Strategies to adapt to water scarcity: circular economy and resource recovery

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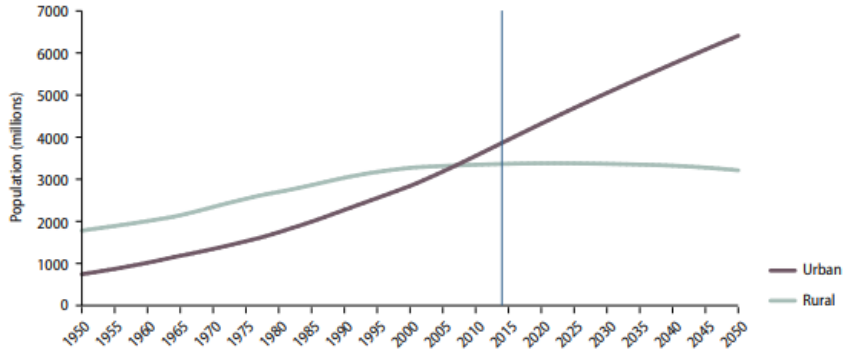
Megatrends

Affecting water resources availability

Changes in population

- Projections show that urbanization, the gradual shift in residence of the human population from rural to urban areas, combined with the overall growth of the world's population could add another **2.5 billion people to urban areas by 2050**, with close to 90% of this increase taking place in Asia and Africa (2018 Revision of World Urbanization Prospects, UNDESA). While today 55% of the world's population lives in urban areas, these projections would increase this proportion to **68% by 2050**.

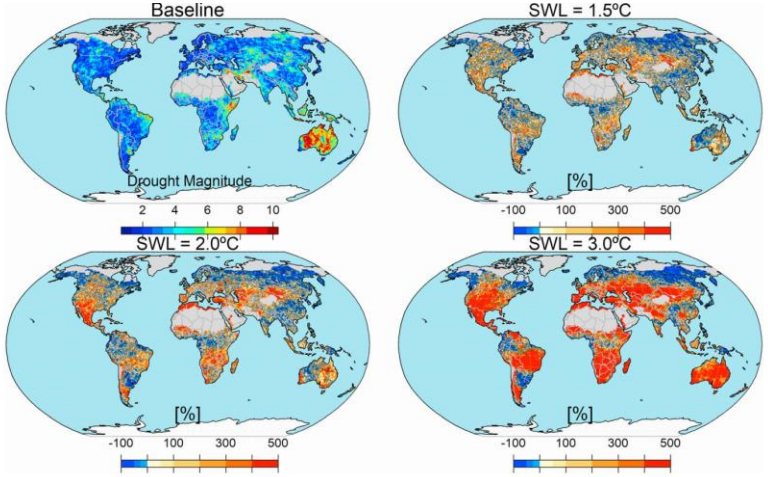
Figure 1: Urban and rural population of the world, 1950 – 2050



Changes in climate

- Some regions are projected to experience **multiple compound climate-related risks at 1.5°C** that will increase with warming of 2°C and higher.
- In terms of drought and dryness, limiting global warming to 1.5ºC may substantially **reduce the probability of extreme changes in water availability** in some regions compared to changes for 2°C global warming.
- Moreover, a global warming of 2°C would lead to an **expansion of the area with significant increases in runoff** as well as of the area affected by flood hazard compared to conditions at 1.5°C global warming.

Figure 2: Drought magnitude and relative changes (%) in drought magnitude with respect to the baseline for the three specific warming levels (1.5, 2.0, and 3.0ºC).



Strengthening resilience facing water-related climate risks

Mitigating drought risk in Chile

Short-Term Plan: Drought Mitigation Plan

- New capacity in wells
- Purchase of raw water
- Renting of water rights
- Agreements with other users of the river
- Monitoring and control of illegal water usage/extraction

Long-Term Plan: Drought and Climate Change Plan 2016-2030

- Preliminary studies :
  - Demand projection
  - Demand management
  - International experiences in drought
- Other actions:
  - Actions to increase supply
  - Water supply projection
  - Synergies at a user level

WHAT HAVE WE DONE?

- 25% more potable water reserves (225,000 m3)
- Habilitation of the Cerro Negro wells with a flow of 300 l/s
- Conduction from the El Yeso Reservoir to Laguna Negra
- Double the number of hours of autonomy from 4 to 9 hours.
- 30 turbidity events without impact

WHAT ARE WE DOING?

- Tripling the autonomy from 9 to 32 hours
- Working with municipalities and authorities in emergency situations.
- Increasing the capacity of the Padre Hurtado Plant and four new filters in the Vizcachas Complex.
- New Chamisero potable water plant in construction.
- New interconnection works (lifting and impulsion plants)

WHAT ARE WE PLANNING TO DO?

- Construction of 8 potable water tanks with reserves of 54,000 cubic meters, in the pre-mountain area
- Habilitation of 13 emergency wells with a production capacity of 500 liters per second in the communes of Conchali, Independencia, and Recoleta
- Construction of new wells with a capacity of 400 liters per second in the communes of Pedro Aguirre Cerda and Lo Espejo.

Producing alternative water for water-scarce areas

By coupling Renewable Energy and Desalination

SUEZ: Pioneer using Renewable energies in SW desalination

2006- Perth, Australia, 145 000 m3/day.

First large facility in the world to be Powered by Renewable Energy. Wind Farm 83 MW, 150 % plant annual needs.

First SWRO Plant @ **“0” Carbon footprint**

2009- Barcelona, Spain, 200 000 m3/day.

Photovoltaic panels on roofs 1,3 MW, 20.372 m2 of surface.

Saving 850 CO2 T (2% approx. of overall consumption)

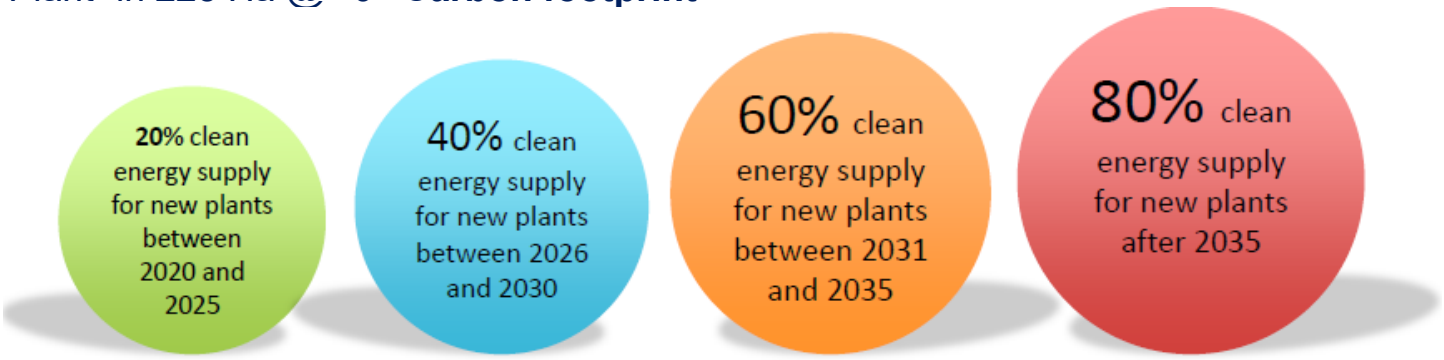
2012- Melbourne, Australia, 450 000 m3/day.

3rd largest SWRO in the world and the largest BOT in water treatment. Renewable Energy Certificate (REC)

2 Wind Farm with a total of 483 MW >> 90MW of max. plant need.

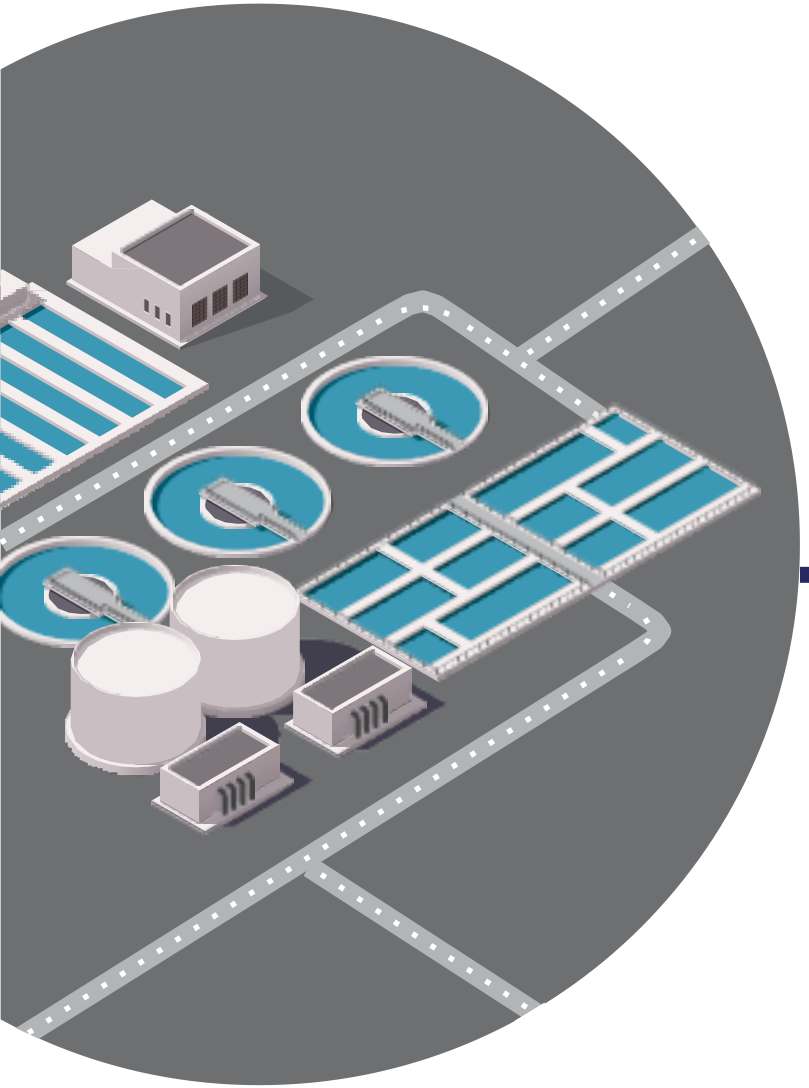
“Green Plant” in 225 Ha @ **“0” Carbon footprint**

Global Clean Water Desalination Alliance



Accelerating the circular economy in the water sector

By transforming WWTPs in *biofactories*



Circular economy

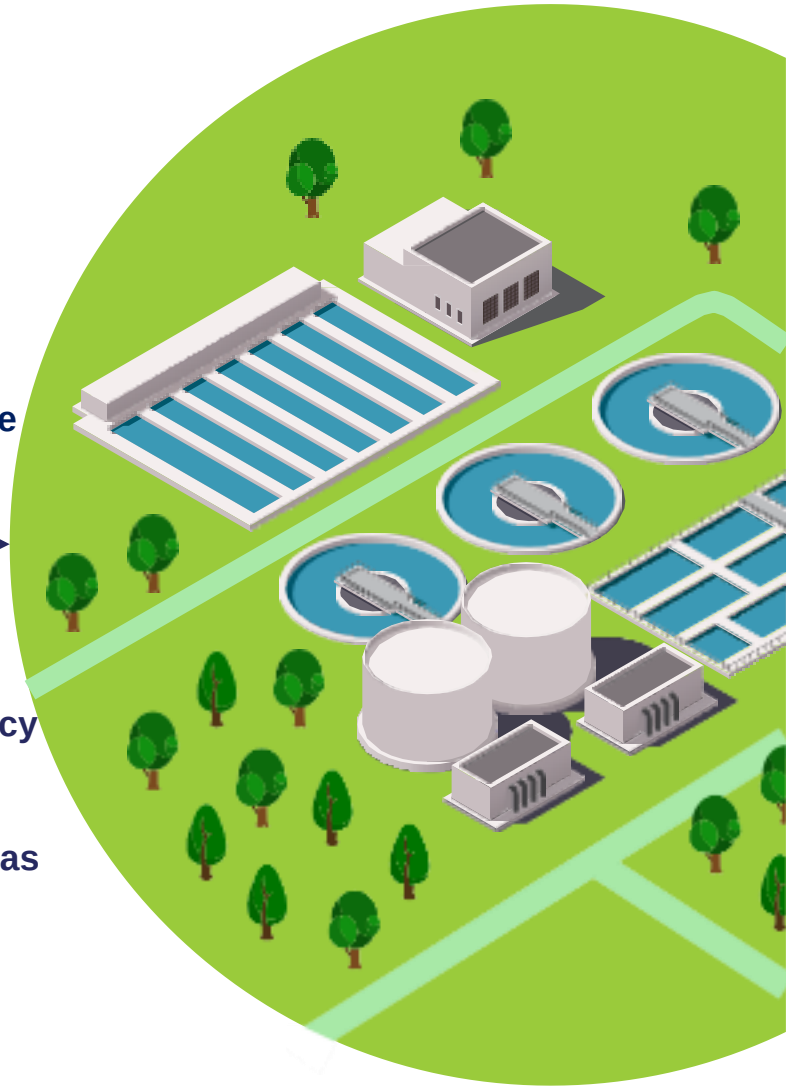
- Reduce consumption of materials
- Reutilization of water
- Recovery of new products (cellulose, plastics, Biorefinery)
- New usages of biogas (injection in the grid, vehicle use)

0% waste to landfills

- Recovery of fractions (sands, grinding, greases)

Green energy

- Energy self-sufficiency
- Reduction of energy consumption
- Maximization of biogas production



Accelerating the circular economy in the water sector

Transforming WWTPs in *biofactories*

The case of Grenade's biofactory (Spain), featured in the *European Circular Economy Stakeholders Platform*, as a success story

- 100% energy self-sufficient
- 100% wastewater reuse
- 100% recovery of sludge, grease and sand

The case of Santiago's biofactory (Chile) announced on 27 September 2018 as winners of the United Nations "Momentum for Change Climate Action Award", and committed by 2022 to be:

- Carbon neutral
- Energy positive
- Zero waste

Catalyzing water stewardship of the industry

BAFWAC

Business Alliance for Water and Climate

Objective:

Preparing and adapting to new climate realities will be one of the defining challenges for businesses in the 21st century. Worsening water stress and climate change has led to the **creation of the Business Alliance for Water and Climate (BAFWAC) at COP 21.**

Each year, BAFWAC tracks and reports to the UNFCCC on the progress of the signatory companies.

In particular, BAFWAC has worked to drive innovation and scale actions that reduce companies' water use and greenhouse gas emissions, focusing on three innovation areas: (1) circular water management, (2) natural infrastructure, and (3) climate resilient agriculture.

Summary Activities and Achievements

- Recruitment of 55 signatories across over ten industry sectors
- Launch of a website (www.bafwac.org) that showcases:
  - 16 case studies across the three innovation areas
  - 24 other tools and resources across the three innovation areas
- Sessions to present the BAFWAC initiative and to promote peer learning held at:
  - Stockholm's World Water Week Conference (Stockholm, August 2017)
  - CDP's Water Forum (India, November 2017).
  - Session at World Water Forum 8 (Brasilia, March 2018)
- Partners presented BAFWAC at COP23

Founded by:

SUEZ

UN Global Compact

The CEO Water Mandate

CDP

DRIVING SUSTAINABLE ECONOMIES

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