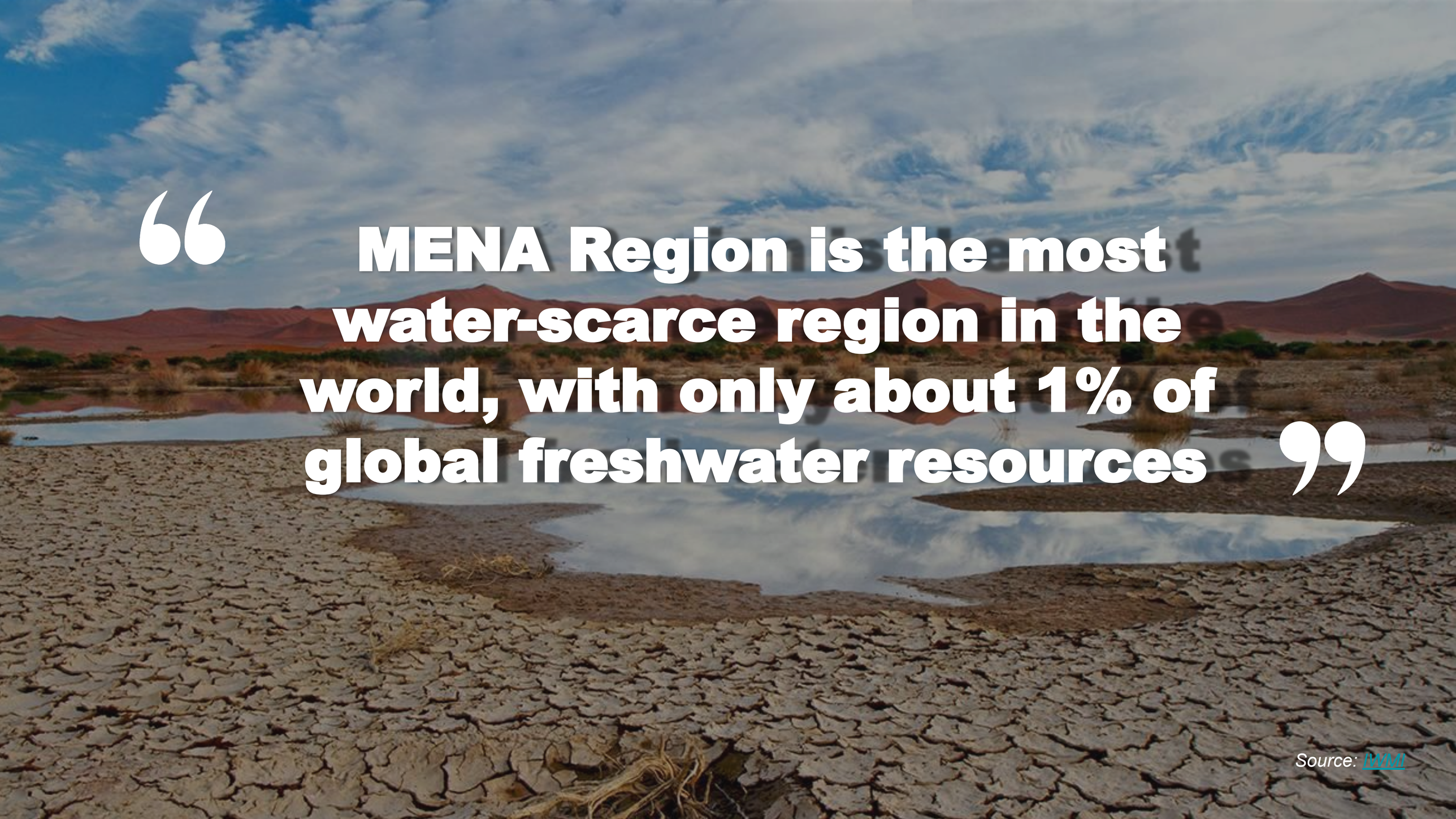
For A Sustainable Water Resource in MENA Region

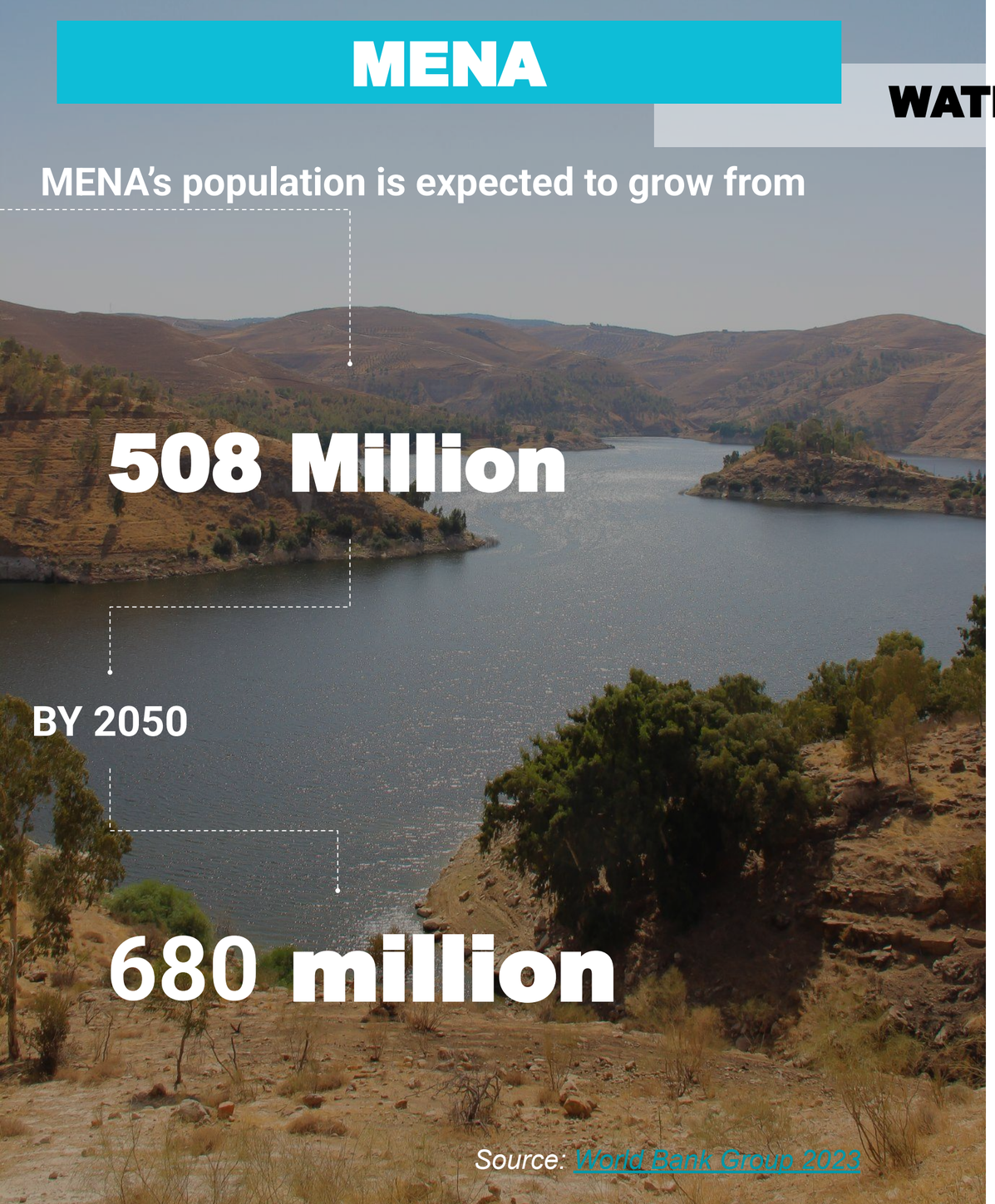
Water Reuse - Towards non-conventional source of water

Pauline Duquesne – May 5th, 2025


“MENA Region is the most water-scarce region in the world, with only about 1% of global freshwater resources”
Source: IWMI

MENA

WATER SUPPLY AND RISING DEMAND



MENA's population is expected to grow from

508 Million

BY 2050

680 million

Source: World Bank Group 2023

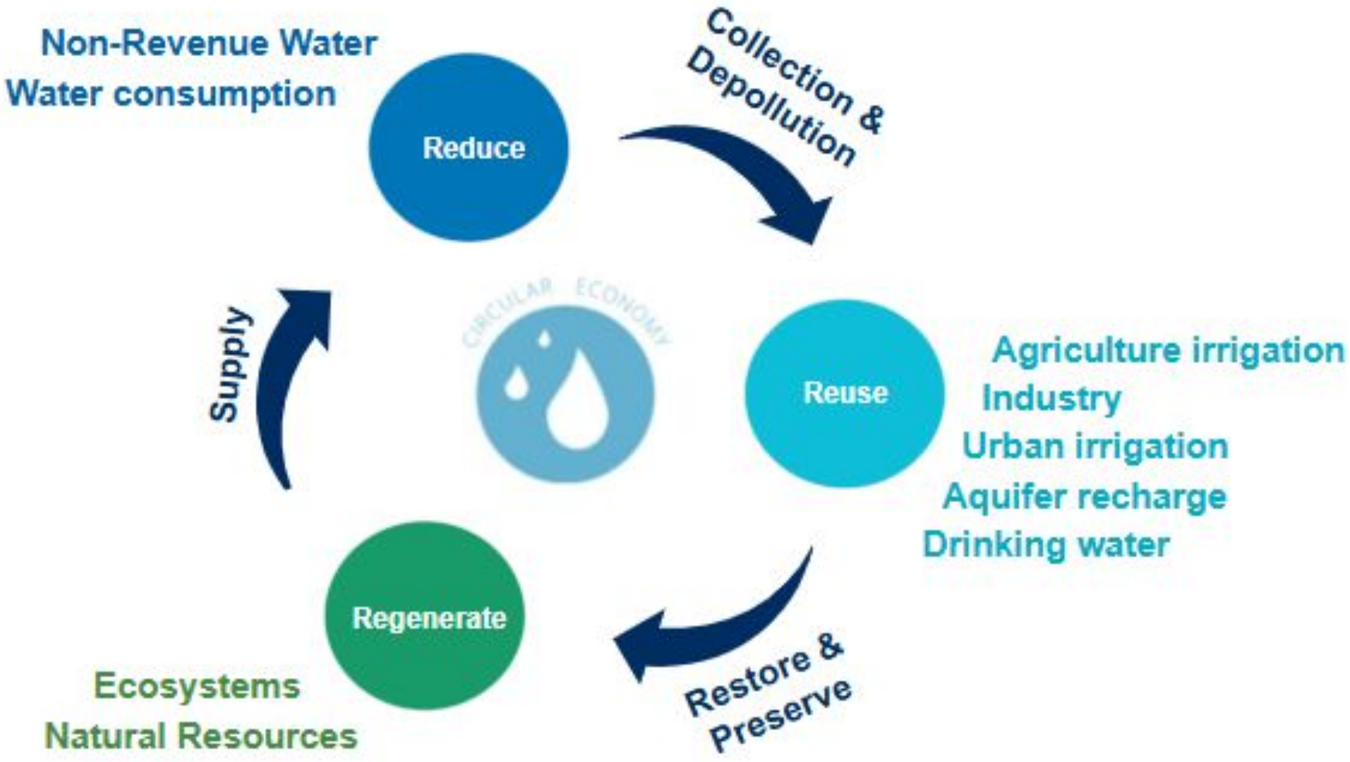
With global warming, temperatures in the MENA region are expected to **rise** in the region **by at least 4°C by 2050.**

By 2030, the **water available** per capita annually in MENA will **fall below the absolute water scarcity threshold** of 500 cubic meters per person per year.

With current water management strategies, **an additional 25 billion cubic meters** a year will be needed to meet 2050 water demand

Water Circular Economy

A sustainable response to growing water demand

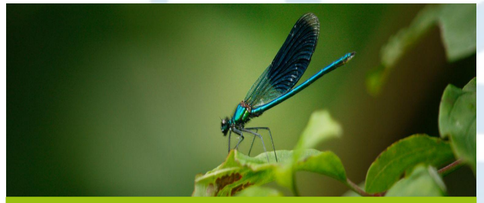


LIVEABLE CITIES

More citizen quality of life, health, affordability, welfare

RESILIENT SERVICE

Gain in agility, less pains during drought, flooding or other uncertainties



RESOURCE PROTECTION

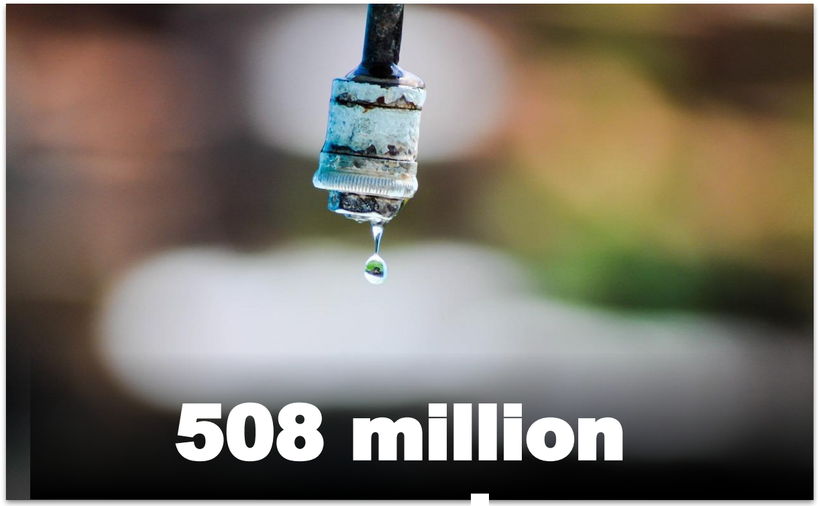
Less impact in environment and biodiversity

AUTONOMY, CIRCULARITY

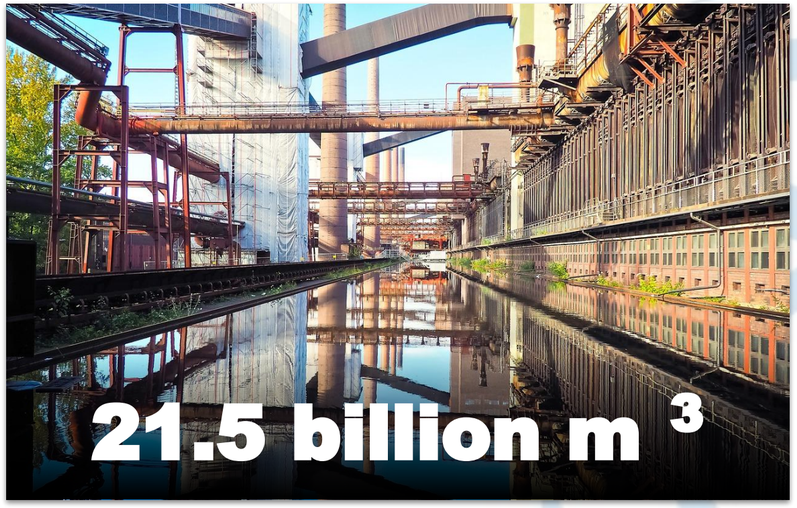
For economical development and social stability, optimized consumption & resource recovery

Water Circular Economy

Water Reuse



live in MENA region



of municipal wastewater produced per year in MENA region

of this municipal wastewater is treated and reused

The only source of water that increases as population and water use grow.

Source: IWMI 2022


“ A journey already started that we can accelerate! ”

Veolia's global expertise & history

170+ years of global experience

1.1 billion m³

of water recycled by Veolia in 2023

PRESENT IN
58 COUNTRIES

SUPPLYING OVER
111 million PEOPLE

MANAGING OVER
4,130
DRINKING WATER PLANTS

ABOVE
90% CONTRACT RENEWAL RATE

43 PATENT FAMILIES

NEW 2024/2027
GREENUP
STRATEGY

"A world-wide experience, bringing knowledge from countries where we had already faced consequences of environmental challenges and applying our best practices to ensure successful contracts"

Adaptable offers of essential services of entire water cycle; from basic needs to advanced and modern applications

Veolia, leader in water reuse

Footprint in the MENA region

556 million m³ of water recycled by Veolia in 2023

the consumption **equivalent of 9 million citizens**

> 15 contracts in 7 countries

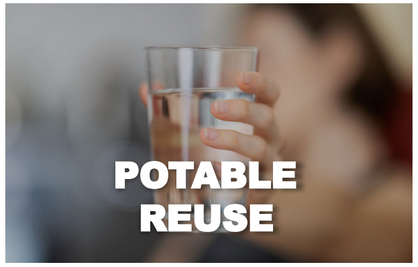
Uses served by our **REUSE water**

- **Agricultural 58%**
- **Urban 39%**
- **Industrial 3%**
- **Environmental**
- **Drinking**

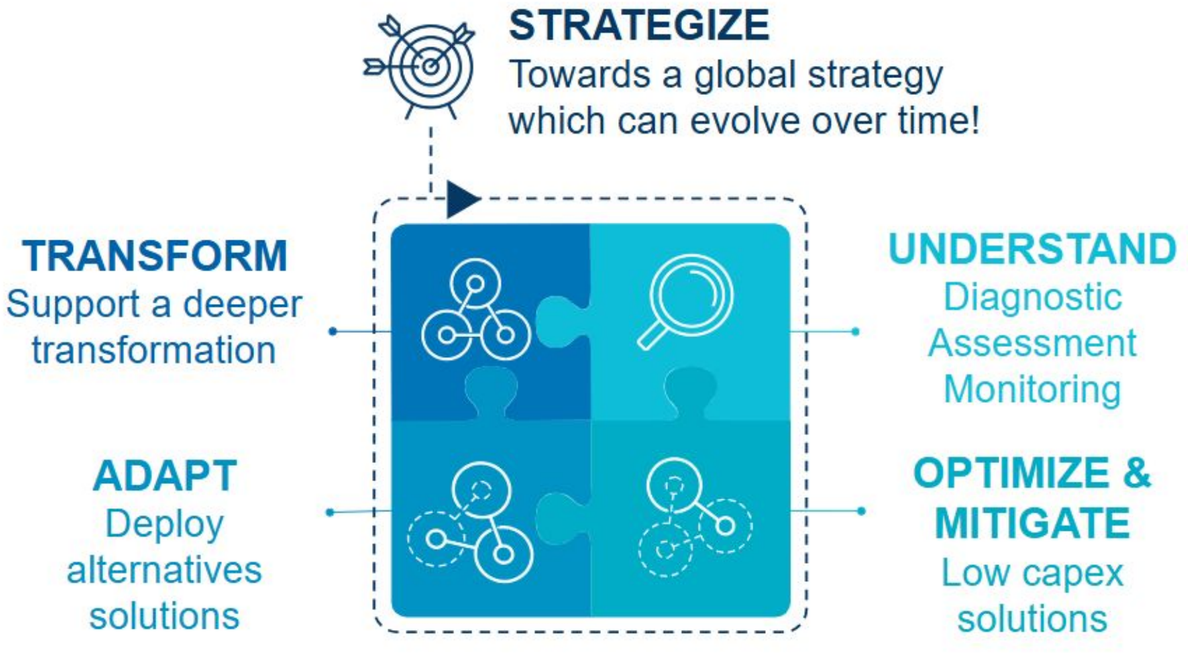
Veolia's offer

As part of an adaptation pathway towards resilience

5 pillars



A customized adaptation pathway



Veolia’s water reuse technologies

A comprehensive portfolio for different needs

INDUSTRIAL REUSE

POTABLE REUSE

URBAN REUSE

ENV. REUSE

AGRICULTURE REUSE

Quality +++

- Biological treatment
- Oxidation and disinfection (*e.g. ozone + UV Advanced oxidation + chlorination*)
- Advanced treatments for the removal of mature dissolved organic pollution *(e.g. reverse osmosis, activated carbon)*

Quality ++

- Biological treatment
- Additional treatment solutions of varying complexity combining filtration and disinfection
- High complexity: UV, ozonation, Ultra-Filtration
- Low complexity: chlorination, cloth filtration

Quality +

- Biological treatment
- Polishing (hydrotech, discfilter)
- Proven, economical disinfection solutions (UV and/or chlorination)

A portfolio of technologies & expertise I.

To design the best plant for each project

Examples of advanced secondary and tertiary treatment technologies:
Turbidity, suspended solids, bacteria, phosphorus, algae, colour, heavy metals…

MEMBRANE BIO-REACTOR S - ZW500

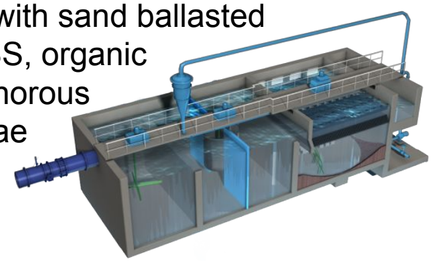
Advanced biological treatment

HYDROTECH DISCFILTERS OR ACTIFLO/DISC

Filtration for TSS reduction and efficient disinfection

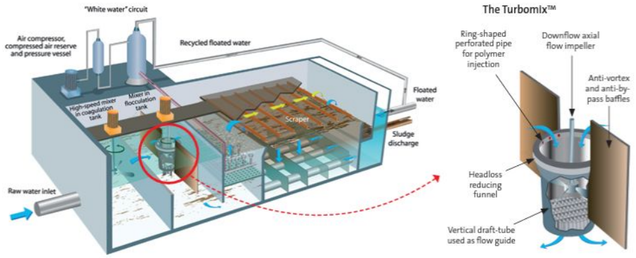
ACTIFLO

High rate settling with sand ballasted coagulation for TSS, organic matter and phosphorous polishing, and algae removal



SPIDFLOW

Achieving high flotation rates from 50 to 80 m/h. Particularly suitable for industrial applications or algae management



ULTRA-FILTRATION (UF) ZW700B / ZW1000 / ZW1500

Comprehensive technology portfolio tailored to project requirements for complete TSS removal and partial disinfection

DIGITAL

Hubgrade digital solutions for a smarter approach combining digital tools and human expertise

Hubgrade by VEOLIA

VEOLIA

A portfolio of technologies & expertise II.

To design the best plant for each project

Advanced treatments for dissolved pollution & micro pollution removal:
Natural Organic matter (NOM), pesticides, cyanotoxins, emerging micropollutants, algae, COD, taste, odor, colour…
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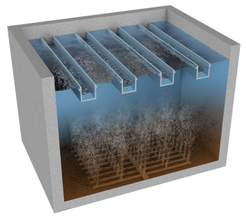
OZONE

WTS/Ozonia technology range

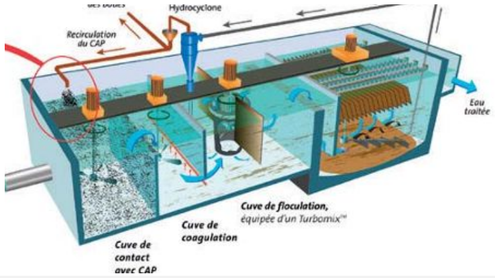
ACTIVATED CARBON REACTORS

Objective: removal of organic micropollutants and dissolved organic matter - potentially coupled with ozone for enhanced treatment



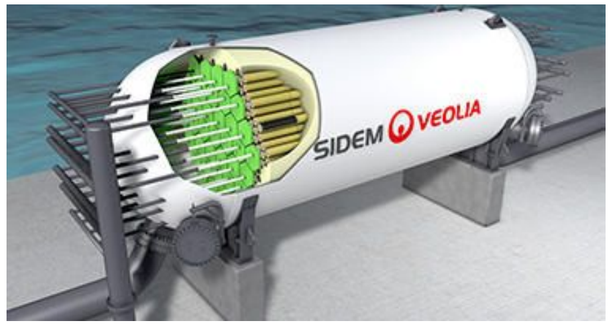
OPACARB

ACTIFLO CARB



NANOFILTRATION & REVERSE OSMOSIS

Nanofiltration reverse osmosis in a Barrel™
Barrier against pathogens, dissolved salt, metals, etc. over a wide range of pollutants



DIGITAL

Hubgrade digital solutions for a smarter approach combining digital tools and human expertise


Focus on Use case

Jordan already a pioneer in reuse

Planning to go further…

- **90%** of treated wastewater is reused in irrigation (15% of water resources)
- **30%** of irrigation needs (530 Million m3) are covered by reuse (165 Million m3)
- **80%** of reused water go to the Jordan Valley (130 Million m3)
- **50%** of reused water go to restricted irrigation (80 Million m3)
- **30%** of additional capacity for reuse is targeted by 2030 (+80 Million m3)

Samra WWTP a landmark…
which produces 60% of water reuse in Jordan
(133 Million m3)

Source: National Water Strategy

AS-SAMRA, JORDAN - WASTEWATER TREATMENT AND REUSE

The conventional water treatment with primary settling, biological treatment (BOD & Nitrogen removal), secondary settling and chlorination - coupled with rigorous process monitoring guarantee high quality treated water. The plant generates more than 90% of its electricity consumption through hydro-powered and biogas generators.

Provide safe reuse of water for irrigation: 25% of the country's agricultural water needs and 12% of the global water needs (notably for domestic use)

DOHA NORTH, QATAR - WASTEWATER TREATMENT AND REUSE

+900,000 inhabitants served

+62 million m3 per year of high quality treated water

5 years O&M contract

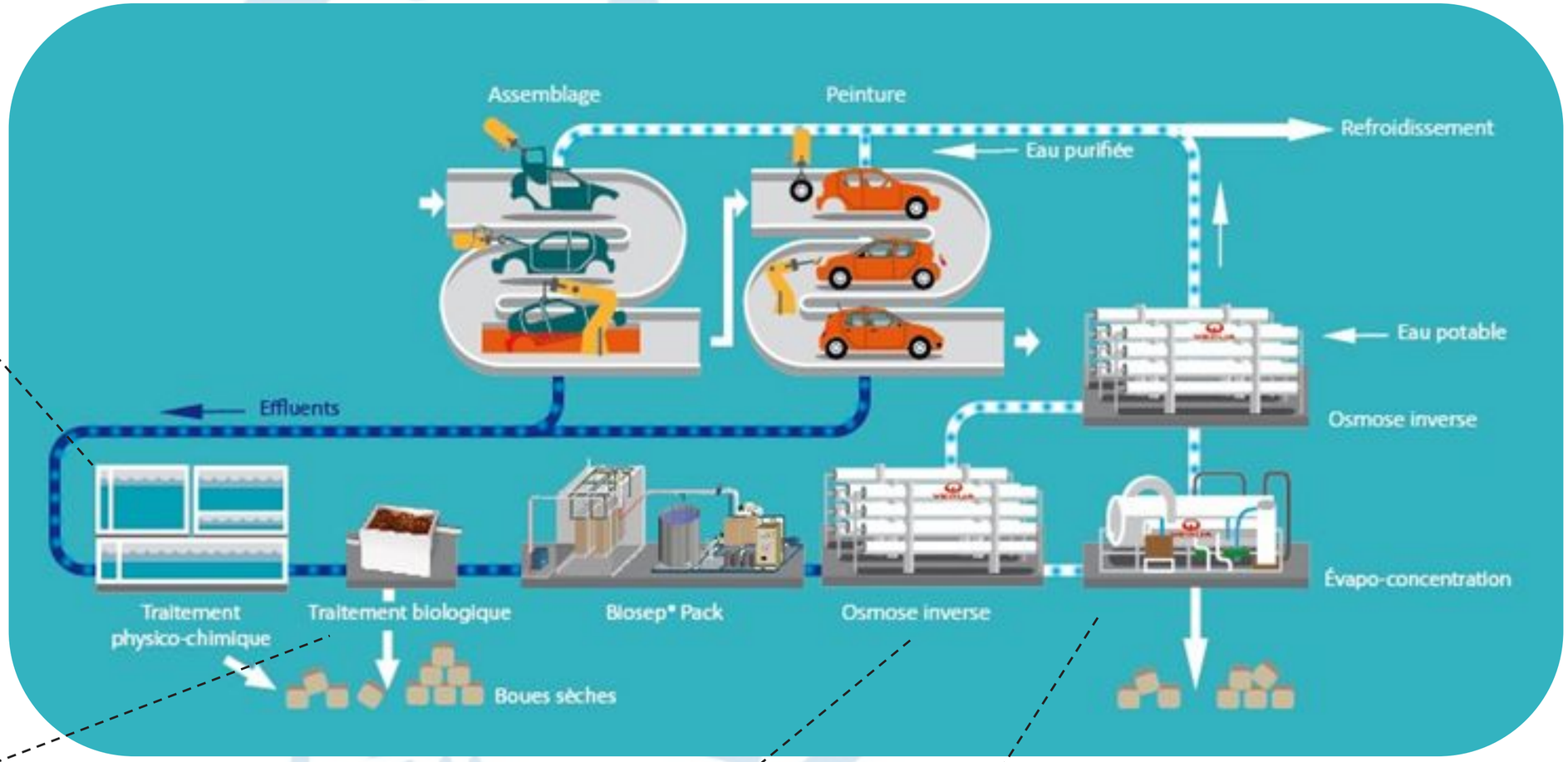
The biological treatment, granular media filtration, ultrafiltration, UV and chlorination- coupled with rigorous process monitoring guarantees very high-quality treated water. The plant includes also a Thermal Drying Plant to process most of the sludge generated by WWTPs within Qatar.

Provide high quality treated effluent for non-potable use, such as irrigation for public parks and landscaped areas.

The complex process consists in physico-chemical pretreatment, membrane bio-reactors biological treatment, and reverse osmosis, thermal evaporation and crystallisation - coupled with rigorous process monitoring produces purified water reused in the car assembly plant.

Provide a water recirculation loop which reduced the site water consumption by 70%, and eliminated all industrial liquid discharges

Renault Tangier ZLD, MOROCCO



A "multi-barrier" technology: ozone treatment, ultra membrane filtration and residual chlorination to eliminate all pollutants and contaminants. The various treatments, coupled with rigorous bio-monitoring programs, guarantee high quality, safe drinking water

Contribute to the water supply of the population of the city in a context of strong urban growth (+ 6% per year).

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THANK YOU

Pauline Duquesne – May 5th, 2025