Under the Patronage of His Excellency **Eng. Abdulrahman bin Abdulmohsen AlFadley**
Minister of Environment, Water & Agriculture

منتدى المياه السعودي
saudi water forum SWF 2024

Improvement operational assets efficiency

Global best practices

29 April – 01 May 2024

Hilton Riyadh Hotel & Residences
Riyadh, Saudi Arabia

Organized by

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture

المؤسسة العامة لتحلية المياه المالحة
Saline Water Conversion Corporation (SWCC)

شركة المياه الوطنية
National Water Company

Organizing Partners

الشركة السعودية لشراكات المياه
Saudi Water Partnership Company

المؤسسة العامة للري
Saudi Irrigation Organization

شركة نقل وتقنيات المياه

منظم المياه
Water Regulator

المركز الوطني لكفاءة وترشيد المياه
NATIONAL WATER EFFICIENCY AND CONSERVATION CENTER
MAEE

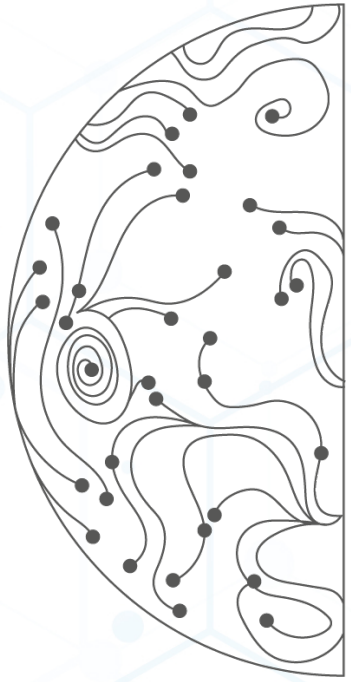
Yann NEZOT
O&M and Performance Director
NWC Central Cluster
ERWAA @ Veolia

26 years within Veolia's water operations and support

Key focuses: Operation performance, NRW & network performance, Customer Experience, Digitalization, and Data management

Currently Operation & Maintenance and Performance Director for the MOMc of Riyadh Central Cluster

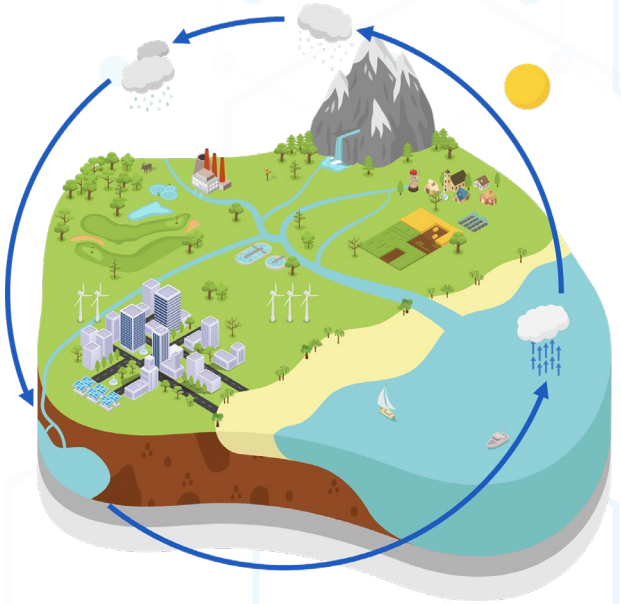
AGENDA



1. Our approach within Veolia
2. Dive #1: Expand Asset Capacity and Lifetime (GCC)
3. Dive #2: Adapt Wastewater Network Capacity (Bulgaria)
4. Dive #3: Achieve Green Energy Self-Powered WWTPs (Jordan)
5. To conclude…

1 Veolia in One slide

Management of the global water cycle, from production and distribution of drinking water to the collection, treatment and recycling of wastewater



WATER RESOURCES & DRINKING WATER

- **111 million people supplied** with drinking water
- **145 drinking water network O&M contracts** throughout the world
- **4,130 water treatment plants** managed

WASTE WATER TREATMENT & REUSE

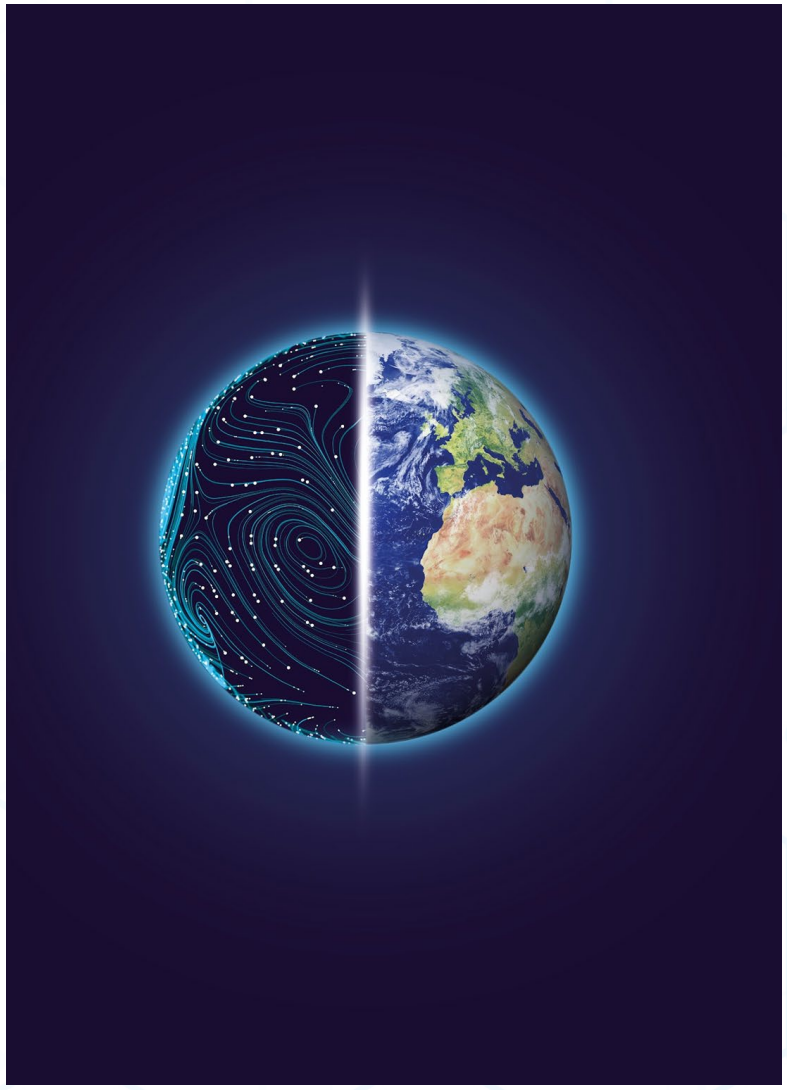
- **97 million people connected to wastewater systems** operated by Veolia
- **3,506 wastewater treatment plants** managed
- **128,000 km of wastewater network** under operation

TODAY in the water business

58,000 engineers & technicians in more than 40 countries

Also active on solid waste management, hazardous waste management & energy including local decarbonized systems

1 The Water Challenges for Cities and Operations



WATER SCARCITY

EXTREME EVENTS

DECARBONIZATION

GROWING CITIES

VS

AGING ASSETS

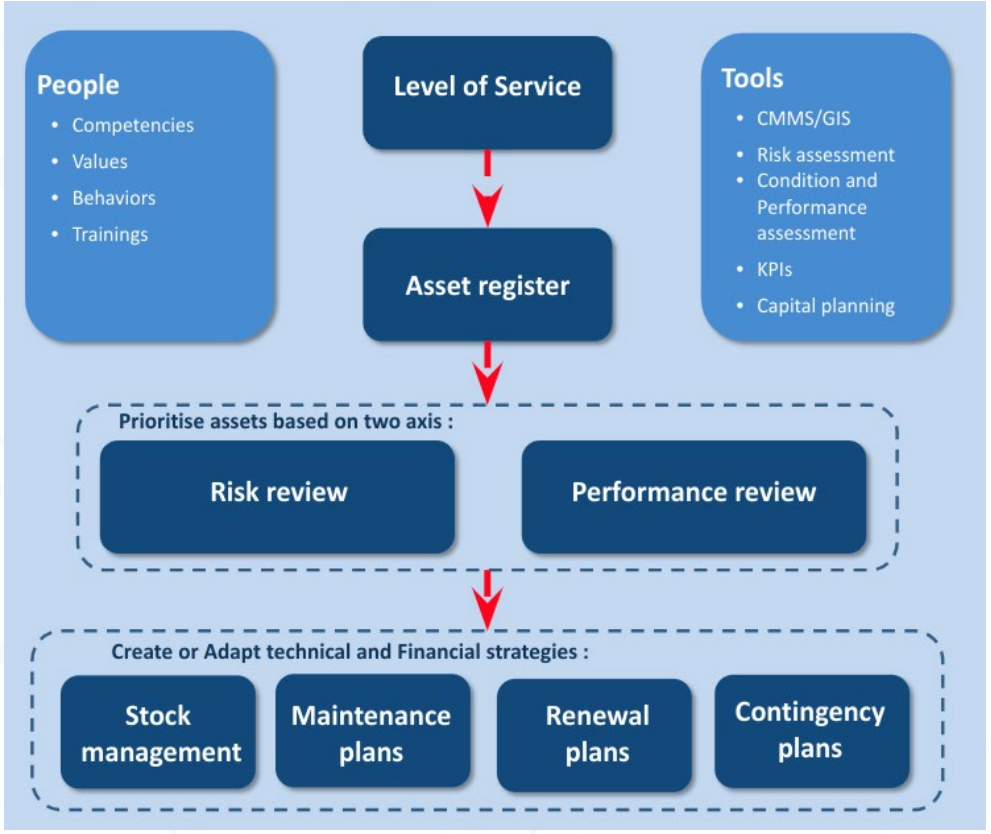
BUDGETARY CONSTRAINTS

STRESSED SYSTEM

How to support the best decision making?

- ➔ Capture data and leverage on it
- ➔ Challenge the status quo
- ➔ Put Asset Management at the heart of operations
- ➔ Consider decarbonization as a key driver of our activity

1 Our Approach to improve operational assets efficiency



*OPTIMISE expenses and performance of the asset portfolio through **Life Cycle Approach** and the right balance of the trade-offs between **RISK, PERFORMANCE** and COSTS (CAPEX+OPEX)*

Create and adapt technical and financial strategies to "Moving Goalposts"

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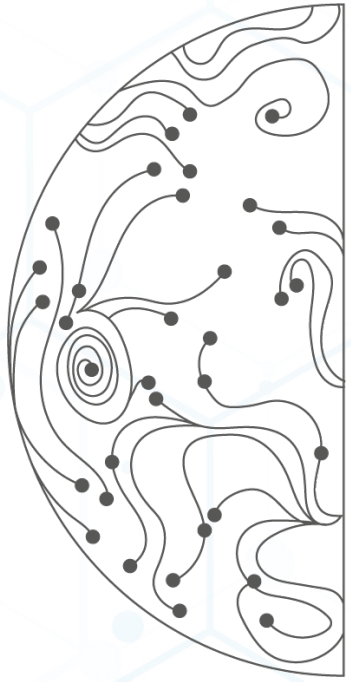

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2 Dive #1: Expand Asset Capacity and Lifetime (GCC)

Ajman (UAE) Sewer Concession - Extend Capacity

- **27-years Sewerage Concession starting in**
- Concession aiming at developing the service and the assets and serving today ~ 500,000 inhabitants
- Starting with embryonic sewerage system relying mainly on tankers
- And reaching a full fledge serage system today:
  - 350 km of gravity and risings mains network
  - 21 pumping stations
  - 1 WWTP (~120 MLD) in 2 phases
- Environmental achievements
  - 70% of electricity from biogas to electricity
  - 100% of water reuse

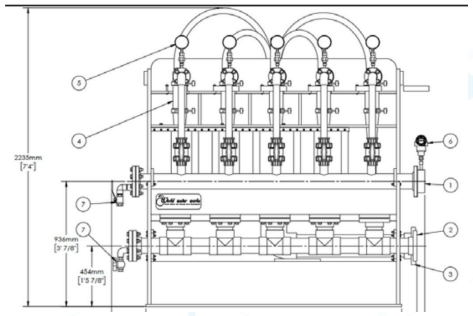
2 Dive #1: Expand Asset Capacity and Lifetime (GCC)

Ajman (UAE) Sewer Concession - Extend Capacity

- **Assets optimization through better asset usage leveraging on find pockets of untapped capacity beyond initial design**
- **WWTP capacity (Phase 1)** was extended by (1) using the network as a buffering system to (2) use the peak capacity of the plant as design capacity.

  Key Success Factors:
  - Challenge design and statu quo
  - Synergy between network and WWTP
- **WWTP capacity (Phase 2) was optimized** by introducing new technology with no civil work modification to debottleneck one part of the plant (InDense on sludge treatment): + ~50% plant capacity (40 ↗ 58 MLD)

  Key Success Factors:
  - Technology watch
  - Process expertise
  - Operations during plant modification



2 Dive #1: Expand Asset Capacity and Lifetime (GCC)

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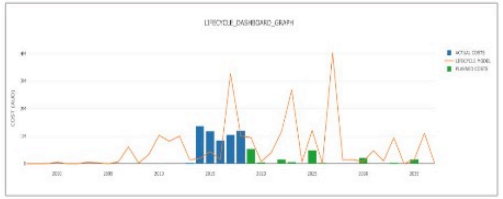
Ajman (UAE) Sewer Concession - Extend Lifetime

- **Progressive "development" of Asset Management** as the adequation of operations, assets and system evolves
  1. Standard Operations
     - Stabilisation of operation (DLP period)
     - Development of asset register and follow OEM maintenance schedule
  2. Maintenance Optimization (Continuous Improvement)
  3. Selective RCM Analysis and Life Cycle Analysis

- **Switching over time to Cost to Assets** with deeper integration into other systems leveraging on CMMS to optimize renewal

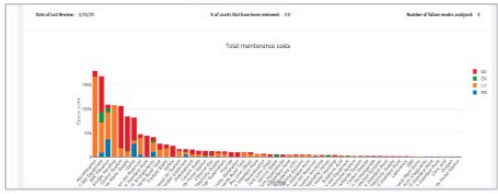
LCC Model

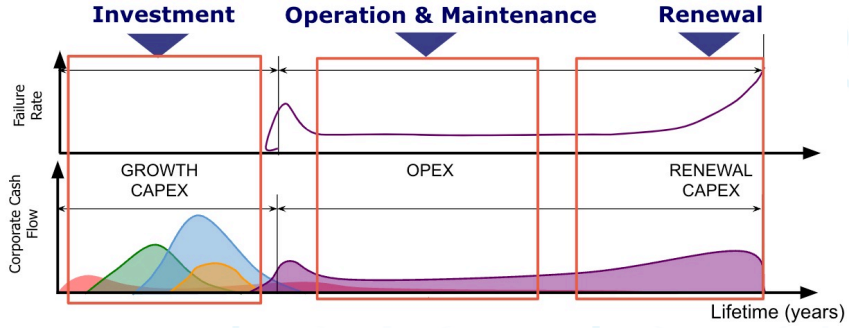


Asset Assessment Model

Condition\Criticality	Unknown	Moderate	Serious	Major	Catastrophic
Unknown	0	0	0	0	0
Excellent	0	700.0	0	0	0
Good	0	22,400.0	0	21,700.0	0
Average	0	1,700.0	0	700.0	0
Fair	0	0	0	0	0
Poor	0	20,000.0	0	0	0

RCM model





VEOLIA

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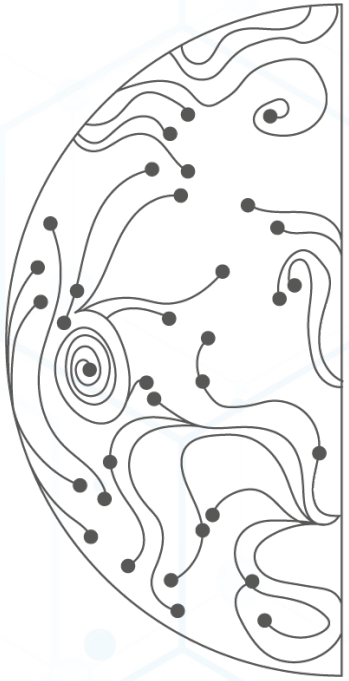

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3 Dive #2: Adapt Wastewater Network Capacity (Bulgaria)

Sofia (Bulgaria) 25y Concession - Key Highlights and Success

- **First and only concession in Bulgaria for Water and Sewer** (assets owner is Sofia Municipality) - 2000 to 2034
- **1,800 km of sewerage network + 2 WWTPs** (480,000 m^3/d + 177,000 m^3/d)
- **Network investments: ~ 15 km/year extension and renewal**
- **Context:** Aging assets with insufficient capacity + Adaptation to changes in EU legislation
- **Challenges:** Climate changes + Extreme events (Flooding, Drought)
- **Opportunities:** Change the concept => from combined to separate sewer network

3 Dive #2: Adapt Wastewater Network Capacity (Bulgaria)

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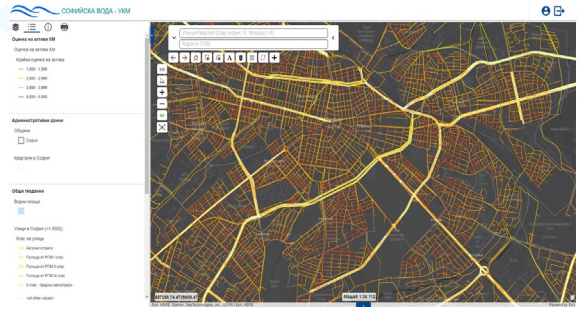
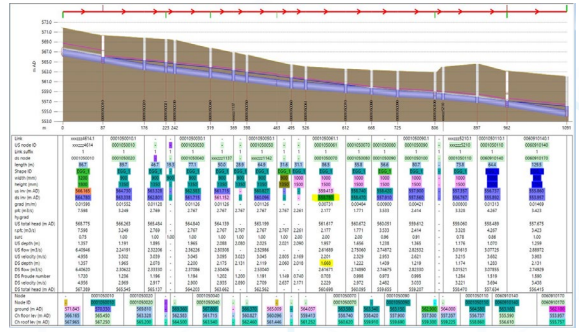
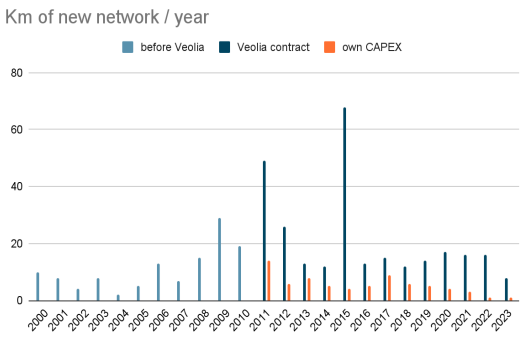
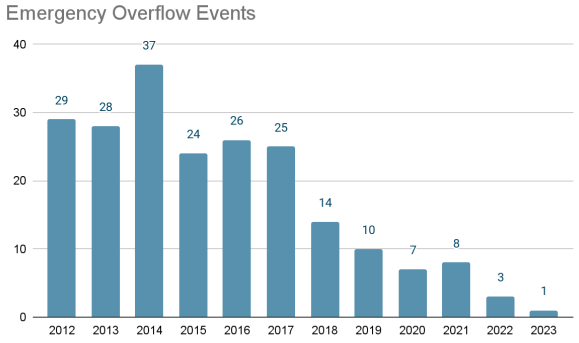
Collecting Data > Challenging Existing Situation > Re-Design
Planification x Investment x Work supervision
During on-going Operations

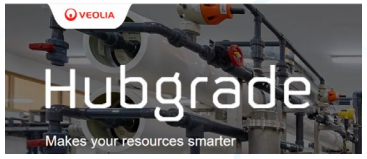




- **Data:** Assets Condition assessment – GIS centric (valuable decision making tool)
- **Design:** Hydraulic modelling as part of the CAPEX decision making process
- **Invest:** +100 km in 3 years (renewal rate x7)
- **Dynamic Operation:** +40 monitoring sites concentrated into Hubgrade \ Sewerview







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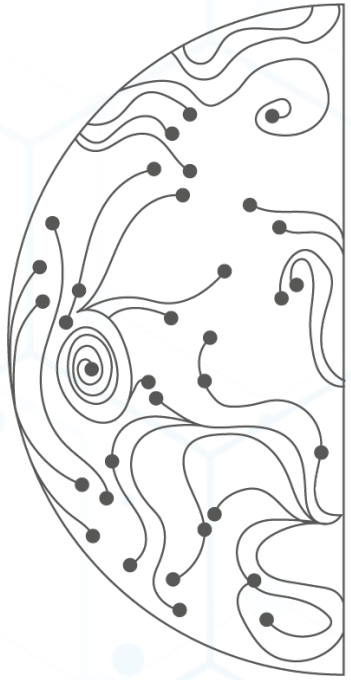

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4

Dive #3: Achieve Green Energy Self-Powered WWTP (Jordan)

SAMRA WWTP BOT - Key Highlights and Success

- **First BOT in Jordan,** signed in 2003 between Government of Jordan & VEOLIA / CCG
- **Phase 1** completed in 2008 & **Phase 2** in 2015
- **364,800 m3/d** capacity equivalent to **3.5 million** inhabitants
- **65%** of wastewater treated in Jordan**, 100% reused** in irrigation
- **Operation & Maintenance** up to 2037
- **92% energy self-sufficiency** with renewable resources (power generation with hydraulic turbines & biogas generators)
- **6 ISO Certifications:** 9001, 14001, 17025, 45001, 50001, 55001

4

Dive #3: Achieve Green Energy Self-Powered WWTP (Jordan)

SAMRA WWTP BOT – On the road to 100% energy autonomy

- **Hydraulic turbines (4 MW):** 2 Pelton (inlet) and 3 Francis (outlet) covering **27%** of energy needs
- **Biogas generators (10 MW):** 10 Caterpillar units covering **65%** of energy needs
- **Many innovations/optimizations** implemented to increase self-sufficiency, among them:
  - **Advanced control of aeration: +7%** of power recovery thanks to reduction in energy consumption
  - **Heat recovery from exhaust of generator: +4%** in energy production increase
- **Solar farm project** on Samra site (under study)**: +2%** of energy production increase

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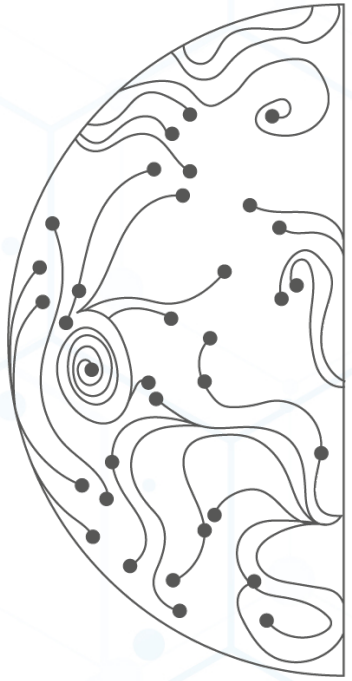

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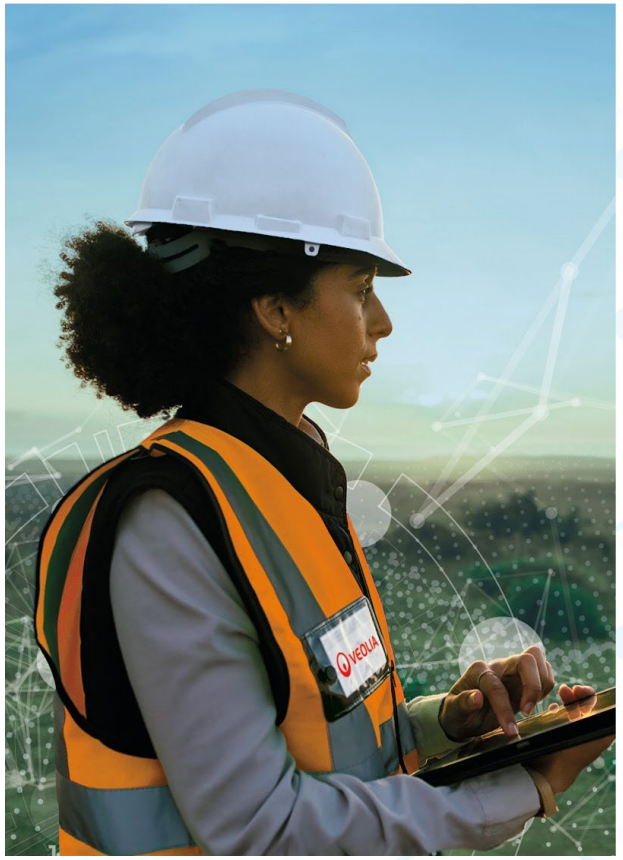
Historical data is determinant to define the right solution and take the best decision for your water system.
Anticipation!

Assets criticality is changing, value-based selection is less intuitive, it is key to modelize our analysis:
Rationalize!

Technical solutions and business models are not giving a complete answer to face the change: better to act than try to reach perfection
Adaptation!



DATA VALUE | **ANTICIPATION** | **ACTION**

VEOLIA

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THANK YOU!

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