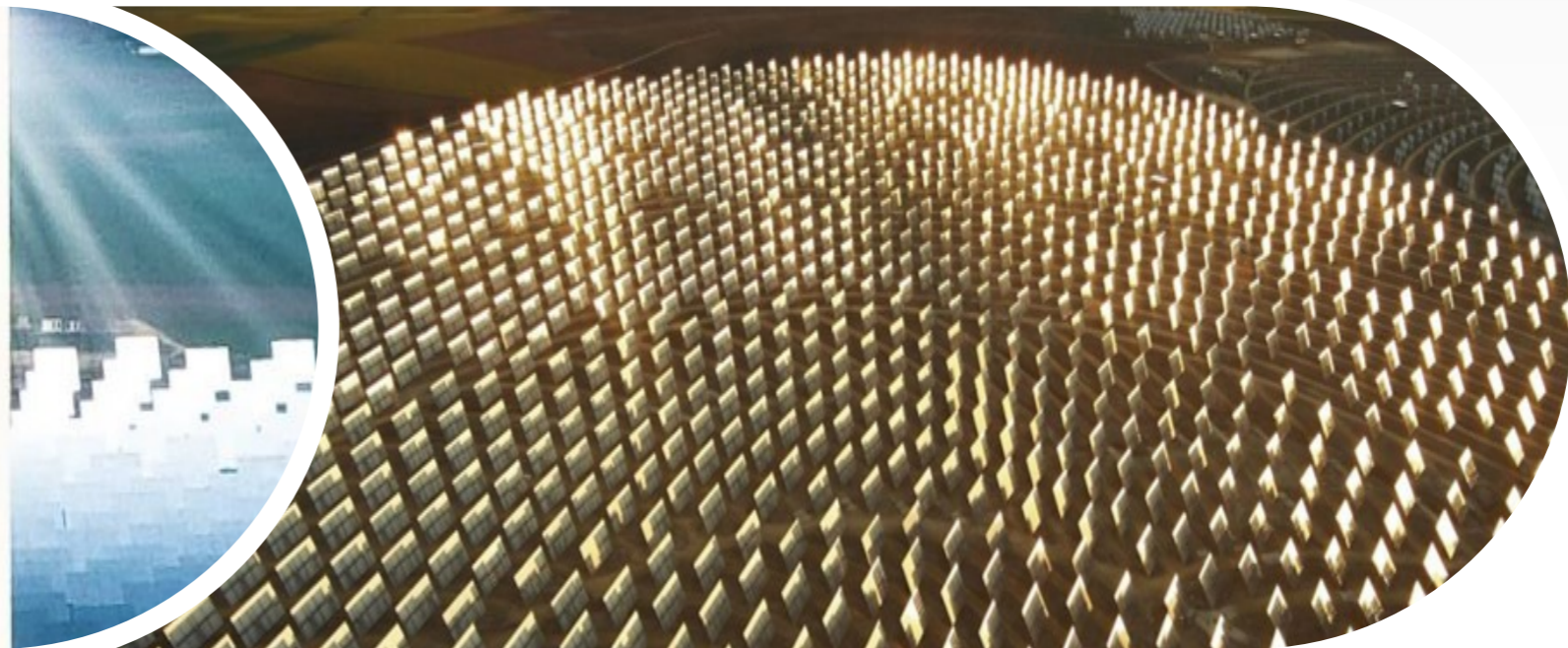
- Client: **Atlantica Yield**
- Power: **11 MW**
- Reflective surface: **60 Has**
- Commissioning: **2007**

#### Project Description

Tower high: **110 m**  
Heliostats: **624**  
**First commercial solar tower power plant in the world**

## PS20

### 20 MW Solar Thermal Tower Plant Spain



#### Project Data

- Client: **Atlantica Yield**
- Power: **20 MW**
- Reflective Surface: **80 Has**
- Commissioning: **2009**

#### Project Description

Tower high: **165 m**  
Heliostats: **1,255**  
**Highest concentration tower in the world in the commissioning date**

# Solar Power

## Solaben

Solar thermal plants in Extremadura, Spain



### Project Data

- Client: **Atlantica Yield**
- Power: **200 MW**
- Commissioning Year: **2012**

### Project Description

4 x 50 MW parabolic trough in Extremadura, Spain.

## Helioenergy

Solar thermal plants in Sevilla, Spain



### Project Data

- Client: **Atlantica Yield**
- Power: **100 MW**
- Commissioning Year: **2012**

### Project Description

2 x 50 MW parabolic trough in Sevilla, Spain

## Solacor

Solar thermal plants in Córdoba, Spain



### Project Data

- Client: **Atlantica Yield**
- Power: **100 MW**
- Commissioning Year: **2012**

### Project Description

2 x 50 MW parabolic trough in Córdoba, Spain

## Helios

Solar thermal plants in Ciudad Real, Spain



### Project Data

- Client: **Atlantica Yield**
- Power: **100 MW**
- Commissioning Year: **2012**

### Project Description

2 x 50 MW parabolic trough in Ciudad Real, Spain

## Puertollano

Solar thermal plant in Puertollano, Spain



### Project Data

- Client: **Ence Energía Puertollano**
- Power: **50 MW**
- Start of operation: **2020**

### Project Description

50 MW parabolic trough in Puertollano, Spain.

# Solar Power

## Kaxu Solar One

Parabolic trough solar thermal plant with 100 MW power 2,5 hours of storage capacity in South Africa.



### Project Data

- Client: **Kaxu Solar One**
- Power: **100 MW**
- Commissioning: **2015**

### Project Description

First solar thermal plant in South Africa

## Khi Solar One

Parabolic trough solar thermal plant with 50 MW power 2 hours of storage capacity in South Africa.



### Project Data

- Client: **Abengoa Solar, IDC & Khi Community Trust**
- Power: **50 MW**
- Reflective surface: **58 Has**
- Commissioning: **2018**

### Project Description

First solar thermal tower plant in South Africa and first tower solar thermal plant operating continuously 24 hours.

## Xina Solar One

Parabolic trough plant with 100 MW power and 5,5 h of storage in South Africa.



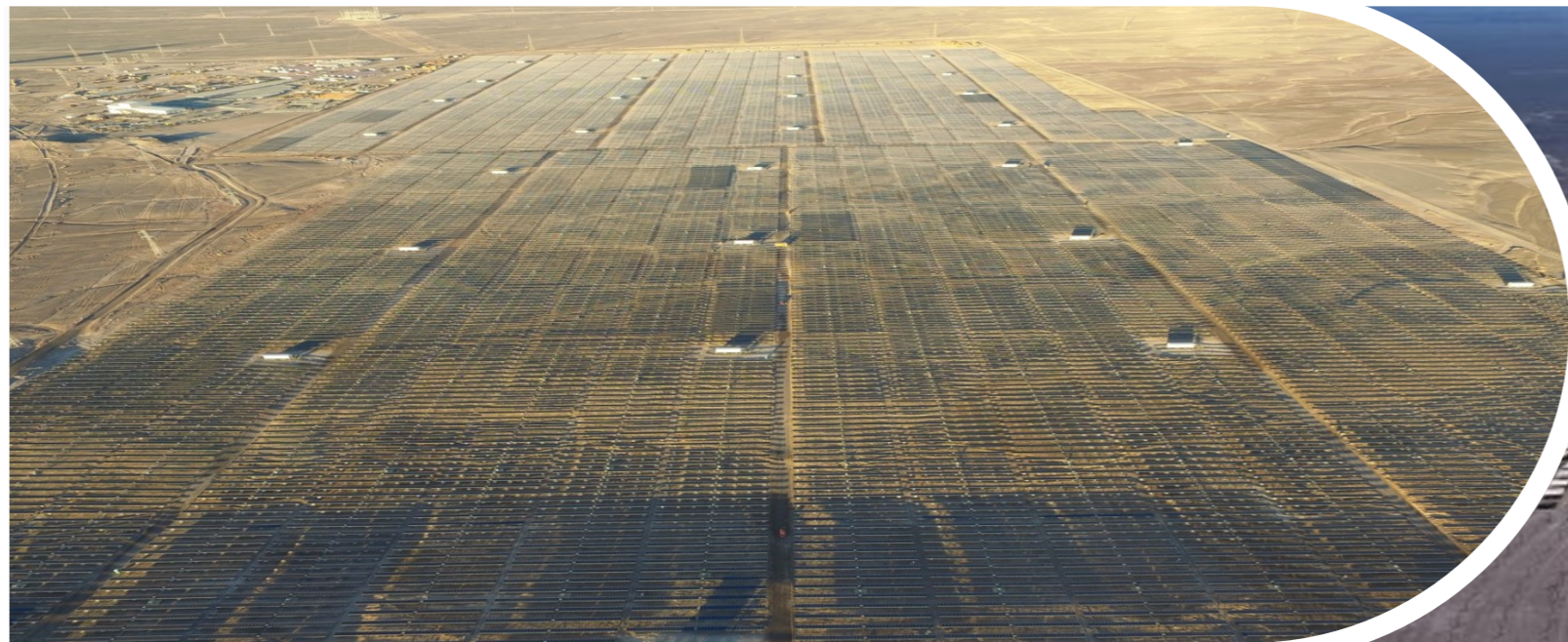
### Project Data

- Client: **Kina Solar One**
- Power: **100 MW**
- Commissioning: **2017**

### Project Description

Third thermal plant built by Abengoa in South Africa. Storage capacity of 5,5 hours.

## Cerro Dominador PV PV Plant Chile



### Project Data

- Client: **Cerro Dominador PV**
- Power: **100 MW**
- Reflective surface: **147 Has**
- Commissioning: **2017**

### Project Description

129,36 MWp  
CTs 1MW AC  
392,000 pv modules 330wp

## Cerro Dominador CSP 1 CSP Plant Chile



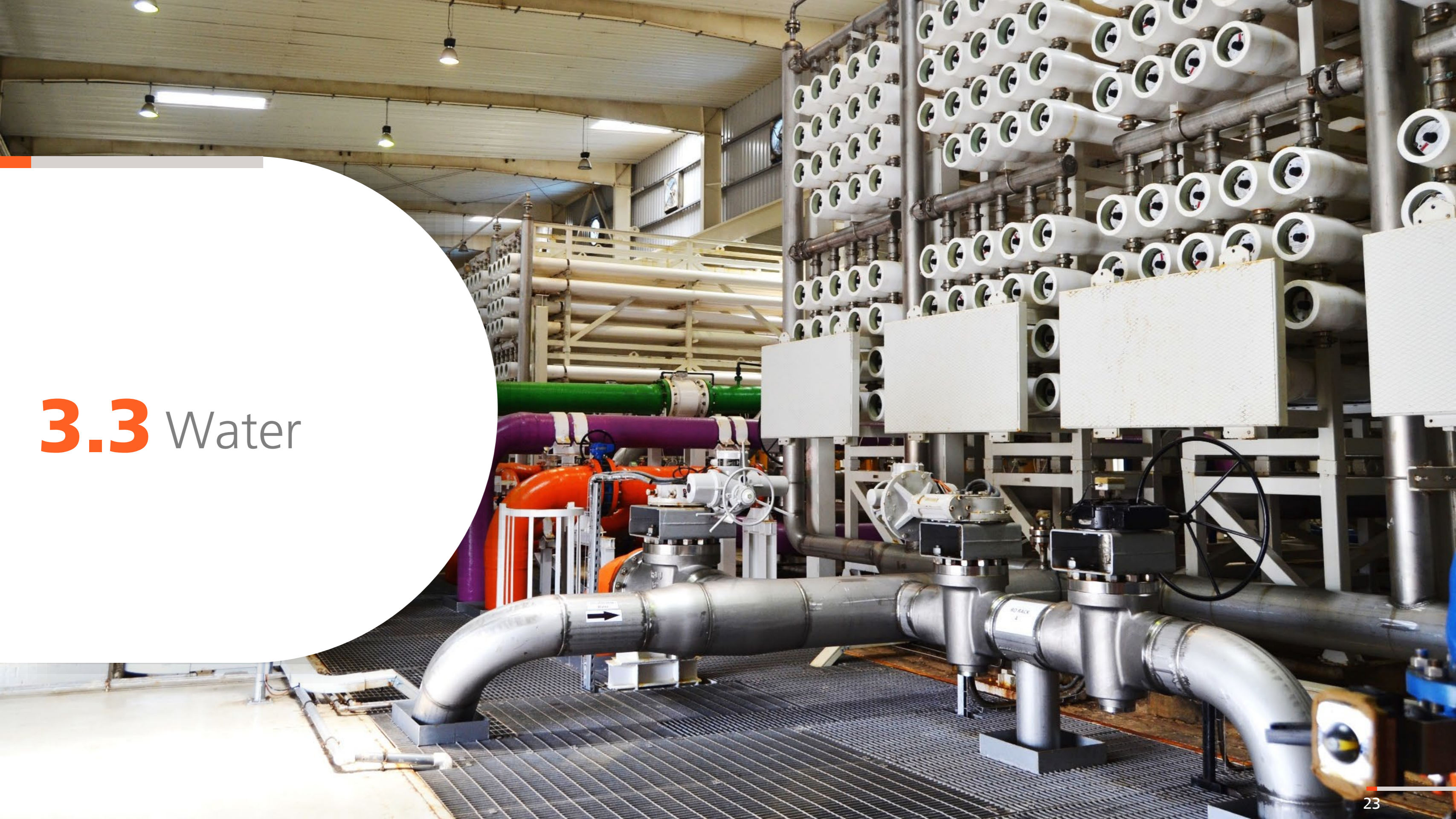
### Project Data

- Client: **Cerro Dominador CSP**
- Power: **110 MW**
- Reflective surface: **148 Has**
- Commissioning: **2020**

### Project Description

Concentration tower: 250 m  
Heliostats: 11,000  
**Thermal Solar Central Tower Receiver (CTR) Plant of 110 MW power with 17.5 hours of storage capacity.**

# 3.3 Water



## Honaine

Desalination plant in the city of Honaine Algeria



### Project Data

- Client: **Sonatrach & Algerienne des Eaux**
- Capacity: **200,000 m<sup>3</sup>/d**
- Commissioning: **2011**

### Project Description

Sea Water Reverse Osmosis technology plant with coagulation-flocculation and sand filter pretreatment. The plant has capacity to supply water to nearly one million people.

## Chennai

Desalination plant in the city of Chennai India



### Project Data

- Client: **Chennai Metropolitan Water Supply and Sewerage Board**
- Capacity: **100,000 m<sup>3</sup>/d**
- Commissioning: **2010**
- Operation: **2010 – 2019**

### Project Description

Sea Water Reverse Osmosis technology plant through membranes with flocculation pretreatment lamellar decanters, filtration and chemical treatment. The post treatment process includes remineralization and an energy recovery system.



# Water

## Skikda

This desalination plant produces drinking water to supply the city of Skikda Algeria

## Ténès

This desalination plant produces potable water in order to meet the water needs in this area Algeria

## Accra

This plant produces drinking water to supply various locations around the metropolitan area of Accra Ghana



### Project Data

- Client: **Algerian Energy Company (AEC)**
- Capacity: **100,000 m<sup>3</sup>/d**
- Commissioning: **2009**

### Project Description

Sea Water Reverse Osmosis technology plant with coagulation-flocculation and sand filter pretreatment.

### Project Data

- Client: **Sonatrach & Algérien des Eaux**
- Capacity: **200,000 m<sup>3</sup>/d**
- Commissioning: **2015**

### Project Description

Sea Water Reverse Osmosis Technology plant with coagulation-flocculation and Open Filters Cartridge pretreatment.

### Project Data

- Client: **Ghana Water Company Ltd.**
- Capacity: **60.000 m<sup>3</sup>/d**
- Commissioning: **2015**

### Project Description

Sea Water Reverse Osmosis technology plant that employs four reverse osmosis racks with pretreatment consisting on hypochlorite disinfection, coagulation with Cl<sub>3</sub>Fe, filters in the self-cleaning system, and UF I MF. The post treatment consists on calcite and H<sub>2</sub>SO<sub>4</sub> with subsequent hypochlorite testing and brine output.

# Water

## Almería

Desalination plant that produces drinkable water for the city of Almería Spain

## Cartagena

Desalination plant that produces drinkable water for the city of Cartagena Spain

## Agadir

Desalination plant which produces drinking water for human consumption and irrigation in Agadir Morocco



### Project Data

- Client: **Ayuntamiento de Almería**
- Capacity: **50,000 m<sup>3</sup>/d**
- Commissioning: **2009**

### Project Description

Desalination plant comprised by coagulation by ferric chloride technology, sand filters, and sulfuric acid addition. In order to adjust the pH level, dispersion agents are added. Microfiltration cartridges and sodium bisulfite supplements are also employed.

### Project Data

- Client: **Ministerio de Medio Ambiente**
- Capacity: **65,000 m<sup>3</sup>/d**
- Commissioning: **2009**

### Project Description

Desalination plant comprised by coagulation by ferric chloride technology, sand filters, and sulfuric acid addition. In order to adjust the pH level, dispersion agents are added. Microfiltration cartridges and sodium bisulfite supplements are also employed.

### Project Data

- Client: **Onee & Ministry of Agriculture, Fisheries, Rural Development, Water and Forests**
- Capacity: **275,000 m<sup>3</sup>/d**
- Commissioning: **2021**

### Project Description

Reverse osmosis desalination plant technology. Process line includes pretreatment with chemical adjustment, filtration and ultrafiltration, eleven reverse osmosis racks with energy recovery and remineralization with CO<sub>2</sub> and calcite beds as post-treatment.



# ABENGOA

Innovative Technology Solutions  
for **Sustainability**

Thank you. ■