Starosel, October 2026

RAJA's Constanta's experience in implementing innovative NRW solutions

Results and lessons learned

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Why our experience is relevant for Bulgaria?

COMMON BASELINE | EU accession | 1 January 2007 | Same EU water acquis

Common starting point. Different scale. Common EU compliance journey

Pre-2007 Pre-accession instruments	2007-2013 First post-accession period	2014-2020 Large Infrastructure & regionalization	2021-2027 Cohesion-policy programmes

ROMANIA

238,397 km²	≈ 19.0 M
SURFACE AREA	POPULATION • 2024 approx.

2.15× the territory • ≈3× the population

BULGARIA

110,994 km²	≈ 6.4 M
SURFACE AREA	POPULATION • 2024 approx.

Same EU obligations • smaller national scale

EU conformity focus: Drinking Water Directive (EU) 2020/2184 • Urban Waste Water Treatment Directive

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System scale & investment

Network footprint, treatment assets and operators

	ROMANIA	BULGARIA
Water network	101,519 km	78,803 km 2024
Sewer network	≈ 49,282 km Including stormwater	13,362 km 2024
Urban wastewater treatment plants	1,299 reported Reported by operators (RO)	182 active plants 2024
Regional operators	45 major	28 regional
Water entering systems	> 1 bn m³/year BG billed: 338.352m m³; RO has no fully comparable consolidated series	851.211m m³ 338.352m m³ billed 2024
Investment need	EUR 30.4 bn over 15 years	≈ EUR 7 bn for wastewater compliance

Latest available year shown for each indicator

Water & wastewater access

Coverage and system-efficiency

Romania | Bulgaria

Public water-supply connection

2024

ROMANIA	BULGARIA
83.6%	99.5%

Sewerage connection

2024

ROMANIA	BULGARIA
60.1% national 60.0% effective in reported service areas	75.4% overall 67.6% to sewerage leading to a UWWTP

Non-revenue water

2024

ROMANIA	BULGARIA
44% sector 50% major regional operators	60.25% sector

ACCESS Bulgaria shows higher connection rates; Romania reports lower sector-wide non-revenue water.

Side-by-side indicators



Despite substantial investments supported by EU funds, Romania and Bulgaria have not yet achieved full conformity of the water and wastewater sector with the requirements of the EU Drinking Water Directive (EU) 2020/2184 and the Urban Waste Water Treatment Directive (91/271/EEC).

Latest available year shown for each indicator

Main challenges for the future

- Aging infrastructure
- Reduced EU funding availability
- **High Investments needed to ensure compliance with EU Directives**
- **High volumes of Non-Revenue Water**
- **Insuficient Regionalisation of the Sector Operators**

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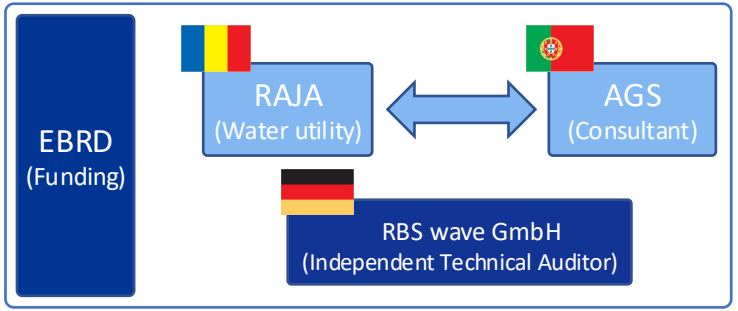
Performance-based service contract (PBSC)

Innovative approach for NRW reduction in Romania

- **Initially a 5-year project** (2021 – 2025): **1 year** for preparatory activities + **4 years for NRW reduction**
- **Fixed-fee remuneration**: 1st year to establish the project **baseline**
- **Performance fee** from year 2 onwards, depending on the achievement performance + fixed fee decreasing over time
- Project extension for one year (2026) to complete pending activities

Project KPI	Final target
KPI 1 - NRW for new zones (%)	Baseline - 5%
KPI 2 - NRW for old zones (%)	Baseline - 12%
KPI 3 - Infrastructure Leakage Index (-)	Baseline - 24
KPI 4 - Pipe breaks [no./(100 km.year)]	Baseline - 12

Project stakeholders



- ✓ **Decrease non-revenue water** in the project area
- ✓ Improve the **knowledge on how the system operates**
- ✓ Develop **plans for NRW reduction**
- ✓ Promote teams' **training** so they can be **autonomous** in NRW management

RAJA – project area | Municipality of Constanța





SC RAJA, S.A. is the **largest regional public operator in Romania** for water supply and wastewater drainage and treatment

RAJA:	3 million	7	170
Project:	**265,000** inhabitants	**1** counties	**5** localities

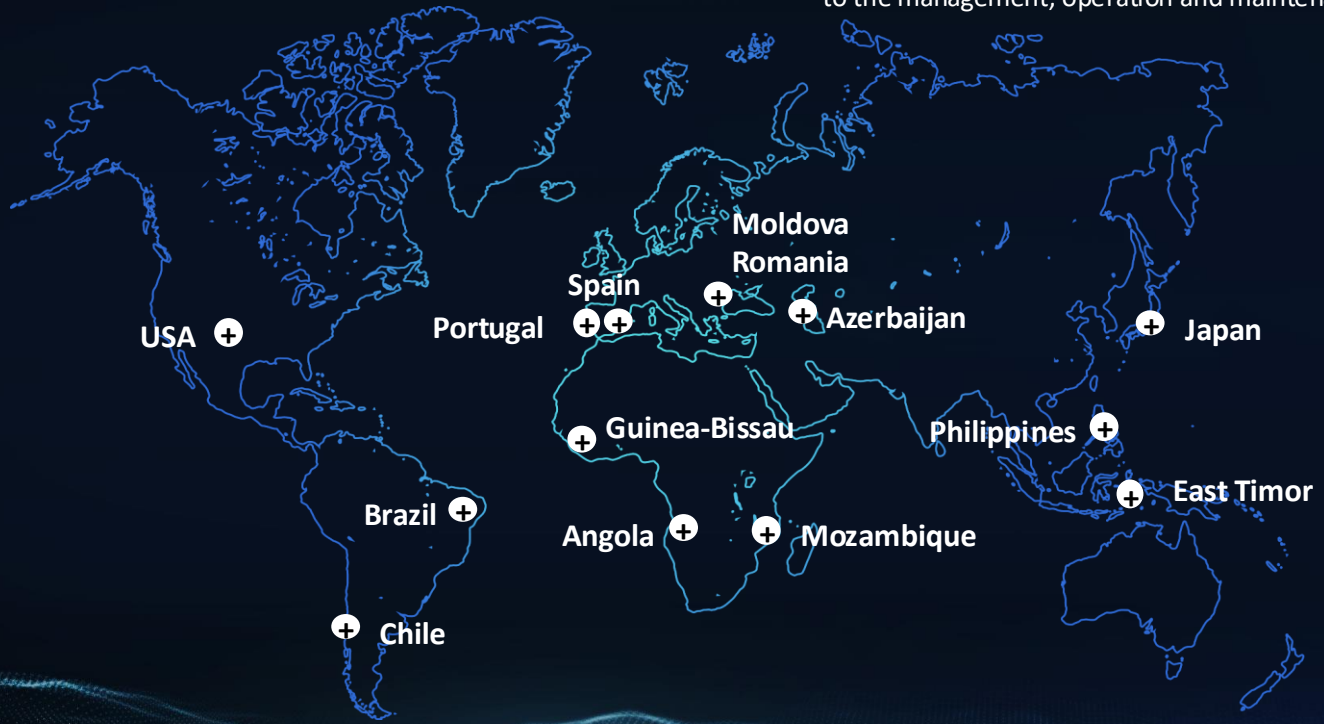
RAJA:	4,300 km	340,000 m³	9
Project:	**700 km** water supply network	**130,000 m³** water storage	**1** WTP

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MARUBENI 100%

AGS has been working in the water sector for more than 35 years, focusing its goal on the preservation of the environment and acting throughout the urban water cycle.

Activities range from consultancy and development of specialized engineering services to the management, operation and maintenance of urban water systems and facilities.



FRAMEWORK & SERVICES:

- Concessions and PPP
- Performance-based agreements
- Operation & maintenance agreements
- Engineering services provider
- IT services provider (Aquasis)

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Initial scenario



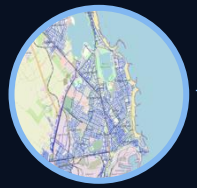
Aged infrastructure



Incomplete metering of the system inlets and outlets



Data mostly recorded **on paper**



"Open" network without subsystems nor DMAs





Limited leakage detection



Lack of **reporting** and performance **assessment** procedures



Lack of **software** for managing the system



Operational activities with low accountability

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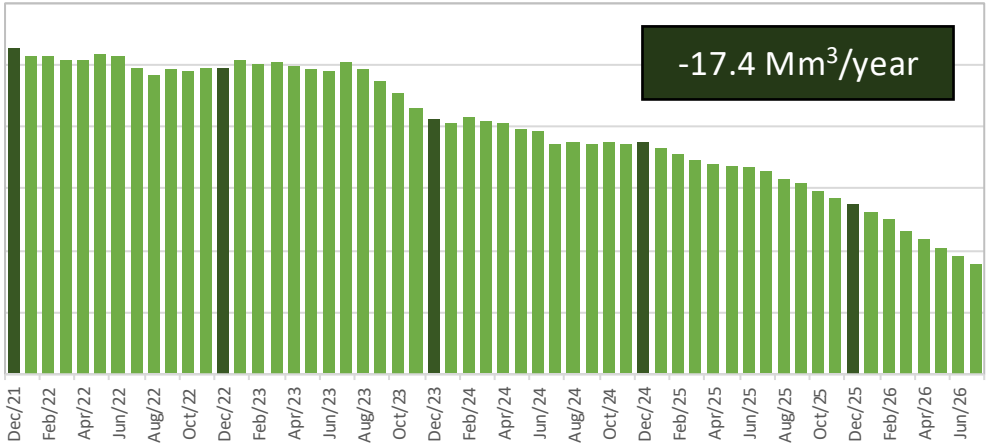
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Project results

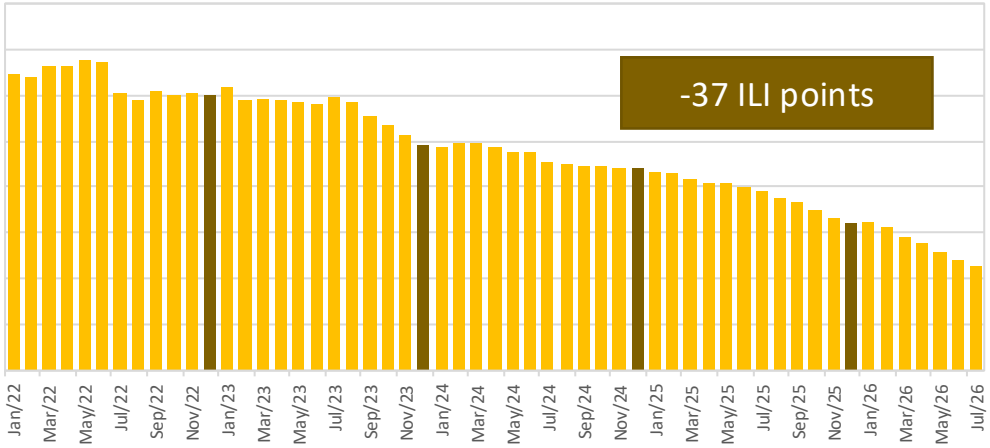
NRW reduction

- Reduction of **17.4 million m³/year of NRW**
- Reduction of **energy consumption of about 24%**
- Reduction of **3,528 tons CO_2/year**
- Reduction of **37 points of the ILI**

PBSC service area NRW volume (Mm^3/year)



Infrastructure Leakage Index (-)



Project results

Infrastructure and network operation improvement

- Construction of **150+ chambers**
- Installation of **245+ flow meters** and **485+ pressure sensors**
- Installation of new **valves** and replacement of non-working ones
- Implementation of **90** DMAs, out of 91 planned, scheduled to finish this year

Variable		2021	2022	2023	2024	2025	June 2026	Difference	
Inspected network length	km	187	336	908	1 087	1 235	875	468%	▲
Mains bursts detected by ALD	no.	62	481	699	247	219	373	602%	▲
Service connections bursts detected by ALD	no.	22	92	174	164	138	173	786%	▲
Operational staff working in water losses	no.	11	15	22	23	23	26	200%	▲







But how?

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A strategy for NRW reduction

NRW concept – A continuous improvement cycle

Reporting
- Inception report
- Daily reports
- Quarterly reports
- Base year report
- Annual reports

Monitoring
- Results analysis
- Technical support
- Activities control

Implementation Action Plan
- Hydraulic modelling
- Measuring equipment
- Pressure management
- DMAs & active leakage control
- Maintenance & quality of repairs
- Combatting commercial losses
- Other activities



Analysis
- Assessment
- Current practices
- Risks analysis
- Mitigation measures
- Work & staff

NRW concept & strategy
- Vision
- Mission
- Objectives, criteria & targets
- Activities planning (short-term, medium-term and long-term)

Procedures & specifications
- Data collection
- KPI methodology
- Equipment description and specifications.
- Best practices

Collaborative effort

Development of short, medium and long-term activities for NRW reduction



Active leakage detection





Hydraulic modelling

Illegal connections detection



Flow and pressure monitoring

Performance assessment



Real losses reduction

A difference that can be seen…



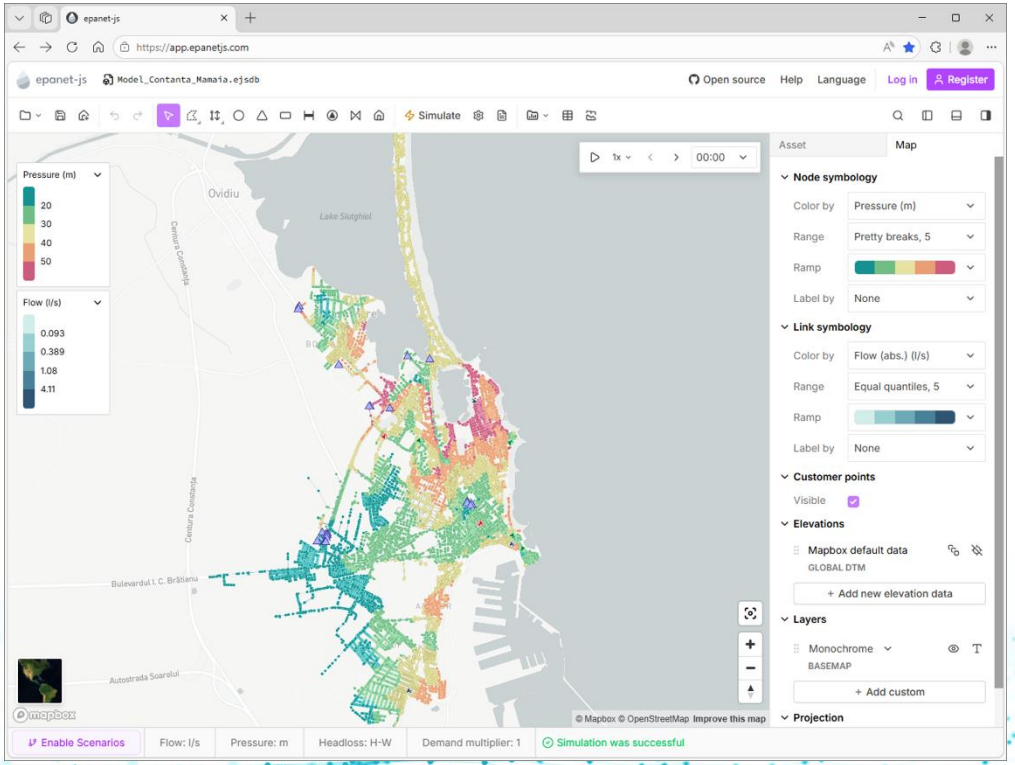


BEFORE	AFTER
• Open network	• Sectorized network
• Low control	• Flow meters & pressure sensors
• Limited software	• Aided by software
• Limited leakage detection (reactive)	• Active leakage detection
• Repairs of visible bursts (reactive)	• Prompt repair of the findings

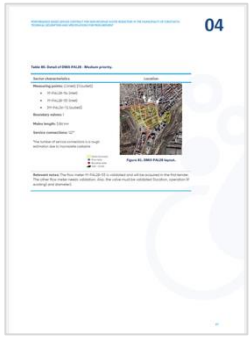
Real losses reduction



Real losses reduction

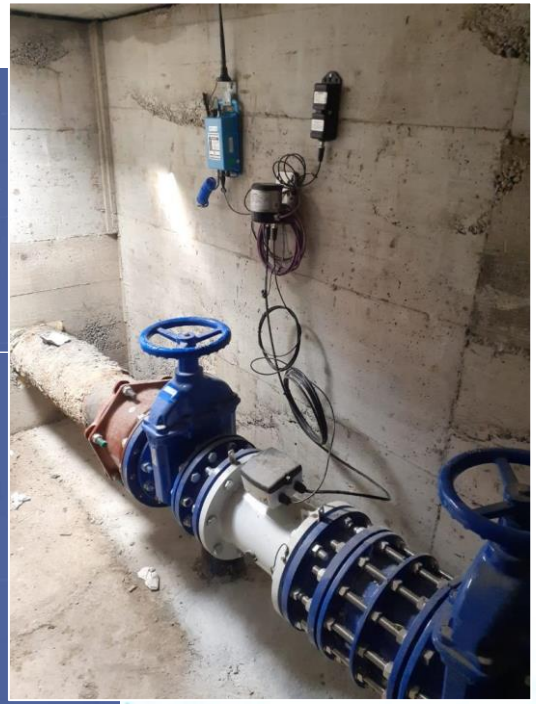


Real losses reduction









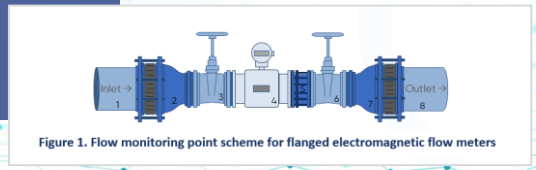


Figure 1. Flow monitoring point scheme for flanged electromagnetic flow meters

Real losses reduction

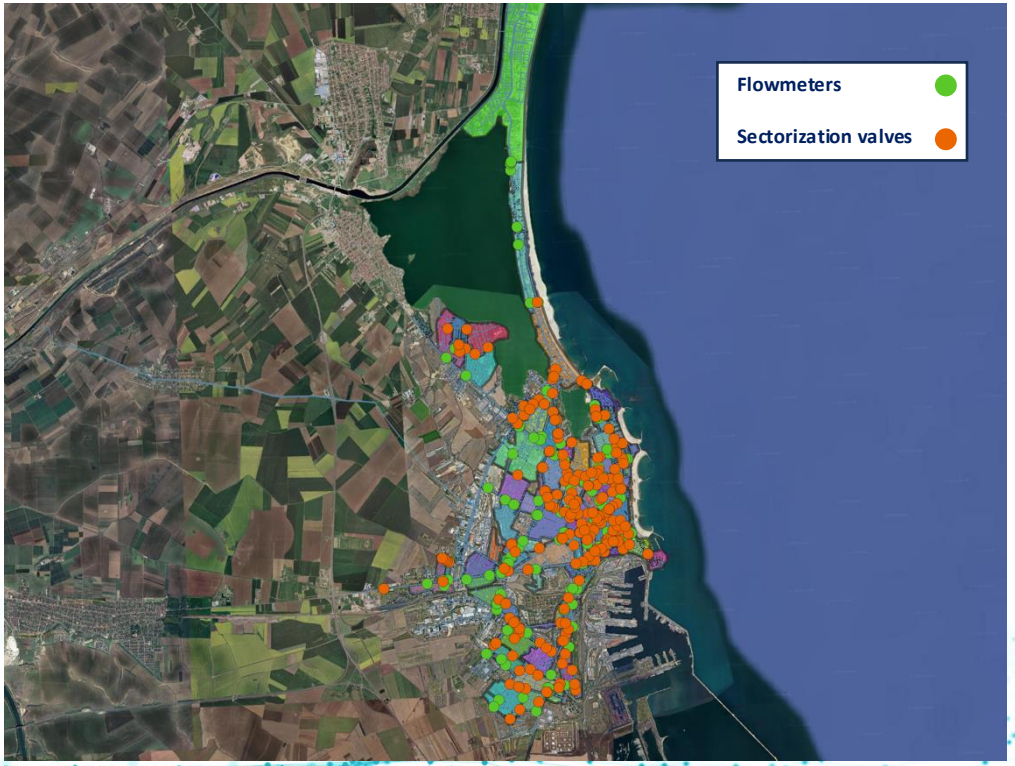








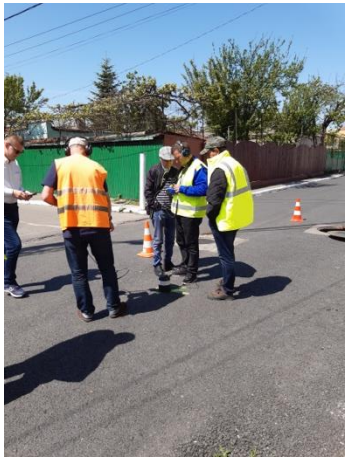
Real losses reduction



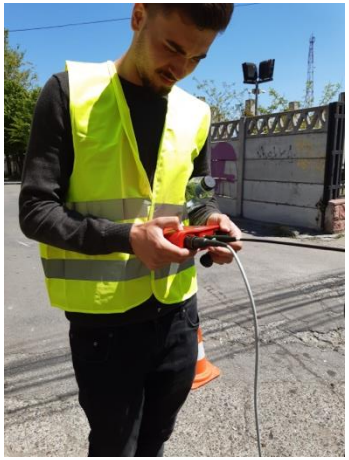
Real losses reduction



Real losses reduction









Real losses reduction









Real losses reduction







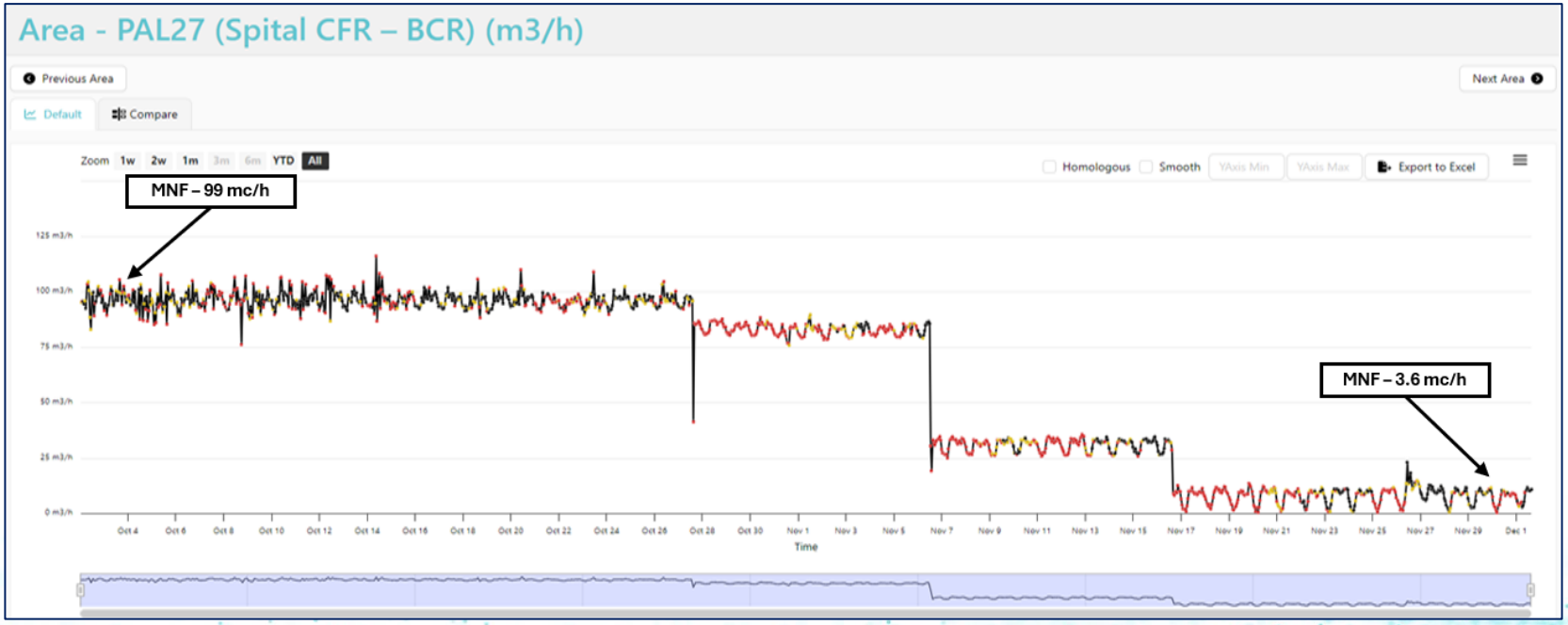




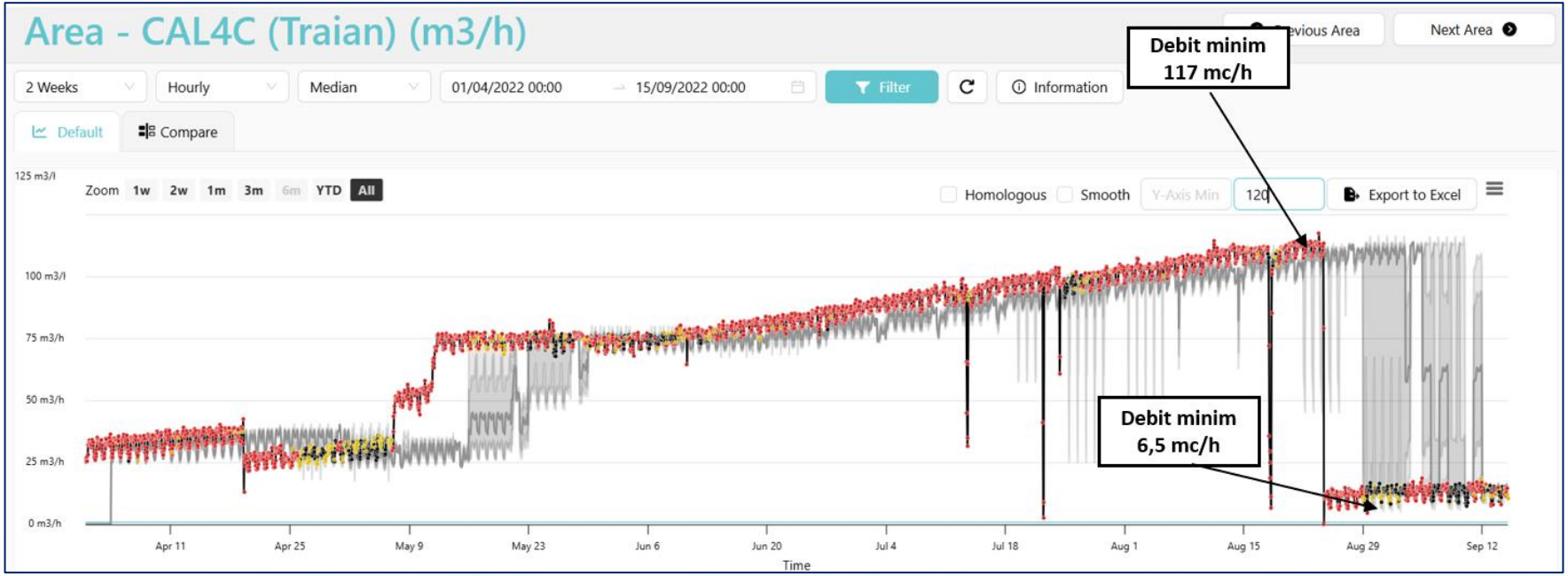




Results of the PBSC project at DMA level
Continuous flow and pressure monitoring for the detection and repair of leaks in DMA PAL27 – October 2023 – November 2024



DMA CAL4C
– Leak detected by the SIPO teams



Flow reduction following the intervention: approximately 111 mc/h

Apparent losses reduction

A knowledge-based approach

- Improving data **quantity** and **quality** (customers, meters & readings)
- Performing **customer meter testing** in laboratory
- Implementing dedicated **software for customer meters management**
- Promoting **customer meters replacement & resizing**
- Conducting inspections for the **detection of irregular uses**

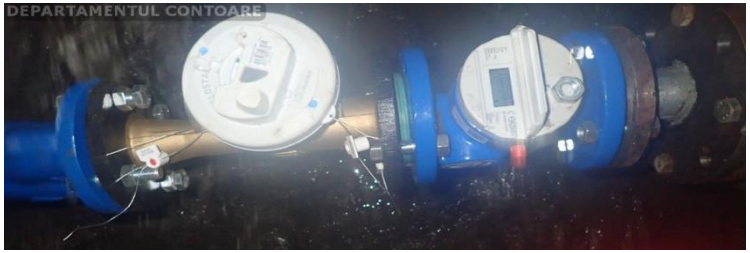


Apparent losses reduction





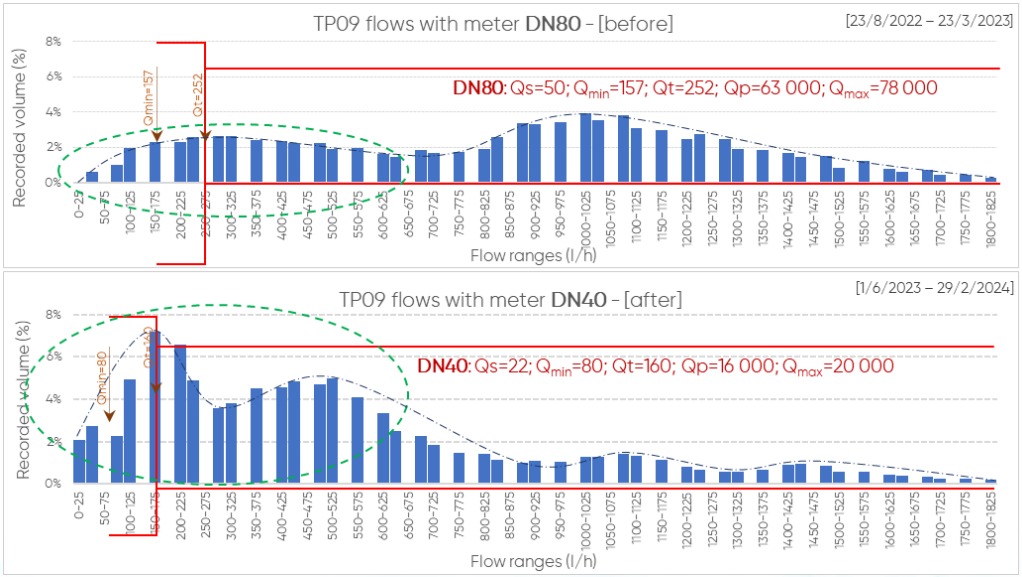


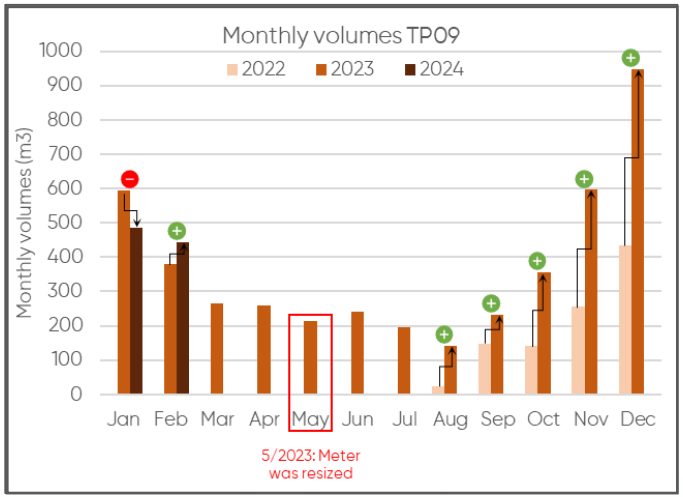






Apparent losses reduction





Lessons learned in implementing a PBSC

- RAJA project proves **PBSC is a successful approach for NRW** and is already a reference in the Romanian water sector.
- **Key success factors** for a PBSC:
  - Set realistic targets.
  - Define clear roles and responsibilities.
  - Set a well-defined baseline or a mechanism to revise it.
  - Ensure adequate resources.
  - Maintain good communication among stakeholders.
- **Main challenges**:
  - Human resources.
  - Change of organizational structure and procedures.
- **Digital transformation** is essential**: data reveals sources of problems and facilitates solutions.**
- **Involving people from management to operational levels is essential.**

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Thank you!

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