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Innovative Technology Solutions for Sustainability

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# Mexico: 260 B$ Investment Plan

Completing Transformation

9th Annual Analyst and Investor Day

**Marcos Ramirez**

Chairman Abengoa Mexico

New York City & London, April 7 & 9, 2015

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# Forward-looking Statement

- This presentation contains forward-looking statements (within the meaning of the U.S. Private Securities Litigation Reform Act of 1995) and information relating to Abengoa that are based on the beliefs of its management as well as assumptions made and information currently available to Abengoa.
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1

# Mexican market outlook

# Business opportunities as of 260 US$bn for Abengoa

PEMEX

- + 4.5 GW — 10 Cogener. plants
- + 60 — Industr. Plants for PR
- + 10,000 km — Gas pipelines

CFE — COMISIÓN FEDERAL DE ELECTRICIDAD

- + 42.5 GW — CC, WP, SP, TE, ..
- + 21,000 km — PT with 69-400 kV

| | |
|---|---|
| Energy generation - 2026 | 60 US$bn |
| Industrial plants - 2026 | 60 US$bn |
| Power transmissions & Substations - 2026 | 38 US$bn |
| Gas and refined products pipelines, Gas Processing & Storage - 2018 | 23 US$bn |

CONAGUA — COMISIÓN NACIONAL DEL AGUA

| | |
|---|---|
| Clean Water | 23 US$bn |
| Irrigation | 7 US$bn |
| Telecom | 42 US$bn |
| Railways | 5 US$bn |
| PPP Buildings | 2 US$bn |

# Mexico's energy infrastrucuture requires the full involvement of companies such as Abengoa

## Large Power generation plants

- ✓ **CC** Noreste (1 GW)
- ✓ **CC** Topolobampo II (820 MW)
- ✓ **CC** Empalme I y II (1,430 MW)
- ✓ **Cogeneración** de Pemex: Salina Cruz (690 MW), Minatitlán (690 MW), Cangrejera (135 MW), Morelos (135 MW)

## Large T&D projects

- ✓ Fase 1 y 2 de LT 2nda TA y Sureste III, IV y V (1,165 km)
- ✓ LT RTA al CC Empalme (454 km)
- ✓ LT Huasteca-Monterrey (422 km)

## Gas and refined products Pipelines, Processing & Storage

- ✓ **CFE and Cenagas gas pipelines:** Submarino, Tuxpan-Tula, La Laguna-Centro
- ✓ Propane, Naphtha and NG in Trans-Isthmus pipelines project

## Public-Private partnerships available with Pemex and CFE

- ✓ Large Power generation plants (+40 GW)
- ✓ Large Power transmission lines (21,000 km)

2

# Abengoa's positioning

# Growth, diferenciation and value creation through an outstanding realization in complex projects and technology leadership

| | Project Developer | Capacity in Mexico |
|---|---|---|
| 1 | Iberdrola | 3,972 MW |
| 2 | Mistui | 2,470 MW |
| 3 | Gas Natural | 2,300 MW |
| ✓ 4 | Abengoa | 2,025 MW |
| 5 | Intergen | 1,225 MW |

**Abengoa is leader in power transmission lines and distribution projects with over 7,000 km in reference**

## Strong Backlog, technological development and high quality work realization

| Backlog | Pipeline |
|---|---|
| **2 BUSD** | **131 BUSD** |
| Turnkey Projects and Convencional EPC Products | Growth Pipeline |

Exchange rate USD/MXN 14.34

# Strong Project References in Mexico

1,150 employees of Abengoa companies in Mexico, within 13 subsidiaries

34 -year active participation in Mexican energy & Infras market


| | |
|---|---|
| **Conventional energy** | 9 projects / **3.9 GW** (1.6 GW under development) |
| **Renewable energy** | 5 projects / **532 MW** (230 MW under development) |
| **Industrial plants** | **11 projects with Pemex** (PR, PGPB, PEP): Sistemas y Mantenimiento de los CPG de Nuevo Pemex, Ciudad Pemex, Beristain, Refineria Madero |
| **Power Transmissions - Substations** | **6,478 km of LT** from 13.8 kV until 400 kV<br>**4,717 MVA - 834 MVAr's** – 309 feeders of SE |
| **PPP Buildings – O&M** | Project of **Centro Cultural Mexiquense Bicentenario** |
| **Water** | Concession of **Zapotillo** aqueduct |

# We currently have 6 assets in operation and under construction

**Cogeneration plant ACT - Nuevo Pemex**

Power Generation – 300 MW

Investment: US$ 640 Mn
Concession: 20 years

PEMEX

CFE
COMISIÓN FEDERAL DE ELECTRICIDAD

**North III Combined Cycle**

Power Generation – 925 MW

Investment: US$ 1,550 Mn
Concession: 25 years

**Power Generation Complex of Abengoa in Tabasco**

**Efficient Cogeneration Plant** A3T with **230 MW** capacity.

**Combined Cycle** ACC4T, with **680 MW** capacity.

Investment: US$ 1,825 Mn
Concession: 20 years

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**Zapotillo Aqueduct**

-Water Distribution-

Investment: US$ 566 Mn
Concession: 25 years

CONAGUA
COMISIÓN NACIONAL DEL AGUA

GOBIERNO DEL ESTADO DE MÉXICO

**Centro Cultural Mexiquense Bicentenario**

-Building Operation-

Investment: US$ 65 Mn
Concession: 21 years

# A broad range of capabilities that add value to our customers

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- **Financial capacities**: long term agreements with International banks and investment capacity
- Company with **International references** in its respective business areas
- **Proven track record in a wide range of sectors** : development, design, Construction and operation
- Close **relationships with Mexican** institutions such as Pemex, CFE, SENER and CRE
- **Land rights** negotiations, approval of construction and **environmental licenses**
- **Execution capabilities all across Mexico** with special concern for safety
- **Proven development** capabilities in **Public-Private concession** model

3

# Main takeaways

1. In the previous years, Abengoa has been performing the restructuration necessary for preparing and triumphing in the MeMo

2. Abengoa has proven the Mexican industry that it offers reliability in projects development and its investment ambitions in Mexico

3. Considering a conservative 4% market share for Abengoa in the market, the upcoming booking would reach +10 US$bn by 2026

4. Several sectors are still under regulatory framework definition which slows down the development of projects under the new regime

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Thank you

April 7 & 9, 2015

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## "Chile, changing the energy matrix"

Completing Transformation

9th Annual Analyst and Investor Day

**Ivan Araneda**

General Manager Abengoa Chile

New York City & London, April 7 & 9, 2015

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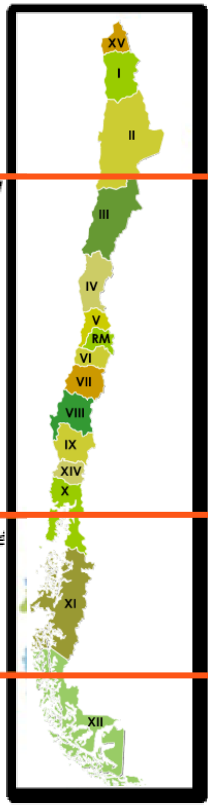
# The Chilean electric market

# Chilean electricity systems as of December 2014

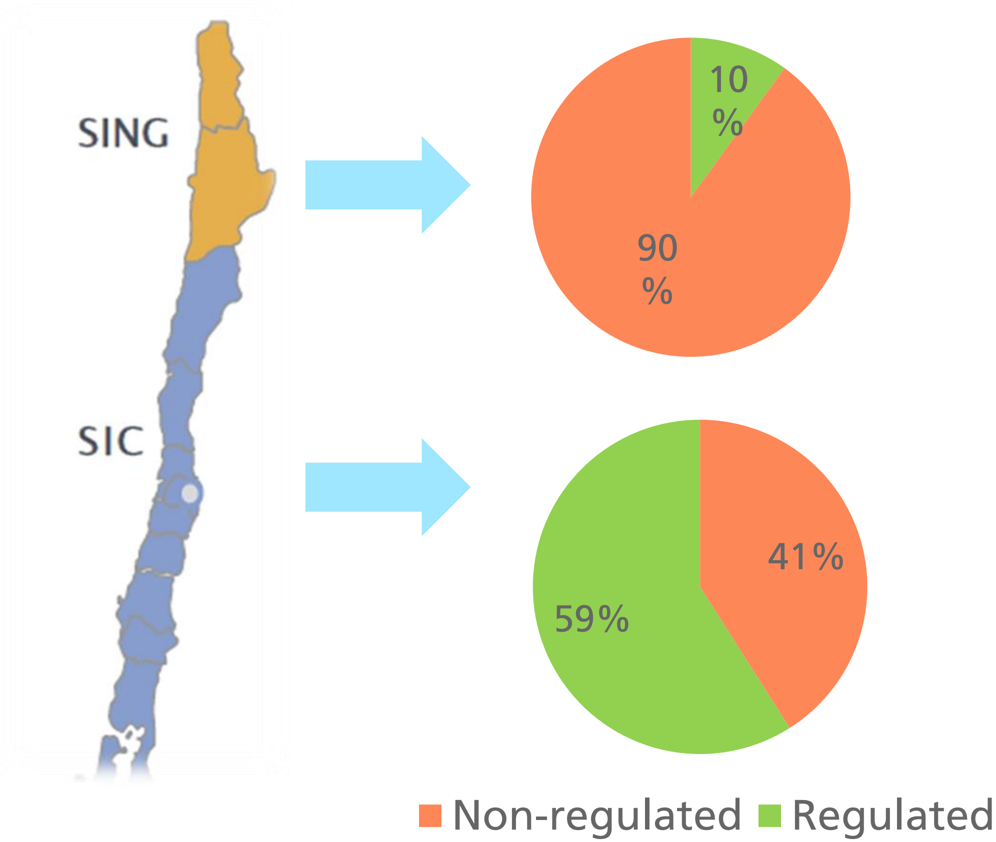



| System | Regions | Gross Capacity (MW) | Electricity Generation (GWh) | Maximum demand (MW) | Population (%) |
|---|---|---|---|---|---|
| **SING** *Sistema Interconectado Del Norte Grande* | Arica y Parinacota<br>Tarapacá<br>Antofagasta | 4,255<br>21.8% | 17,688<br>25.2% | 2,372 | 5,7% |
| **SIC** *Sistema Interconectado Central* | Atacama<br>Coquimbo<br>Valparaiso<br>Región Metropolit<br>Lib. Gral. Bdo. O'h<br>Bío-Bío<br>Araucanía<br>Los Ríos<br>Los Lagos | 15,085<br>77.4% | 52,207<br>74.3% | 7,547 | 92,6% |
| **SEA** *Sistema de Aysén* | Aysén | 50<br>0.3% | 136<br>0.2% | 22 | 0,6% |
| **SAM** *Sistema de Magallanes* | Magallanes | 100<br>0.5% | 239<br>0.3% | 42 | 1,1% |

Source: CDEC, 2015

# Chilean electric market

## Clients in the Chilean electric market

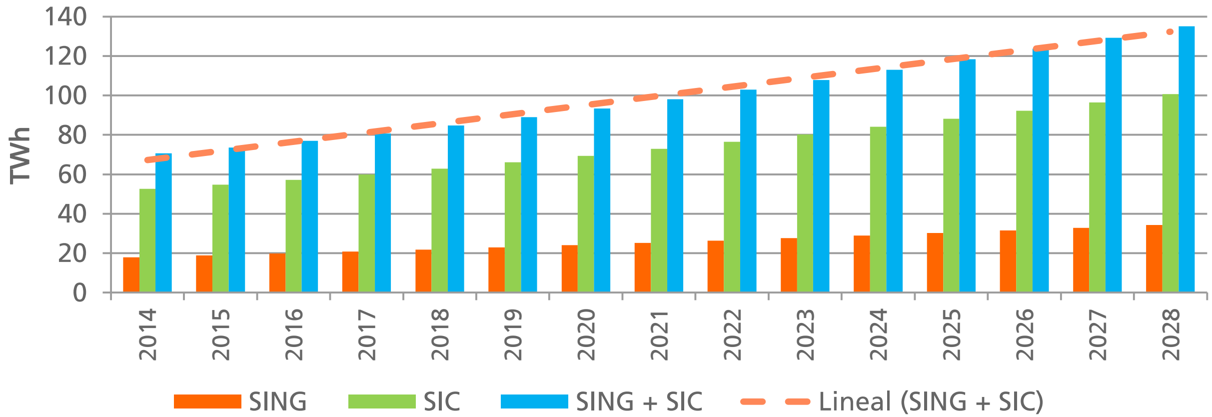



## Installed capacity and energy mix SING + SIC, as of December 2014

| Technology | Capacity (MW) | % |
|---|---|---|
| **Thermal** | **10,939** | **58,0%** |
| LNG | 3,988 | 21,2% |
| Coal | 3,541 | 18,8% |
| Diesel | 2,582 | 13,7% |
| Other Thermal | 828 | 4,4% |
| **Hydro** | **6,129** | **32,5%** |
| ROR | 2,096 | 11,1% |
| Dam | 4,034 | 21,4% |
| **NCRE** | **1,784** | **9,5%** |
| Wind | 829 | 4,4% |
| Biomass | 309 | 1,6% |
| Solar | 271 | 1,4% |
| Mini ROR Reservoir | 259 | 1,4% |
| Other NCRE | 116 | 0,6% |

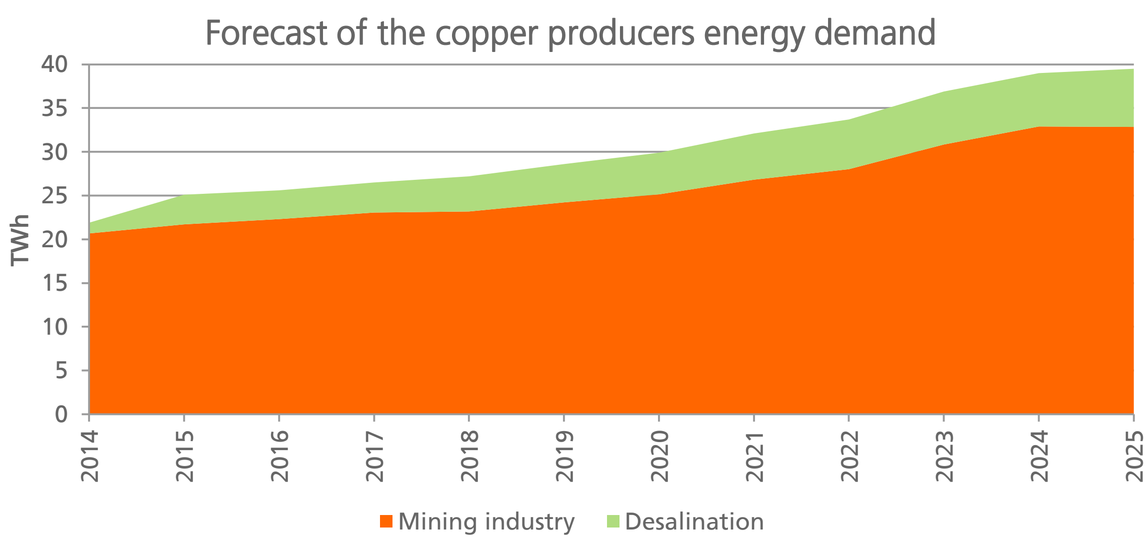
Source: CDEC, 2014

# Forecast of the demand, SIC and SING




The SING and the SIC will have an CAGR of 4.7%

The largest copper producers drive future energy demand




Source: CNE-Ministry of Energy, Cochilco-Ministry of Mining, 2014

# The government's energy agenda

| | |
|---|---|
| Promotion of NCRE | • Law 20,257, NCRE will represent 20% of the generation by the year 2025<br>• Tax carbon emissions |
| Innovation in energy | • Incentives in the research and development of renewable energy<br>• Corfo's bid including subsidiy and financial support |
| Increase competition between generators | • Transmission system strengthening<br>• New rules for electricity supply tenders (PPA), including renewables, in a bid to attract new investment from renewables developers |

"We aim to a safe, efficient, reasonably priced energy development, and to take advantage of our renewable resources in a sustainable and non-polluting environment."

Source: Ministry of Energy 2014

# Market size for solar development in the Atacama Desert

- The Atacama desert, the driest  in the world,is located in the north of Chile, covering the regions of Arica and Parinacota, Tarapacá, Antofagasta y northern Atacama.
- It covers an area of approximately 105,000 km², equivalent to 10,500,000 hectares (25,946,065 acres).
- Abengoa's 110 MW CSP plant  occupies 700 hectares.

**If we use onlye 1% of the Atacama Desert, we would have approximately 16.000 MW**

# CSP technology adds value to the Chilean electric market

| Market Challenges | CSP solutions |
|---|---|
| **Constant demand** that will **increase** in the following years. | Capacity to produce energy 24 / 7, and **always dispatched.** |
| Long term **price uncertainty** due to indexation to fuel prices. | Ability to structure **long term PPA with fixed prices** – Certainty for Offtakers. |
| Environmental **concerns**. | Solar clean energy in the location with the **highest solar resource in the world**. |
| Fuel **supply risk**. | Abundant natural **non-intermnitent** resource. |
| Progressive introduction of **intermittent facilities** (solar pv, wind). | Conventional dispatchability thanks to **energy storage** capacity. |
| Renewable energy regulatory **requirements.** | Renewable energy **attributes**. |

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# Status of current projects

# Strong backlog and pipeline of projects in Chile

| | Technology | Location | COD | MW | GWh/ year | Status |
|---|---|---|---|---|---|---|
| Atacama 1 | CSP | María Elena, Antofagasta | **2017** | 110 | 850 | Under Construction |
| | PV | María Elena, Antofagasta | **2017** | 100 | 300 | Under Construction |
| Atacama 2 | CSP | Sierra Gorda, Antofagasta | **2018** | 110 | 850 | Pre-Construction |
| | PV | Sierra Gorda, Antofagasta | **2018** | 100 | 300 | Pre-Construction |
| Future Projects | Atacama 3 | TBD | **2019e** | 300 | 2,320 | Pipeline |
| | Atacama 4 | TBD | **2020e** | 300 | 2,320 | Pipeline |

**Abengoa is undertaking the projects using its integrated technology, engineering & construction, and O&M capabilities worldwide.**

# Molten Salt Central Receiver Technology

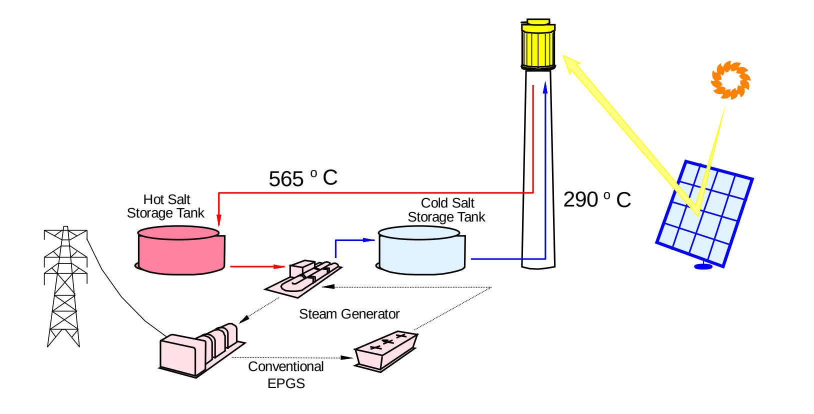
## Basic Operation of a Molten Salt Tower

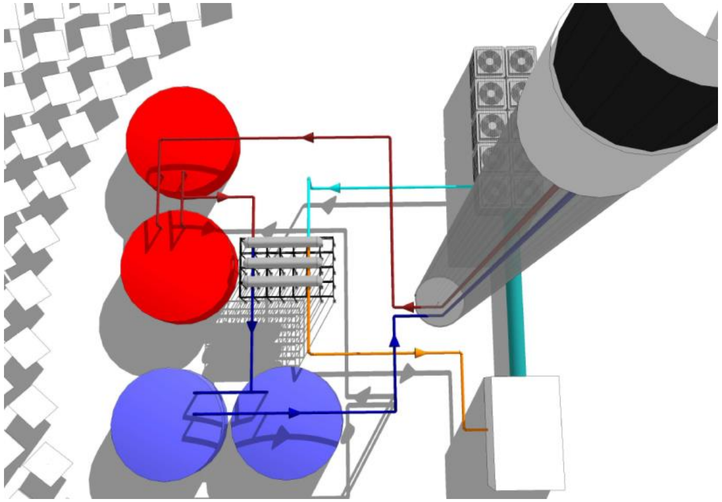
1. Cold Salt is pumped at 290ºC up to the solar receiver, previously preheated with the heliostat field.

2. Molten salts flow through the panels of the receiver, reaching 565ºC

3. Hot salt flows back down to the Steam Generation System through the hot salt storage tank.

4. The cold salts are directed back to the cold tank, while the superheated steam at 550ºC runs the steam turbine

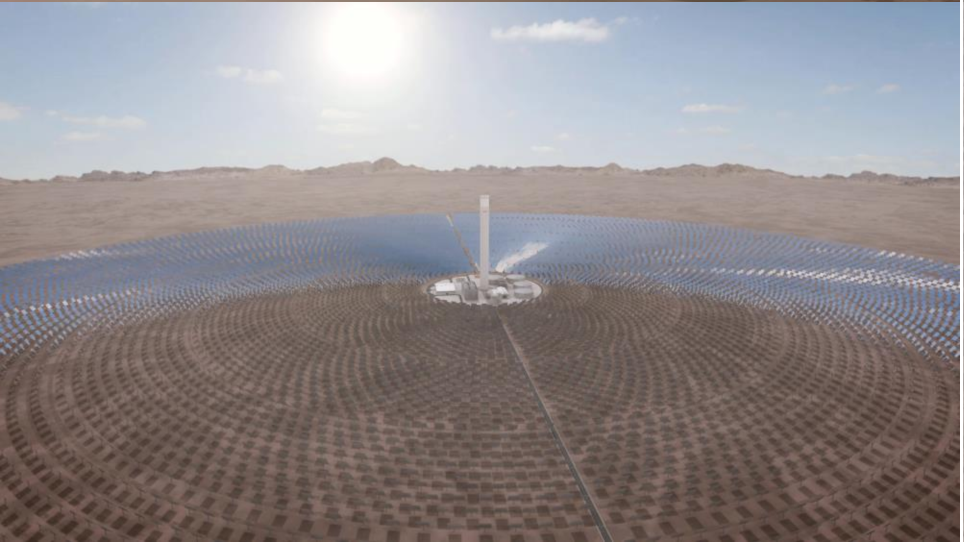


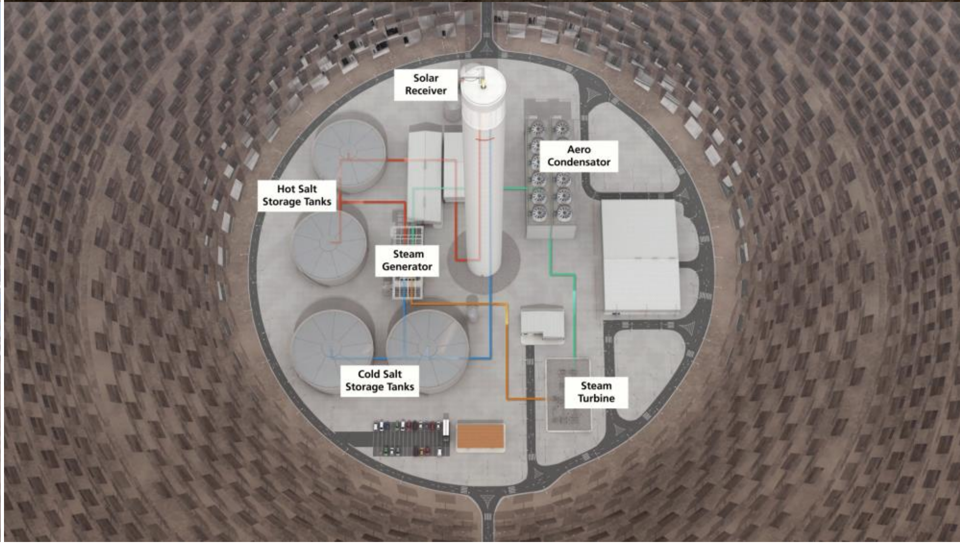



**Advantages:**

- Molten salt is heated up to 565ºC in the receiver at very low pressure
- The high temperature salt exchanges thermal energy with water and steam in a steam generator to produce superheated steam at 550ºC
- Possibility of storage, fully dispatchable power, capable for 24h operation

# Solar concentration design Atacama 1






Watch Video

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# Solar concentration Atacama 1 progress

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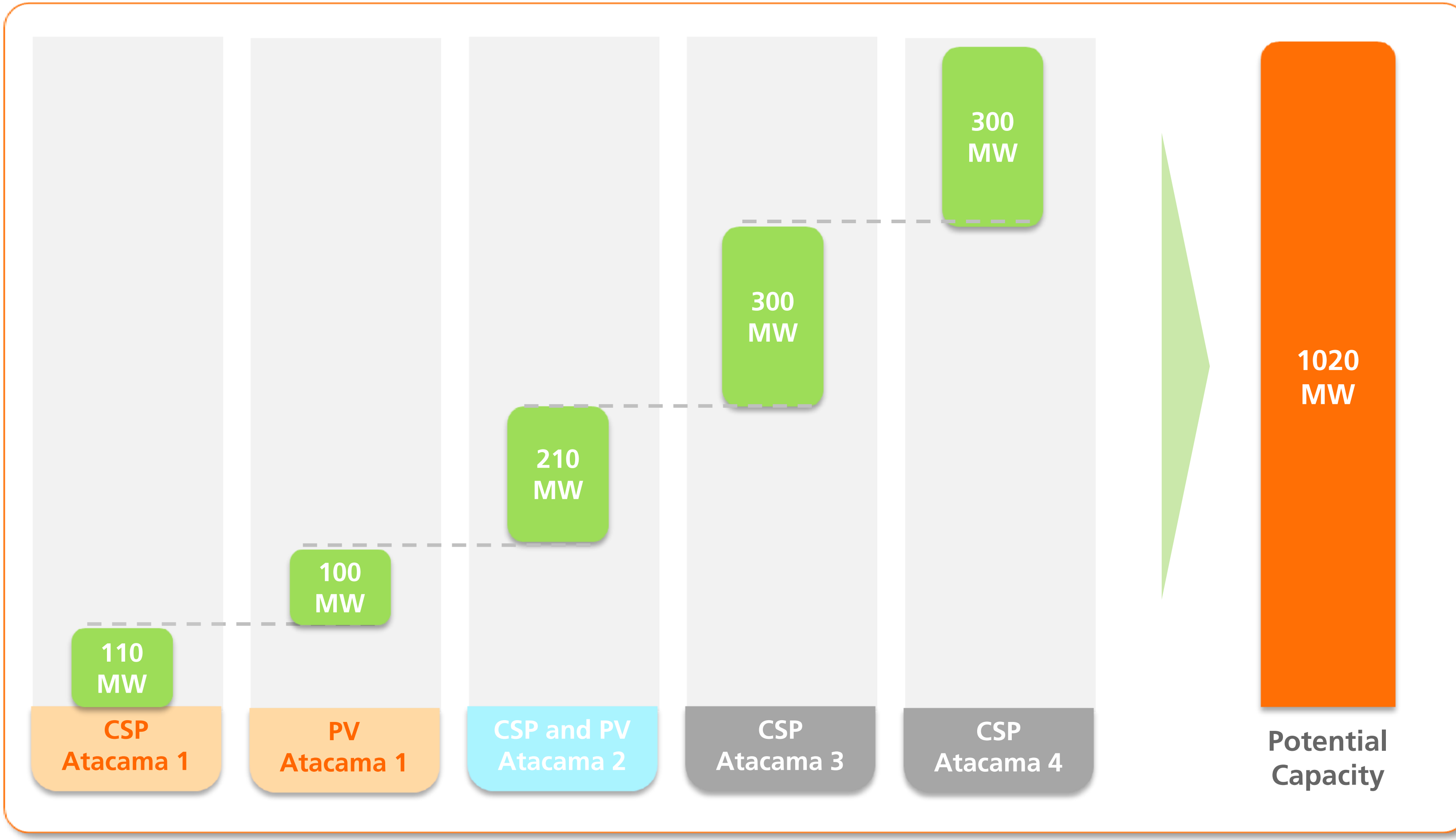
## 1st Heliostat

# Advantages of the CSP technology

- Capacity to poduce energy 24/7
- Ability to structure long term PPAs with fixed prices
- Clean energy generation in the region with the highest radiation in the world
- Non intermitent energy, siendo energia de base
- Dispatchability thanks to the storage capacity
- Renewable energy attribute
- Ability to generate energy in a hybrid way

**Considering the energy market situation in Chile, mining companies are finding CSP a very compelling proposition**

# CSP technology plans to be a major player in the market




With the current and future projects, Abengoa has a potential capacity of 1020MW and wil produce **7,400 GWh** per year, representing the **10.6%** of the generation in the Chilean electric market.

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# Main Takeaways

1. Abengoa’s CSP technology adds value to the Chilean electric market, by reducing dependency from fuel imports, diversifying energy matrix, and matching demand 24 hours.

2. Atacama CSP 1 Corfo awarding project validates and promotes Abengoa´s technology capabilities within Chilean market.

3. Abengoa’s technology proves to be competitive, securing PPAs with power distributors for 950 GWh per year for 15 years.

4. Abengoa’s technology has the capacity to expand and become a relevant player in the market.

IDB

The Atacama 1 STE plant awarded with the Climate and Environment Project of the Year - Infrastructure 360 Awards 2015 - by the Inter-American Development Bank (IDB) on March 27, 2015, for its commitment to the environment.

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## Thank you

April 7 & 9, 2015

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## Water: Large Growth Global Opportunities

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**Carlos Cosín**

Abengoa Water CEO


New York City & London, April 7 & 9, 2015

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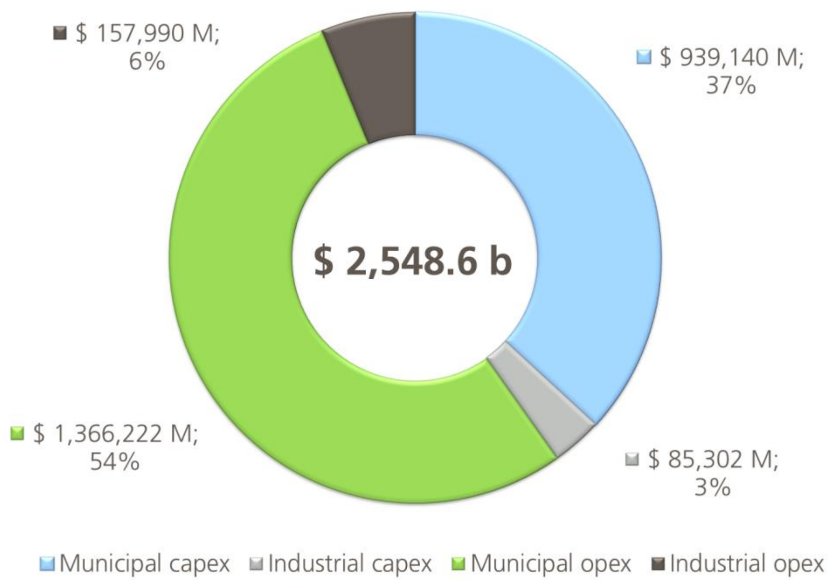
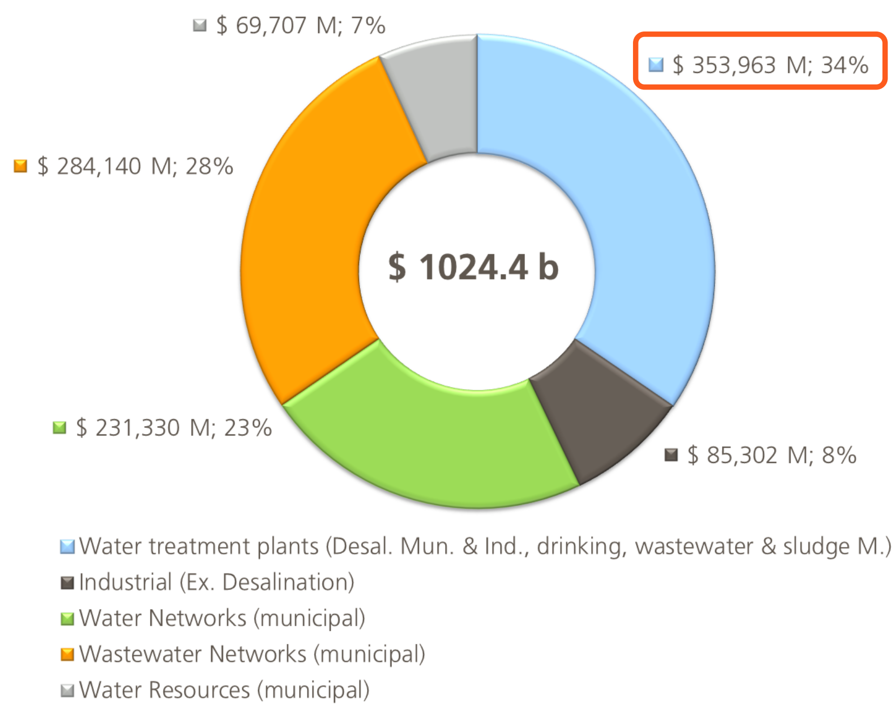
# The Water Market

# The water market (2015-2018)

## Cumulative global water market (2015-2018)



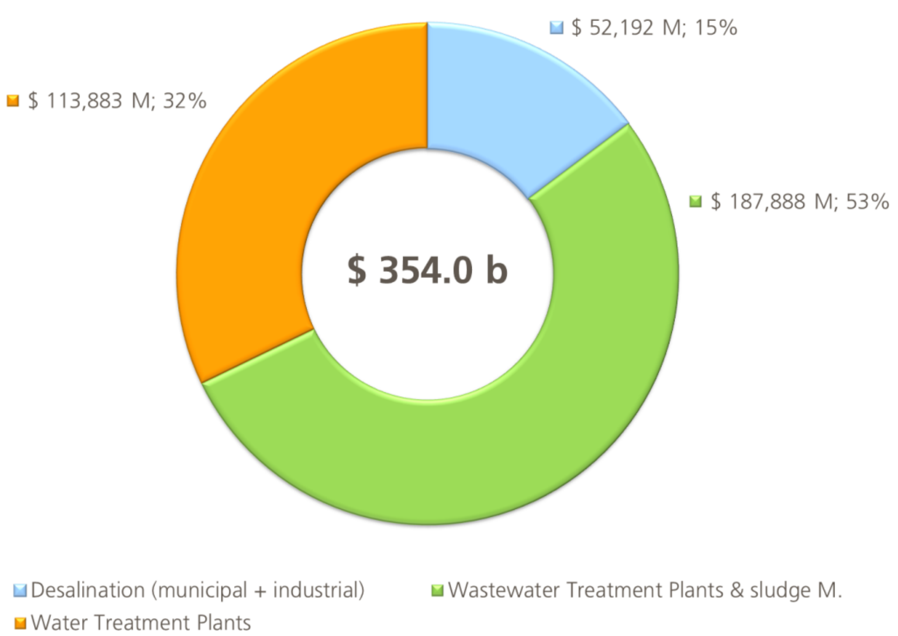

## Cumulative CAPEX water market (2015-2018)



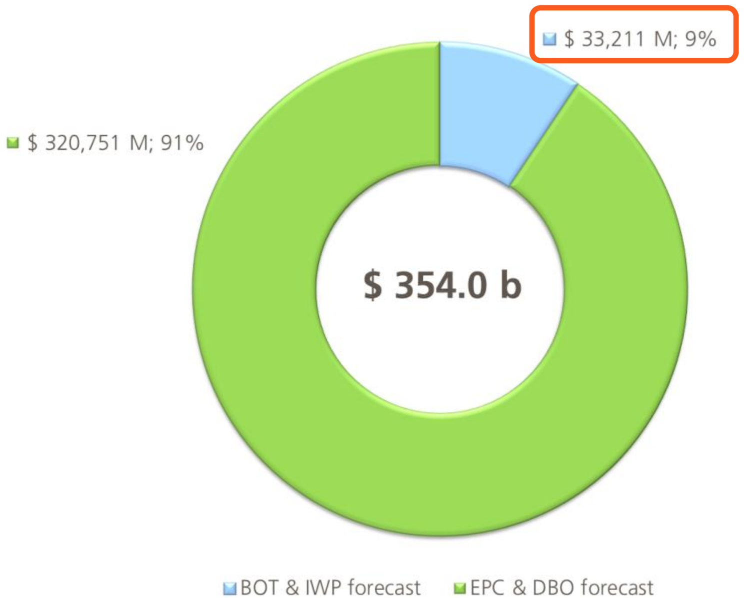

Source: own analysis, data obtained from Global Water Markets 2014 report

# The water market (2015-2018)

## Cumulative water treatment facilities CAPEX market (2015-2018)




## Cumulative water treatment facilities CAPEX market (2015-2018)




Source: own analysis, data obtained from Global Water Markets 2014 report

# Global water challenges

**Increasing water scarcity problems**

- Increasing water demand
- Uneven population distribution
- Climate change
- Rapidly growing cities

**Increasing water quality problems**

- The use of pesticides, fertilizers and chemicals in agriculture
- Over exploitation of underground water
- Emerging pollutants

Source: own analysis, data obtained from Global Water Markets 2014 report

2

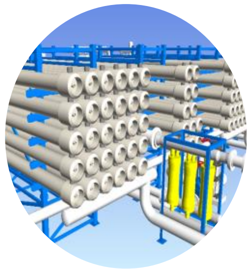
# Abengoa's value propositions

# Abengoa in the water market

**Abengoa in the water market is a technology-driven, global water company that provides integral solutions for municipal and industrial clients.**

- Abengoa develops **integral solutions** through combining its capacity for project finance, design, build and operation & maintenance.
- Abengoa offers **turnkey projects** leveraging its know-how, experience, and technology
- Abengoa provides **services of operation & maintenance** for municipal & industrial clients

R & D → Development → Finance → Design → Procurement → Construction → O & M → Technical Consulting



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# Abengoa’s markets

## Municipal water


Desalination


Water treatment


Wastewater treatment


Reuse

## Industrial water


Power


Refining


Mining


Oil & gas

# Abengoa's solutions

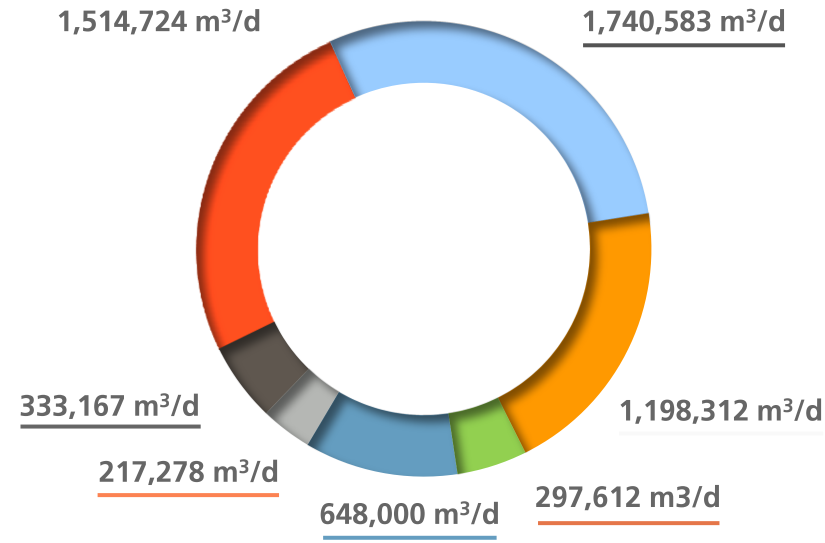
Municipal water

- Desalination
- Water treatment
- Wastewater treatment
- Water reuse
- Others municipal (disinfection…)

Industrial water

- Process water
- Wastewater treatment

Capacity




**Total: 4,947,040 m³/d**

BOT/PPP model

Technology & innovation

# Desalination

Source water ➔

**Intake**
- Open intakes
- Subsurface intakes

➔

**Pretreatment**
- Conventional (GSF, PSF, DAF, etc.)
- Membrane filtration (MF-UF)

➔

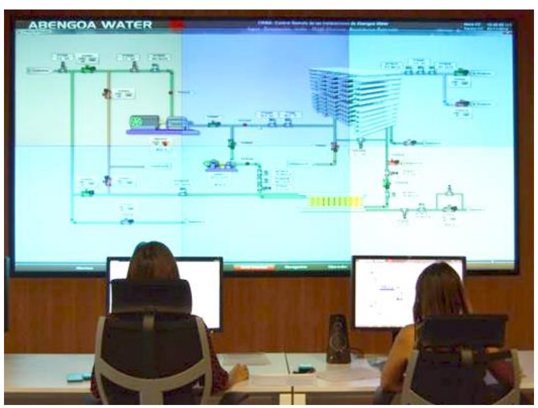
**Pretreatment**
- Cartridge filtration
- High-pressure feed pumps
- RO racks
- Energy recogery systems

➔

**Post-treatment**
- Chemical addition
- Dissolving minerals
- Mixing with source water

➔ Drinking water

**Brine management**
- Direct discharge
- Zero liquid discharge (BW)




Abengoa's water infrastructures control room

UF membrane racks in Qindao desalination plant

Ghana desalination plant

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# Water treatment for drinking water

Raw water → Coagulation → Flocculation → Dissolved air flotation or clarification → Rapid gravity filter → Disinfection → pH correction → Drinking water

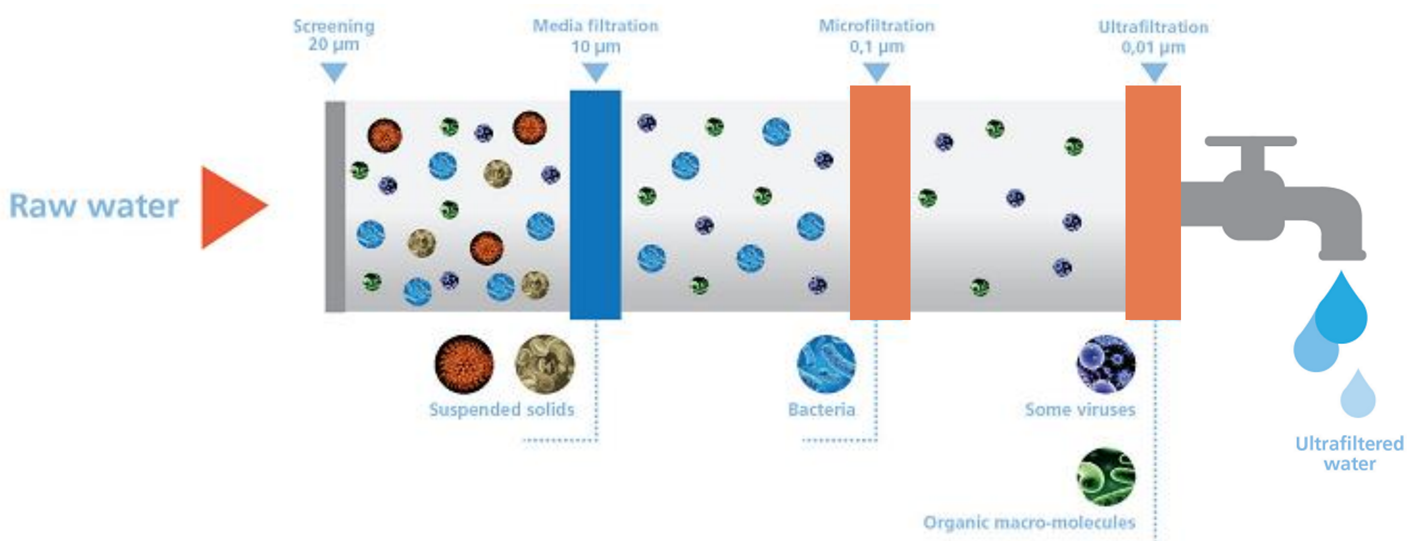
Dissolved air flotation or clarification → Waste sludge

Rapid gravity filter → Backwash water

Membrane treatment technologies

Examples of emerging pollutants: Antivirals and antibiotics, muscle relaxants, and antidepressants and tranquilizers, as well as medications for treating cancer, diabetes, and hypertension

Traditional water treatment systems are unable to eliminate the emerging pollutants

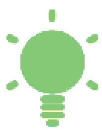


# Wastewater treatment & reuse

Influent → Screening & grit removal → Primary settlement & clarification → Biological reactor, nutrient recovery or elimination → Secondary clarification → Media filtration → Disinfection

Primary settlement & clarification / Biological reactor, nutrient recovery or elimination / Secondary clarification → Sludge treatment → Dehydration →

Biogas



Biosolids

Media filtration → Membrane filtration → Advanced oxidation →

Reclaimed water

Disinfection →

Discharge

or other uses

Qinghe tertiary treatment plant

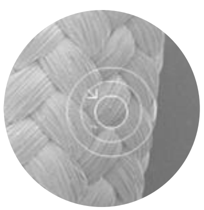
Worker installing hollow fiber membranes in MBR

# R&D+i programs

**Abengoa Water develops its own R&D+i plan which is based on 3 main programs:**

### Desalination

To produce alternative water resources at a competitive price



### Membranes

To develop solutions and proprietary technology for advanced filtration

### Water treatment & reuse

To develop solutions for wastewater treatment allowing its reuse

Pilot plant for study of selective precipitation


Multimembrane demonstration plant

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3

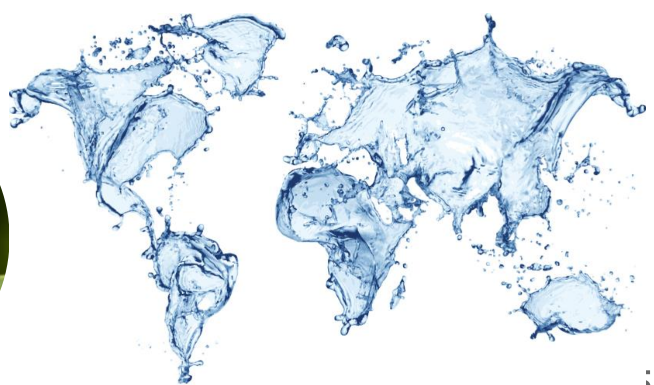
# Main Takeaways

1. Abengoa offers integral solutions for both municipal and industrial clients providing technology and high value services

2. In Abengoa we believe in R&D+i as a key element to differentiate ourselves and remain competitive

3. We also believe that the BOT/PPP model offers an alternative to traditional EPC model for solving water challenges

4. Abengoa will keep on working to solve water scarcity and water quality problems, contributing to the development of local communities in which it operates, with a pipeline of more than $ 3.1 billion in BOT/PPP projects and $ 16.6 billion in EPC projects



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## Thank you

April 7 & 9, 2015