

WATER REUSE

Contributing to Urban Service Water

Case Study of MADINATY WWTP



sustainable solutions. for a better life.



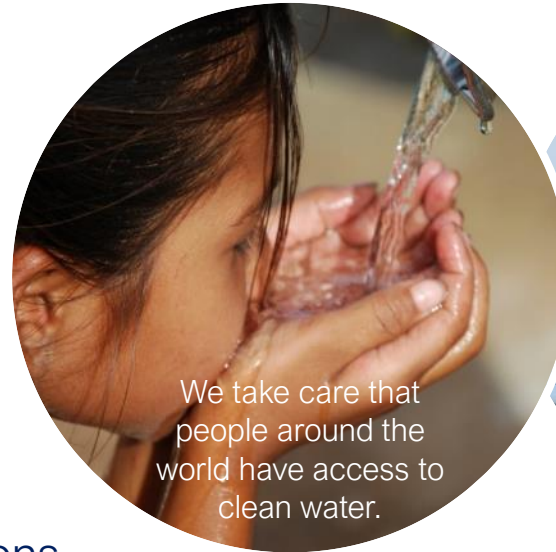
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WABAG - WHO WE ARE

WE DESIGN, BUILD AND OPERATE WATER AND WASTEWATER TREATMENT PLANTS.

- Water technology multinational with presence in 4 Continents.
- Century of expertise.
- Trusted partner for complete solutions throughout the life-cycle for municipalities and industry.
- Best technology integrator with 125+ IP rights with 2 R&D centers



- 1.500+ completed plants in 3 decades
- 5th in top desalination plant suppliers
- 3rd largest private water operator globally

WABAG - OUR PORTFOLIO



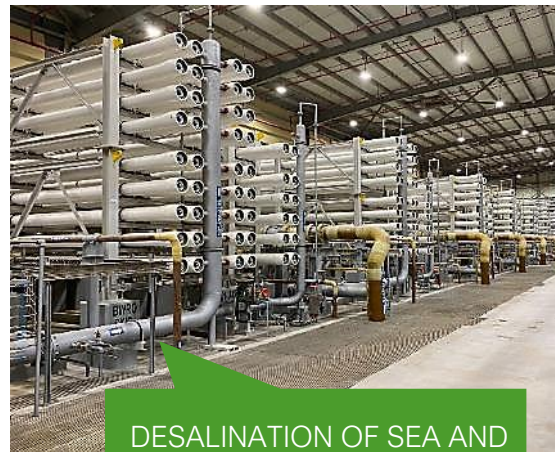
sustainable solutions. for a better life.



DRINKING WATER
TREATMENT



INDUSTRIAL WATER
TREATMENT



DESALINATION OF SEA AND
BRACKISH WATER



WATER RECLAMATION – UP
TO DIRECT POTABLE REUSE



MUNICIPAL WASTEWATER
TREATMENT



INDUSTRIAL EFFLUENT
TREATMENT



SLUDGE TREATMENT &
ENERGY RECOVERY



INDUSTRIAL WATER
RECYCLING & REUSE

Cleaner Solutions for a Greener World

Where water comes from



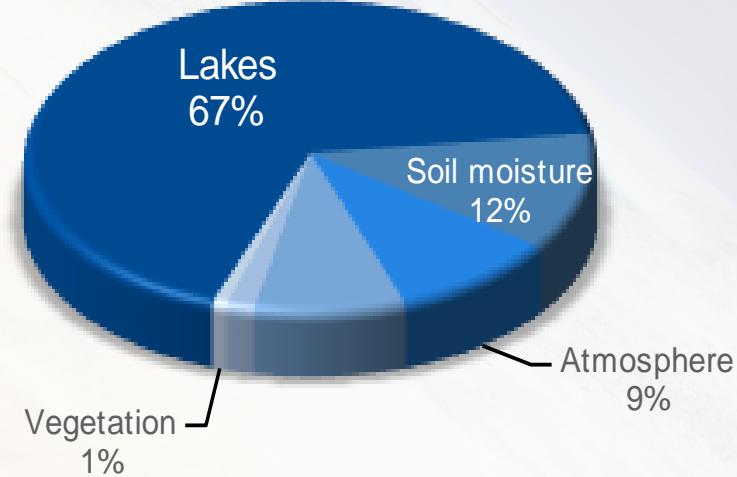
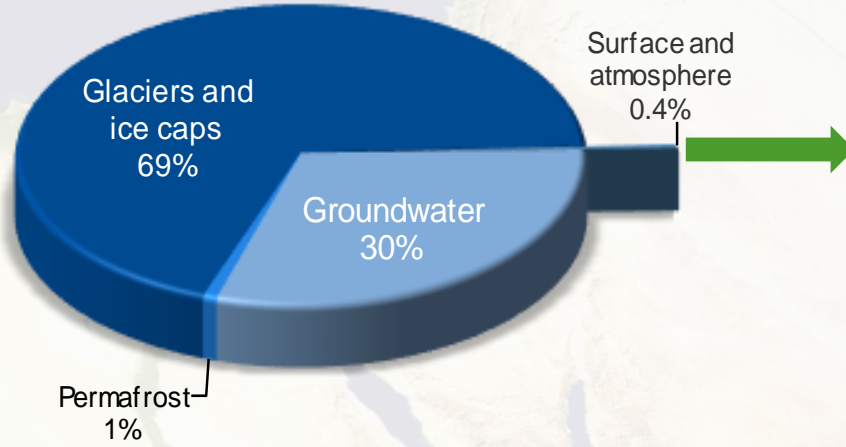
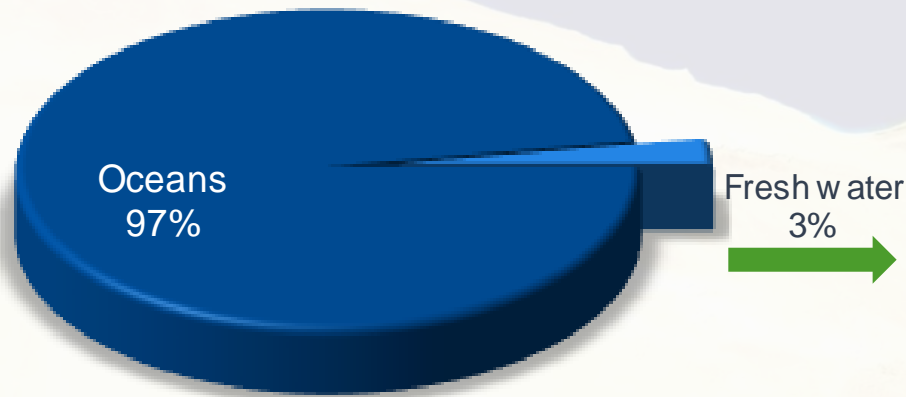
Where water comes from...

Only 1% of the earth's fresh water is available for withdrawal and human use.

Global water resources, 100%

Fresh water, 3%

Surface and atmosphere, 0,4%



* Ground Water & Surface Water are the most easily accessible source of water.

WATER RECLAMATION

The key to sustainable water management and development.

Water recycling and reuse increase the availability of this precious resource for potable, public, agricultural and industrial needs and thus improves water security which supports sustainable socio-economic development.

- Water is a renewable but finite resource.
- Water scarcity already affects >40% of the people on the planet.
- Today, our planet needs to feed 8 billion people. By 2050, this number will rise to over 9 billion.
- Agriculture is the largest water consumer – 70% of current, global water consumption.
- There is an urgent need to conserve existing resources.
- The multiple use of water and the implementation of water reclamation concepts are of enormous importance.

WATER RECYCLING AND REUSE



*„Water is too precious
to be used only once.“*

Employing the
latest technologies,
we turn used water
into high-quality water.

We have built the
world's first direct
potable reuse (DPR)
plant in Windhoek,
Namibia.

We are water
recycling pioneers.

WE TURN USED WATER INTO

- **Water for irrigation**
Agriculture, forestry, recreational areas, golf courses, ...
- **Urban service water**
Street cleaning, fire fighting, landscaping, toilet flushing...
- **Potable water**
Indirect potable reuse (IPR)
Direct potable reuse (DPR)
- **Industrial water**

Benefits for mankind and the environment:

- ✓ Increase in water availability.
- ✓ Protecting natural fresh water resources.
- ✓ Independence from rainfall and droughts.
- ✓ An important contribution to food security.
- ✓ Keeping cities clean and green.
- ✓ Sustainable socio-economic development.
- ✓ Improvements in the quality of life.

Globally, over 80% of the wastewater generated by society flows back into the ecosystem without being treated or reused.

WATER REUSE IN EUROPE

Municipal wastewater – an untapped resource. *

Addressing Water Scarcity:

- EU countries facing increased droughts and water scarcity
- Imperative to reuse water from municipal wastewater treatment plants

Benefits of Water Reuse

- Ensures a safe and predictable water source
- Reduces pressure on natural water bodies
- Enhances EU's climate change adaptation

Importance of Proper Treatment

- Necessity of properly treated water
- Extends water life cycle
- Preserves water resources

Current Practice and Potential

- Existing water reuse practices in several EU countries
- Untapped potential for wider adoption

Barriers to Wider Adoption

- Limited awareness among stakeholders and the public
- Lack of supportive and coherent framework

- More than 40.000 million m³ of wastewater is treated in the EU every year
- Only 1.100 million m³/year – less than 3% - of this treated wastewater is reused.
- By 2030 water stress and scarcity will probably affect half of Europe's river basins.



Municipal wastewater is a viable alternative water source.

New regulation for Water Reuse in EU –
improving access to safe irrigation.

REGULATION (EU) 2020/741 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 May 2020 on minimum requirements for water reuse

Released: May 2020

Effective: from June 26, 2023

Targets:

- To promote and facilitate water reuse across the European Union (EU), helping to address droughts and water stress.
- Harmonization of minimum water quality requirements for safe reuse for agricultural irrigation.
 - ✓ Increased efficiency of water utilization.
 - ✓ Reduction of water stress and drought.
 - ✓ Contribution to food safety and environmental protection.
 - ✓ Creating an instrument for tackling climate change.
 - ✓ These rules encompass not only water reuse in agriculture but also permit EU member states to use reclaimed water for industrial purposes, environmental initiatives, and amenity-related uses.

- Setting obligations for operators of water reclamation plants to comply with minimum water quality requirements and risk management plans.
- Treated municipal wastewater will be subject to further treatment requiring an approval by the respective authorities in order to be re-used in agriculture or other non-potable-reuse applications.
- A risk management plan shall be drawn up with the relevant stakeholders, such as suppliers of recycled water, distributors and end users, in order to identify and counter potential additional hazards.

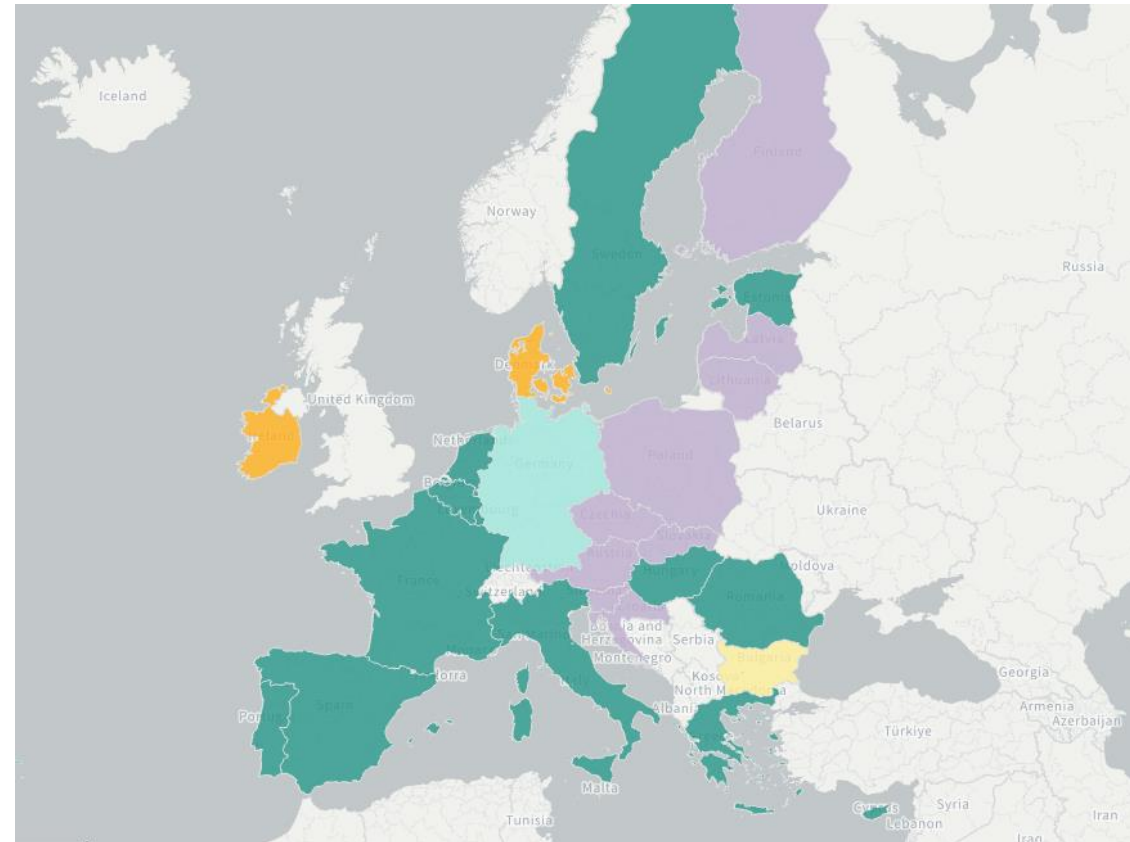
WATER REUSE IN EUROPE

The Mediterranean countries are the most successful in water reuse.

The volume of reclaimed water is significant:

- ✓ 12% in Italy and Spain
- ✓ 60% in Malta
- ✓ 90% in Cyprus

Map – EU Member States where water reuse for agricultural irrigation is allowed (June 2023)



WATER REUSE IN ROMANIA

Water reuse in Romania is currently in an early stage, with significant efforts being made to comply with EU regulations.

Future Plans:

EU Regulation 2020/741 Compliance:

- Starting in 2027, Romania will implement significant water reuse obligations.
- The regulation sets minimum requirements for water reuse, focusing initially on agricultural applications.

Focus Areas:

- Enhancing water management.
- Addressing water scarcity issues.
- Encouraging the use of treated wastewater in agriculture and other sectors.

Challenges:

- Infrastructure development for water treatment and distribution.
- Public acceptance and awareness of water reuse practices.
- Investment and funding for new technologies and systems.
- Ensuring quality and safety standards for reused water.

- Households and certain industries generate approx. 20 million p.e. of wastewater every day.
- Urban wastewater is treated in 642 plants.

Romania's efforts in water reuse are expected to ramp up significantly as the 2027 deadline approaches, driven by the need to comply with EU regulations and the increasing urgency of addressing and sustainability issues.

PRODUCT

Drinking Water



Drinking Water



Industrial Water



Urban water

Irrigation, Firefighting water, Service water (street washing etc.)



Irrigational water

TECHNOLOGIES & PROCESSES

Direct potable reuse - DPR

- Advanced Multi-Barrier Systems
- Non treatment & Operational barriers
- No environmental buffer

Typically for indirect potable reuse - IPR

- Advanced Multi-Barrier Systems
- Non treatment & Operational barriers
- Groundwater/reservoir augmentation (environmental buffer)

Industrial water recycling & reuse

Depending on the application:

- Typically: Coagulation/Flocculation, Clarification, Filtration, Ozonation, Ultrafiltration, Reverse Osmosis, Ion Exchange

Typically for urban reuse

- Tertiary sand filtration & Disinfection
- Biofiltration/Ultrafiltration/Dual Media Filter & Disinfection
- Biofiltration & Disinfection

Typically for agricultural irrigation

- Tertiary sand or Dual media filtration & Disinfection using Cl₂ or UV

APPLICATIONS

● Direct potable reuse

● Indirect potable reuse

● Industrial recycling & reuse

● Urban reuse

● Agricultural irrigation

Source water: used water and/or industrial effluents

Case Study



sustainable solutions. for a better life.

Madinaty WRP, Cairo, Egypt

Municipal WWTP & Water Reuse Plant

2 x 40 MLD



MADINATY WRP, Egypt

New Wastewater treatment & Water Reuse Plant
for new satellite city near Cairo



Building a City of International Standards in Egypt

- A new and exclusive satellite city was built east of Cairo by a private company, part of Talaat Moustafa Group Holding (TGM)
- A modern city with international standards that offered a high quality of life was realized
- Covering an area of 33 mio m²
- Providing a contemporary lifestyle for 600.000 inhabitants in 120.000 housing units
- Plenty of green spaces and recreation areas highlight its modernity

Green technologies for a Green City.

Great value was attached to environmental protection. Accordingly, the treatment plant was designed for the sustainable reuse of the resultant cleaned water.

MADINATY WRP, Egypt

New Wastewater treatment & Water Reuse Plant
for new satellite city near Cairo



GENERAL INFO

- Client:
Developed by Arab Company for Projects and Urban Development A.R. - a private company, part of Talaat Moustafa Group Holding (TMG)
- Location:
Madinaty – a new satellite City near Cairo, Egypt
- Type:
Stage I: 40 MLD – DBO
Stage II: 40 MLD – EP & O&M
- Commissioning:
Stage I: 2018
Stage II: 2022
- Reclaimed water is reused for urban irrigation.

Design &
Engineering

Procurement

Equipment
Supply

Installation

Commis-
sioning

Operation &
Maintenance
– O&M

MADINATY WRP, Egypt

New Wastewater treatment & Water Reuse Plant
for new satellite city near Cairo



TECHNOLOGY

3-stage wastewater treatment:

- Mechanical/Biological treatment – Activated Sludge Process
- Tertiary treatment by Sand filtration
- Disinfection

Sludge treatment:

Anaerobic sludge digestion
Dewatering by centrifuges

Additional components:

- TSE Pumping Station
- Odour treatment (biofilter)
- Laboratory
- SCADA system for fully automated plant.

Protecting natural resources – 80.000 m³ every day.

The reclamation plant has a capacity of 2 x 40.000 m³/day. This volume, which would cover the daily water requirement of over 600.000 people, can be saved and natural resources thus protected.

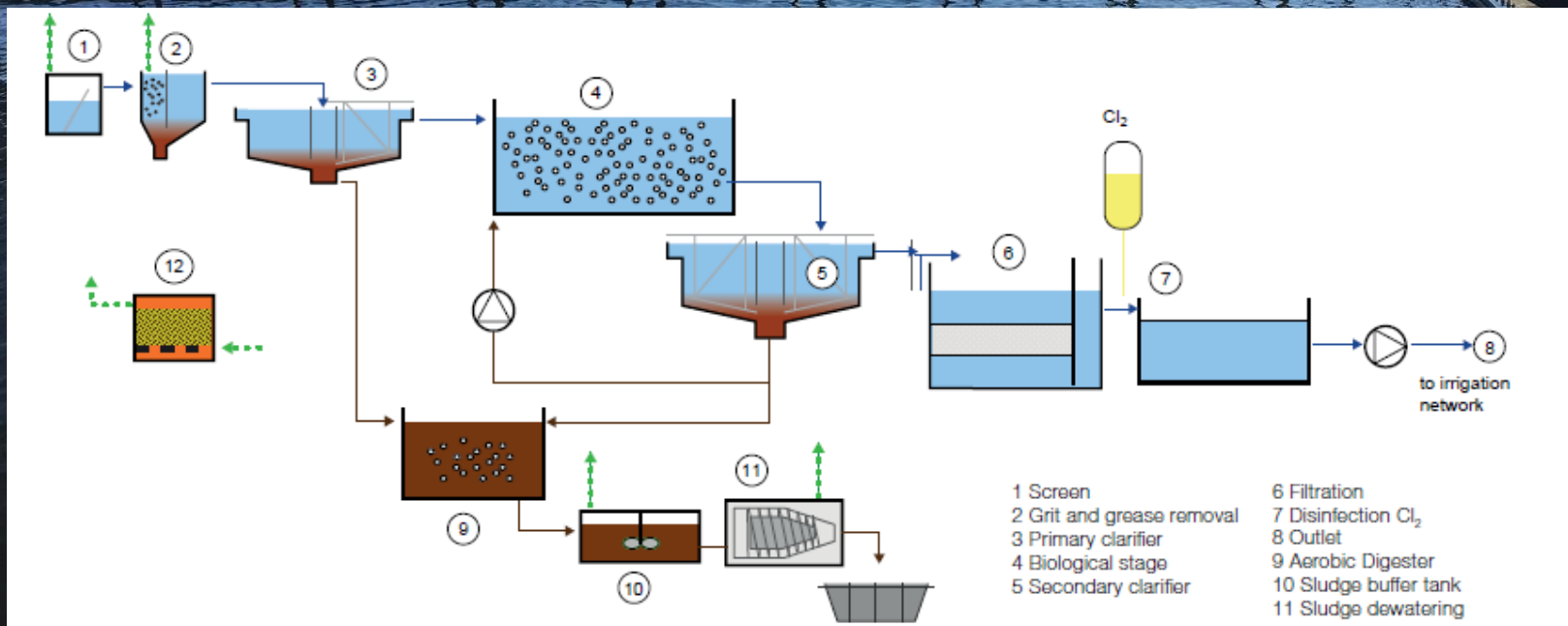
MADINATY WRP, Egypt

New Wastewater treatment & Water Reuse Plant
for new satellite city near Cairo

PROCESS & WATER QUALITY

Wastewater treatment
Main process steps

- Mechanical pre-treatment
- Primary clarification
- Biological treatment (activated sludge process)
- Secondary clarification
- Wastewater filtration (rapid gravity sand filtration)
- Final disinfection



MADINATY WRP, Egypt

New Wastewater treatment & Water Reuse Plant for new satellite city near Cairo

WATER QUALITY

The reclamation plant comprises a fully equipped laboratory, where not only the effluent quality is measured and monitored continuously.



The reclaimed water is directly pumped into a special service water network for irrigation purposes.

Parameter	Units	Treated water – Guarantee Values
BOD	mg/l	≤ 10
COD	mg/l	≤ 50
SS	$\mu\text{g/l}$	≤ 10
Residual Chlorine	mg/l	$\geq 0,5$
Fecal Coliform Bacteria		$\leq 2,2/100 \text{ ml}$
Dewatered sludge – cake dry solids		$\geq 20 \%$

MADINATY WRP, Egypt

New Wastewater treatment & Water Reuse Plant
for new satellite city near Cairo

ENERGY GLOBE AWARD – Category Water - WABAG with the Project
Madinaty was the NATIONAL WINNER IN EGYPT 2023



Operations and maintenance have been provided
by WABAG since the commissioning of the plants
in 2018 and 2022, respectively.

(Photo: O&M activities during COVID in 2020)

REUSE OF TREATED MUNICIPAL WASTEWATER

SOME MORE EXAMPLES & VARIOUS APPLICATIONS



sustainable solutions. for a better life.

Saving 120 MLD



Jubail Industrial City WWTP, KSA, 120,000 m³/d, Urban Irrigation

Saving 40 MLD



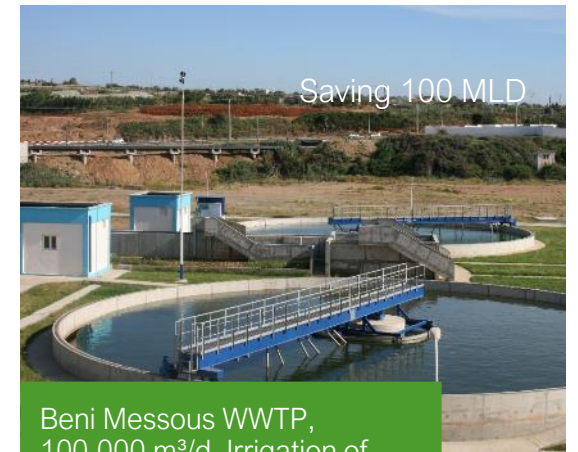
Port Said WWTP, Egypt, 40,000 m³/d, Urban irrigation

Saving 40 MLD



Madinat Salman WWTP, Bahrain, Reuse for urban irrigation, 40,000 m³/d

Saving 100 MLD



Beni Messous WWTP, 100,000 m³/d, Irrigation of plantations (grass, flowers and non-fruit trees).

Saving 10 MLD



Jazan Economic City, KSA, 10,000 m³/d, Urban and industrial reuse

Saving 3.3 MLD



Sidi Bou Ali WWTP, Tunisia, 3,300 m³/d, Agricultural irrigation

Saving 300 MLD



Al Kharij Road WWTP, Phase 3, KSA, 300,000 m³/d, Agricultural Irrigation

Saving 45 MLD



Koyambedu TTRP, Chennai, India, Reuse as industrial water, 45,000 m³/d

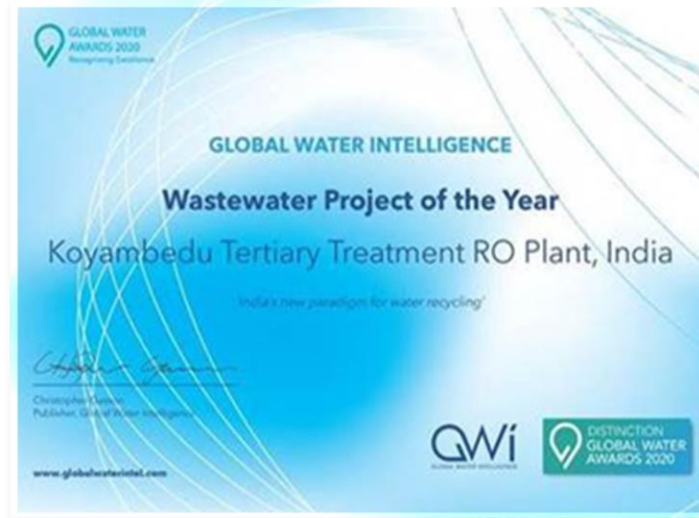
WABAG - WATER REUSE PROJECTS - AWARDS



sustainable solutions. for a better life.



ENERGY GLOBE
WORLD AWARD
2023 for
JUBAIL Ind. City
Water Reuse Plant





sustainable solutions. for a better life.

Thank you for your attention!



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