

Learning from water resilience best practices throughout Europe

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BY 2055

+40%

OF WORLD POPULATION
WILL LIVE IN AREAS WITH
WATER SCARCITY

TODAY

55M

OF WORLD POPULATION AFFECTED
BY DROUGHT EVERY YEAR
(OMS, 2021)

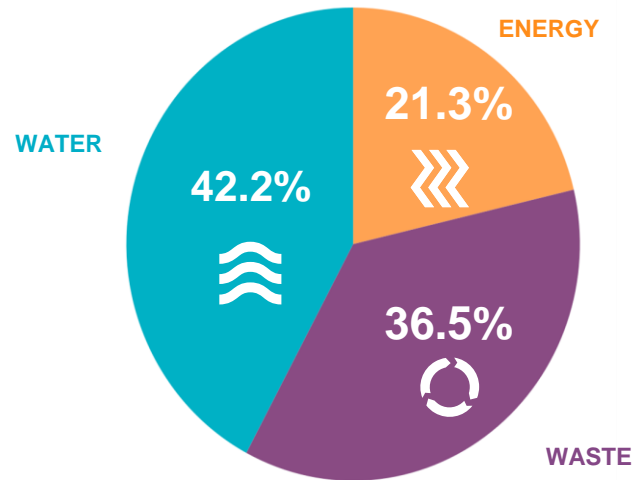
90%

OF NATURAL DISASTERS
ARE DROUGHTS, FLOODS, STORMS

Imminent risk of a global water crisis,
warns the UN World Water Development Report 2023

Climate change adaptation - Veolia activities

GLOBAL OVERVIEW BY ACTIVITY*



*breakdown of revenue by business line

| Climate change adaptation

N°1 challenge for our water management business is **adaptation to climate change**.

- More than **30 NBS references** worldwide with both municipalities and industries. **7 EU projects** ongoing.
- Multiple solutions for water reuse - **250 water reuse sites to reduce water intake**
- **Ecofactories** to boost local resource production
- **Hubgrade digital solutions** increase sewer system resilience

| World utility leader in water management

111 million people supplied with drinking water

97 million people connected to wastewater systems

4,130 drinking water production plants managed

3,506 wastewater treatment plants managed

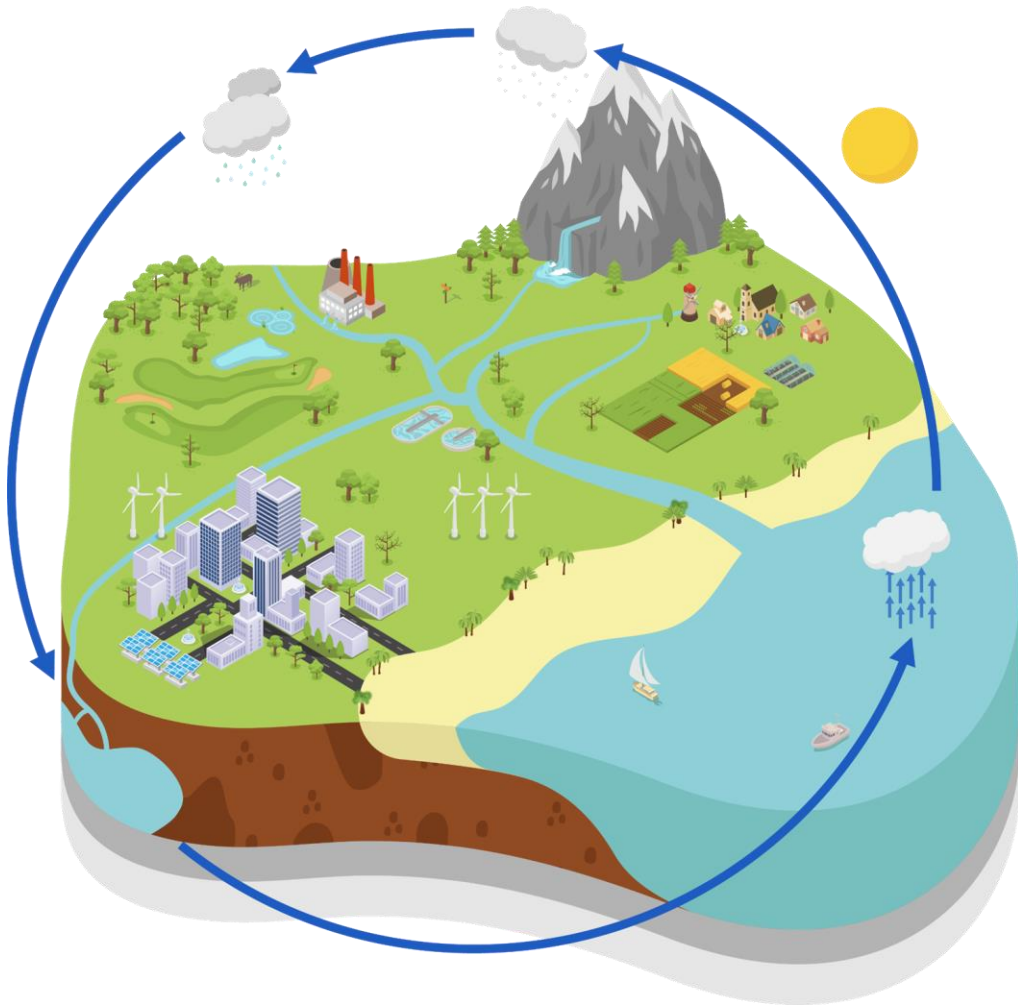
| Veolia strategic program GreenUp

A commitment on regenerating natural resources :

1.5 billion m³ of fresh water saved in 2027



We need to consider the big water cycle to enhance Resilience... **Solution already exist**



Promote sanitation

Reduce energy consumption

Promote water consumption reduction

Affordability of access to water & sanitation

Anticipate floods and mitigate them

Preventive maintenance

Increase Alternative energy production

Security and hypervision

Cyber security by design

Monitor effluent quality to detect diseases

Water Reuse

Sustainable infrastructure management

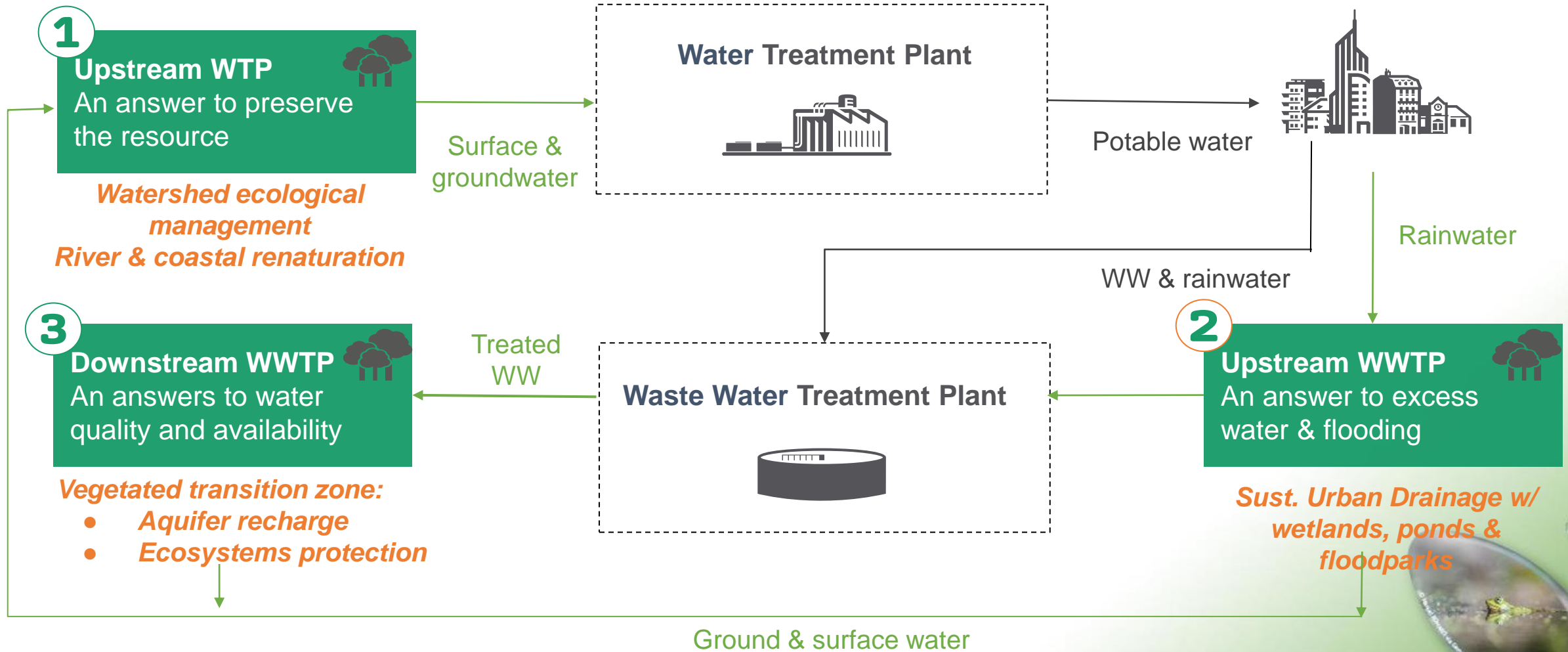
Onboard citizen and local stakeholders

Sustainable management of water resource

Identify and propose alternative resources

NBS or “Green infrastructure” for Veolia

Our Positioning



Veolia's portfolio - example of different types of NbS



Resources preservation through aquifer recharge & natural storage



River & coastal renaturation



Urban drainage & floods protection with wetlands, ponds & floodparks



Watershed ecological management



Ecosystems protection with vegetated buffer at WWTP outlet



Industrial waste water management



Urban drainage & floods protection with wetlands, ponds & floodparks

El Marjal Park, Alicante, Spain

| Challenge

- Increase **resilience to climate change** in urban area with **green infrastructure**
- Preserve aquatic environments while controlling hydraulic flows to **be protected from flooding** which can be brutal in the region

| Solution

- Urban park of **3.6 ha** with **green spaces and 2 ponds**, created by collaboration between Alicante City Council and Aguas de Alicante
- **Water retention**: 2 collectors, located in avenues with tendency to flood, collect rainwater and channel it to 2 ponds. Water is then taken to the wastewater treatment plant. **45 000 m³** of storage capacity.
- **Artificial wetland** inspired by the wetlands of the Mediterranean regions for local biodiversity
- **Biodiversity**: Creation of a favorable habitat for vegetation and 100+ bird species, some of which had never before been spotted in the city
- **Cost**: ~3 million euros



Biodiversity



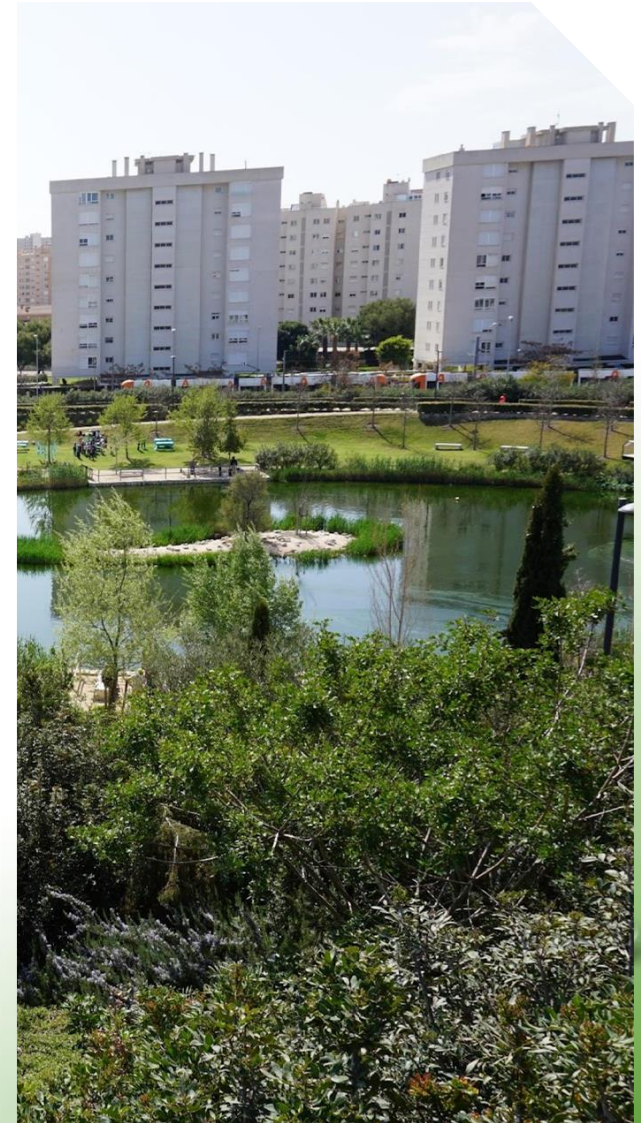
Flood risk mitigation



Cost Savings



Social benefits



River & coastal renaturation

SIAVB, Bièvre Valley, France

| Challenge

- Find a long-lasting solution to **protect the valley and its 200 000 inhabitants from flooding risks** (the valley was flooded in 1982 and 7.5 million m³ of water submerged the valley)
- **Monitor water quality** of the river to ensure smooth running of leisure activities in the valley

| Solution

Dynamic regulation of the river and associated retention and storage works:

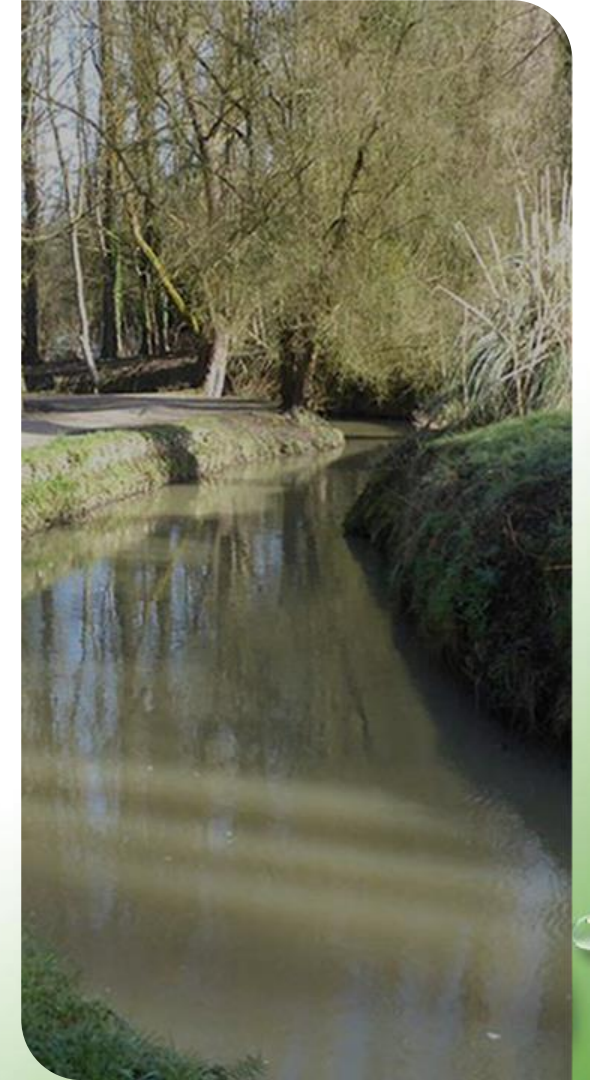
- **Remote management of green infrastructures** (basins and ponds)
- **Maintenance:** Mechanical and electromechanical systems (valves, motors, relays, safety devices)
- **Maintenance and development:** Software and **computerised control systems**, river and network measurement systems (level, flow and quality)
- **Adaptation of the regulation** during the creation of wetlands
- **OPEX:** ~ €450k /year
- **30% increase in water retention capacity (1,000,000 m³)**



Flood risk mitigation

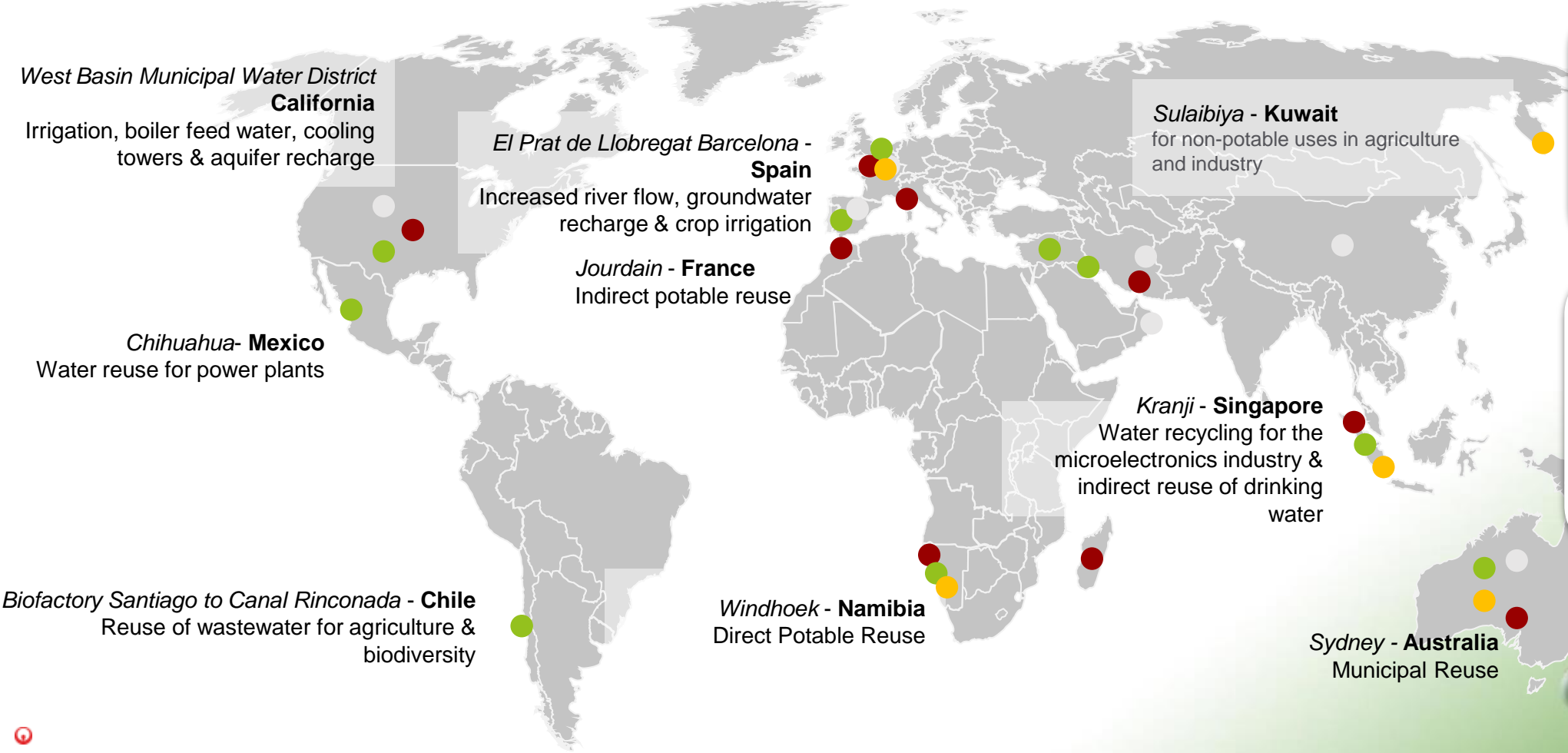


Biodiversity



Veolia already operates **250 WATER REUSE** références in **18 countries**

REUSE: ● agricultural ● drinking water ● urban ● environmental



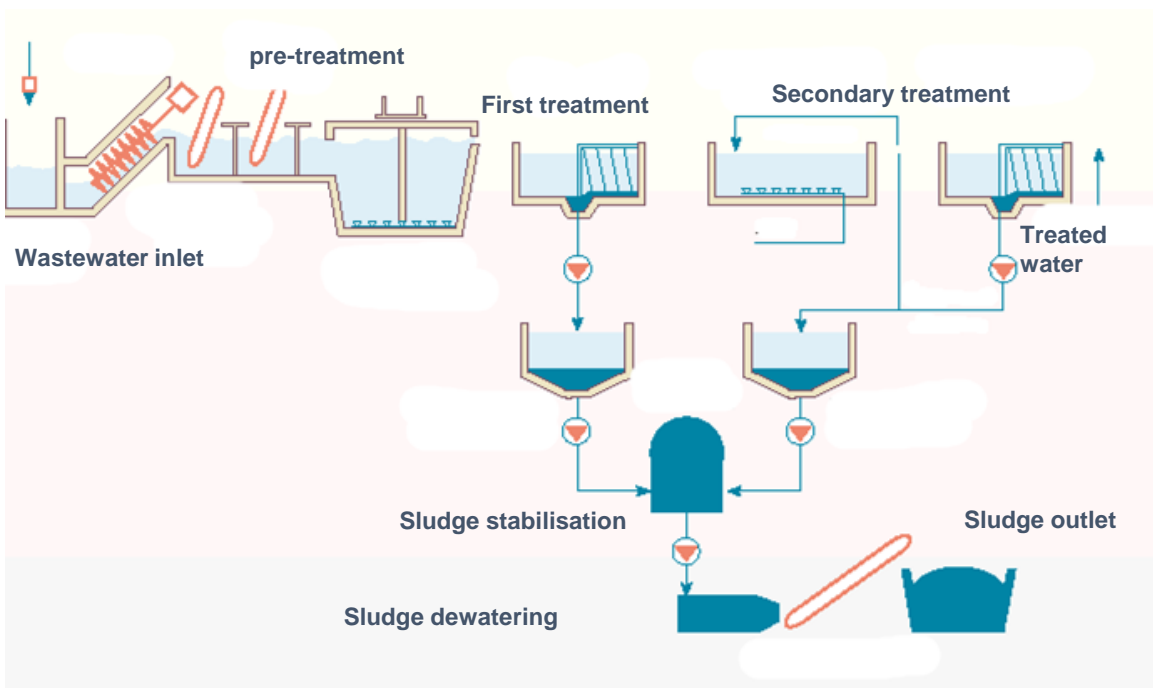
1.1 billion m³
of water recycled by Veolia in 2023, the consumption equivalent of **18 million citizens**

- Uses served by our reuse water:
- **Agricultural** ~40%
 - **Urban (sewage & street cleaning)** ~35%
 - **Environmental (irrigate green areas)** ~8%
 - **Drinking** ~3%
 - **Industrial** ~14%



DIFFERENCES BETWEEN TREATED AND REUSE WATER

“Treated water”: water to be released to the environment from a treatment and purification operation, which takes place in a conventional wastewater treatment plant



“Reuse water”: water treated to adapt its quality to a broad range of other uses



Physico-chemical



Micro filtration



Disinfection by UV and chlorination



Ultrafiltration



Reverse osmosis



Reverse osmosis low pressure (BARREL)

Technology to produce ‘fit-for-purpose’ types of water

United States

EDWARD C. LITTLE WATER - Recycling facility (California)



Since 1995, the facility has been producing **recycled water for use in a wide variety of commercial, industrial and irrigation applications**

With Southern California’s economic growth and prosperity dependent on two unreliable imported water supply sources, **water conservation had become a major challenge.**

Veolia and the West Basin Municipal Water District, working together, are helping to **preserve drinking water supplies by recycling wastewater.**

The facility has reduced the amount of sewage by 5 tons a day and has reclaimed more than 140 billion gallons to date.

This water recycling facility is **the only one in the world to produce 5 different “designer” waters and has been named a National Research Center.**



Ecofactories : booster of local resource production



Ecofactory Grenada

Self Sufficiency > 120%

Self Consumption: 3.448.041 kWh

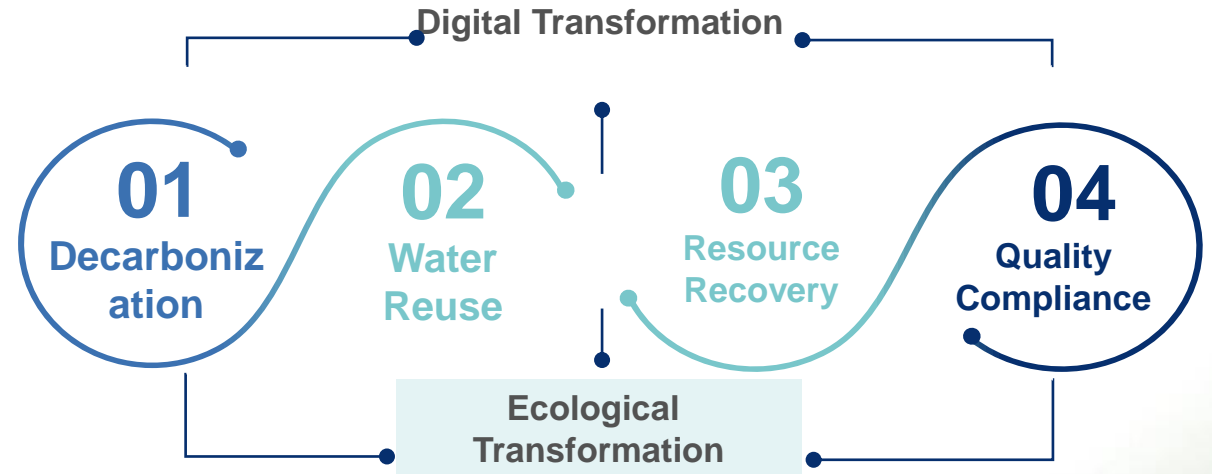
Energy sold: 486.318 kWh



Ecofactory Baix Llobregat Barcelona

2m³/s of regenerated water for multiple uses

industrial, Indirect potable reuse, agrícola, green areas...



- **Tackle water scarcity** for cities, agriculture and industries
- **Increase energy autonomy** (biogas/biomethane, electricity)
- Remove organic waste from landfills
- **Support economic development**
- **Environmental restoration**, soil remediation and recovery
- Mobility decarbonization



Digital transformation to strengthen agility & transparency

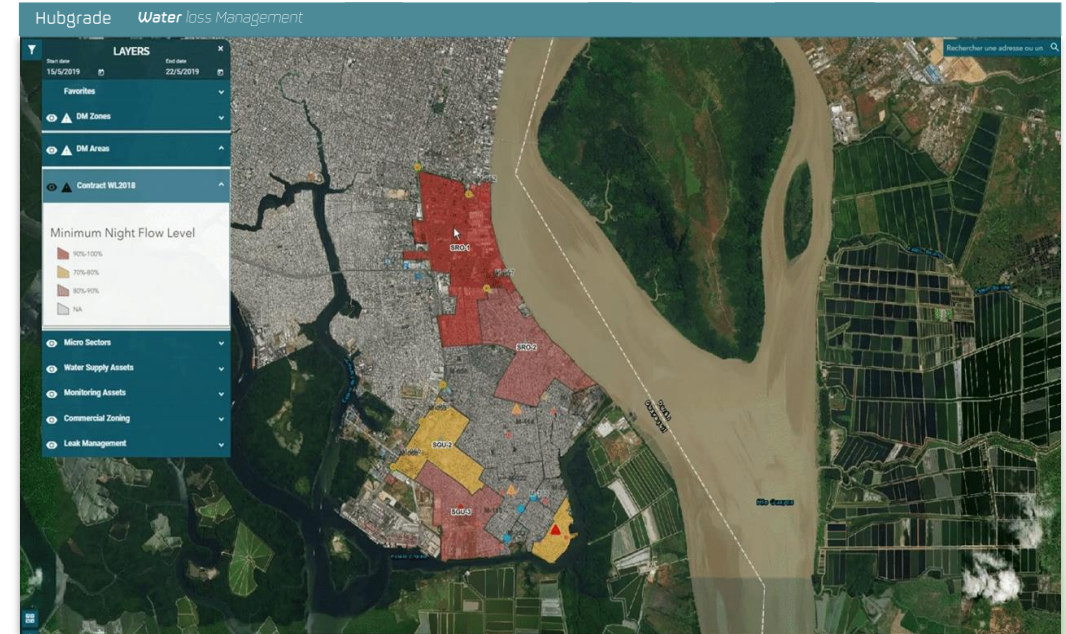
Solutions combining digital & expertise to support cities in their resilience while preserving resources :

Water Loss Management near real time follow-up of network efficiency

Water Energy Optimisation to monitor energy performances

Water Performance Sewer prediction of system behaviour

Crisis Management for responsive & real time action plan



Water Losses : + 25 millions m3 saved on connected networks

References 2020 - 2023

Guayaquil (Ecuador), Rabat (Morocco),
Frontignan (France) Dar Es Salam (Tanzania)



THE NEED FOR REGULATORY AND FINANCIAL INCENTIVES TO MAKE REUSE MORE WIDESPREAD IN EUROPE

Challenges

Water scarcity at least **11 % of the European population**

The potential of water reuse is **6 time greater** than current capacity

France is one of the Member States with the highest **reuse potential**

Barriers

Authorisation process too long, **4 to 10 years per project and no one-stop shop**

Reluctance on the side of authorities, particularly health authorities

Lack of national experience

Legislation

26 June 2023: entry into force of the **new European Regulation** on the reuse of treated wastewater for agricultural irrigation

October 2023: vote on the European Parliament's position on the revision of the **Urban Wastewater Directive**, in which REUSE is promoted

Veolia is advocating for each Member State to have a Reuse roadmap tailored to national needs



Key successes for adaptation to climate change

- ▶ **Consume less** : sobriety and operational efficiency
- ▶ **Reduce Network losses**, in particular by hunting down leaks
- ▶ **Developing new resources** : wastewater reuse, desalination, nature-based solutions
- ▶ **A strong and clear regulatory framework** is essential to boost projects, especially those involving reuse
- ▶ The success model for accelerating water reuse relies **on collaboration between the public and private sectors**
- ▶ **Public awareness and acceptance** is key to the adoption of the approach

**The emergency is here and proven technologies exist,
let's speed up the implementation of these solutions!**



EU Green Week
PARTNER EVENT

Innovative & resilient water basin management for cities and regions

EU Committee of the Regions
31st May 2024

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