

An Israeli approach to transforming high levels of water loss into a new water source

Results and implications for water utility companies

Implementation of the approach to reduce physical water losses in Devin, Bulgaria

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Conceptual illustration

Recover supply across the network

Combine water-loss harvesting, targeted renewal and performance verification.

REDUCE TODAY'S LOSSES

Recover usable supply

Treat multiple active defects across the existing network.

TARGET RENEWAL

Replace where needed

Direct replacement to assets whose condition and failure risk justify renewal.

CREATE SUSTAINABLE SUPPLY

Sustainable supply and infrastructure

Recover supply and strengthen infrastructure — verifiable by results.

The outcome: sustainable supply and sustainable infrastructure.

Pair water-loss harvesting with targeted renewal, supported by measured results.

The Devin challenge



21.32 L/s

Reported night flow
in September 2024



Up to 7.9 bar

Pressure recorded in
parts of the network



21 hidden leaks

Located by acoustic
investigation

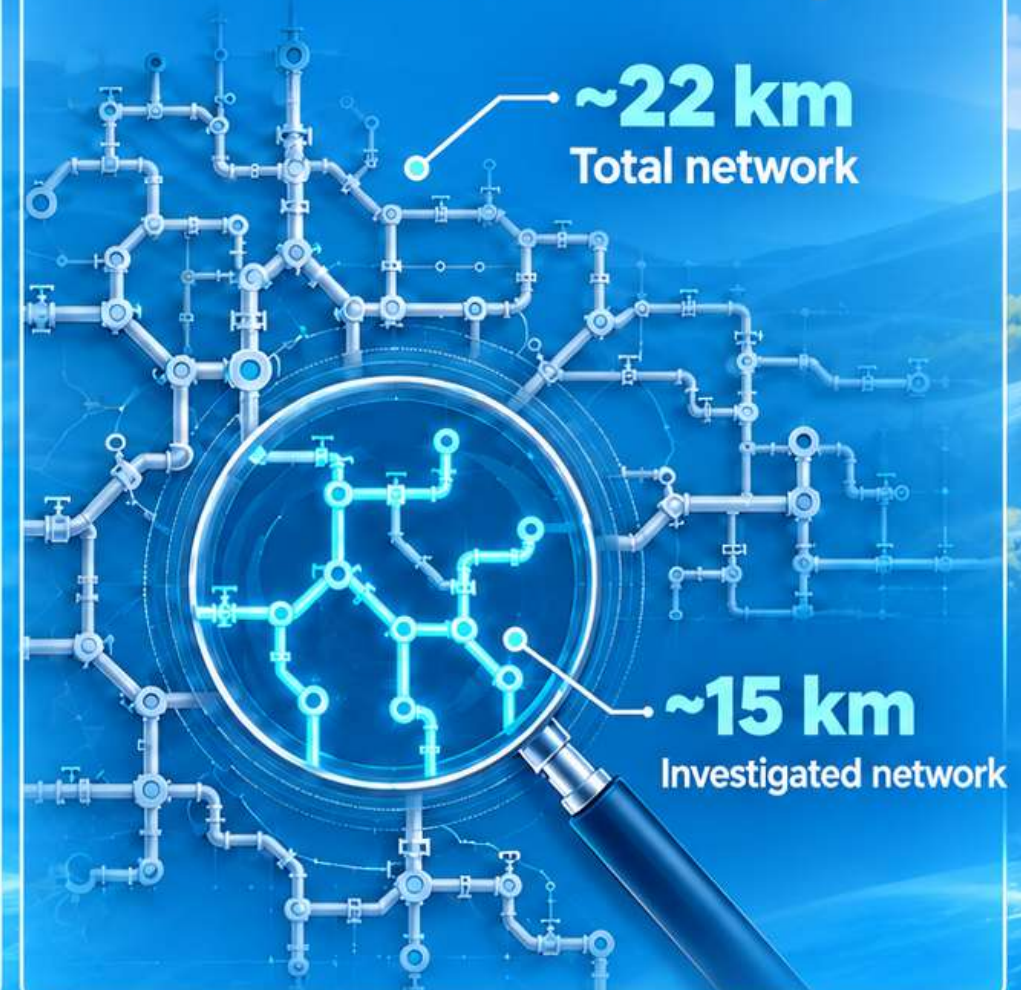
Why Devin needed a different approach

The escalation before intervention



The subsequent repairs revealed mixed defects that conventional excavation could not resolve for the long term.

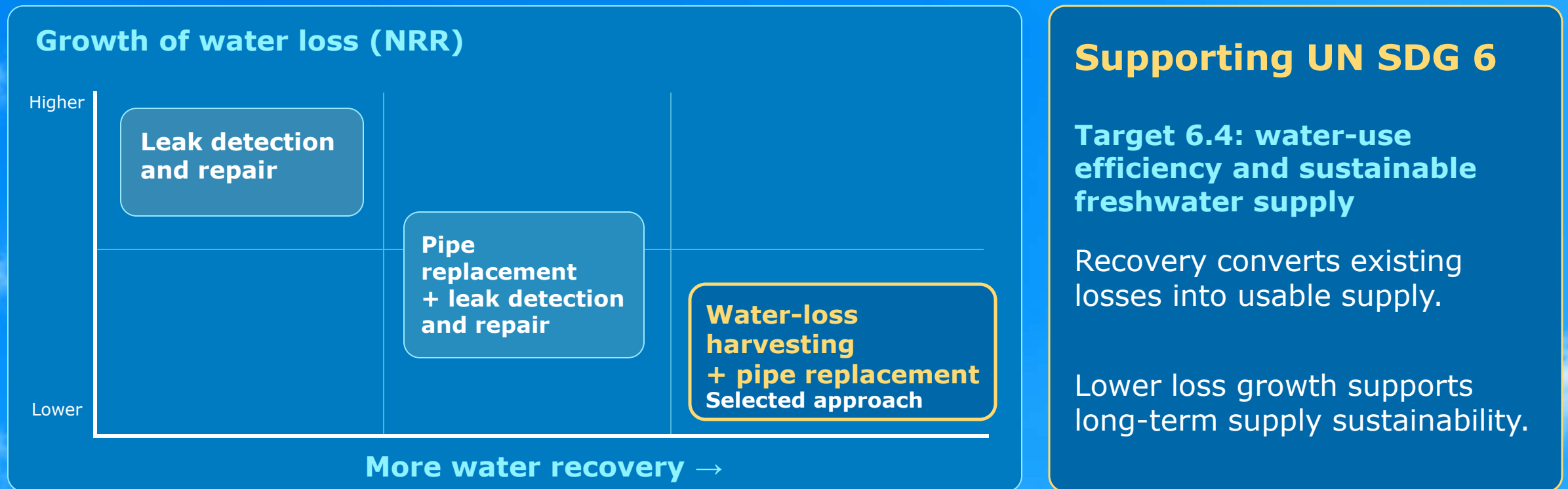
The network in scope



Recover water and reduce the growth of losses

The growth of physical water loss over time is called the Natural Rate of Rise (NRR).

Devin's >55% increase highlights the need for the combined effect: recovery and lower NRR.



Water-loss harvesting + pipe replacement: recovery and supply sustainability.

The network suffered from defects of mixed types

Deep pitting corrosion



Small, localized corrosion pits can penetrate the steel pipe wall.

Elastic cracks



Cracks were among the mixed defects identified in the report.

Reported network pressure: up to 7.9 bar

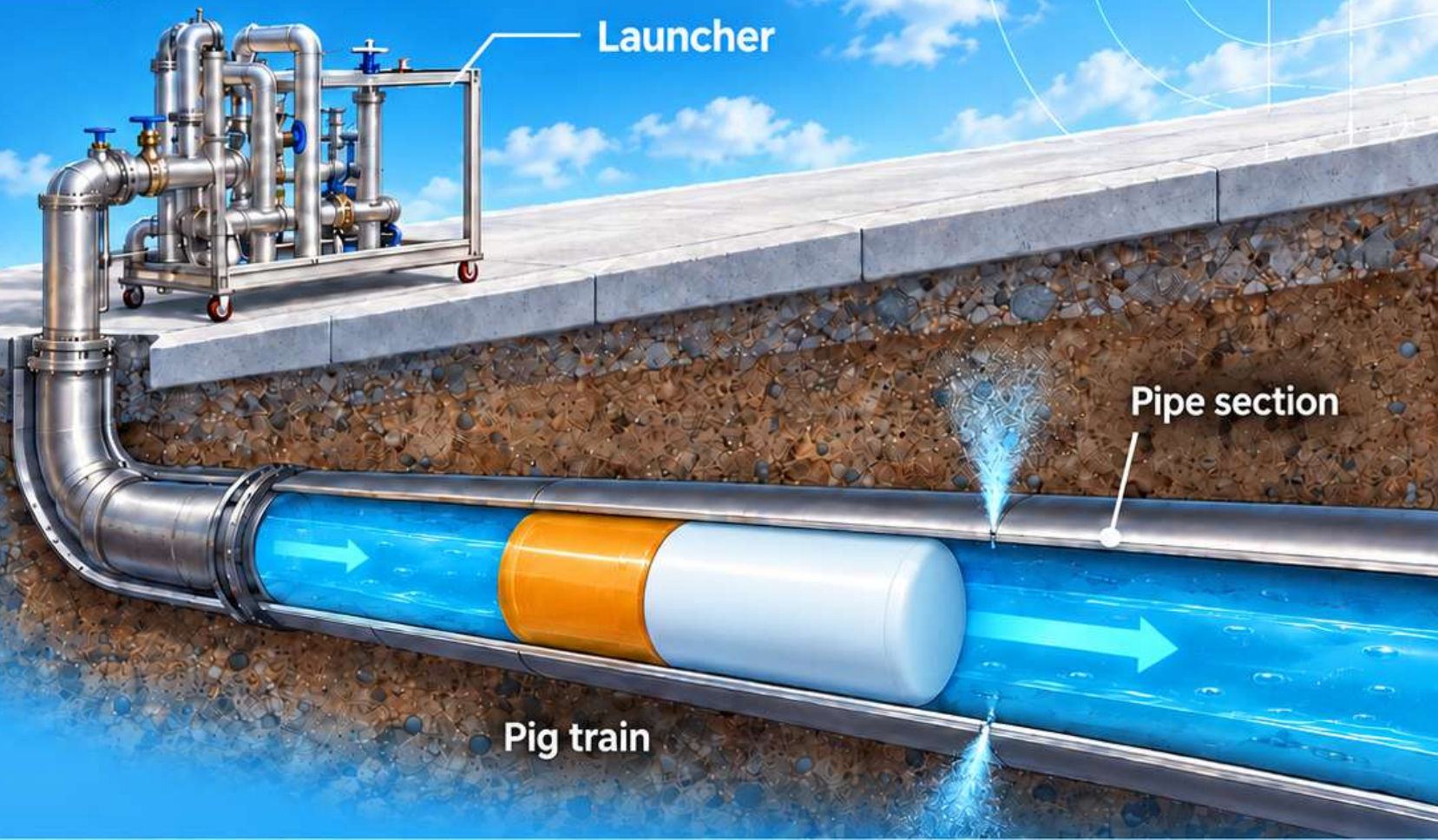
Elastic cracks and corrosion pits for which conventional excavation repairs were not a long-term solution.

A different approach: TALR

Trenchless Automated Leakage Repair

To bring the problem under control, Devin adopted an innovative trenchless approach.

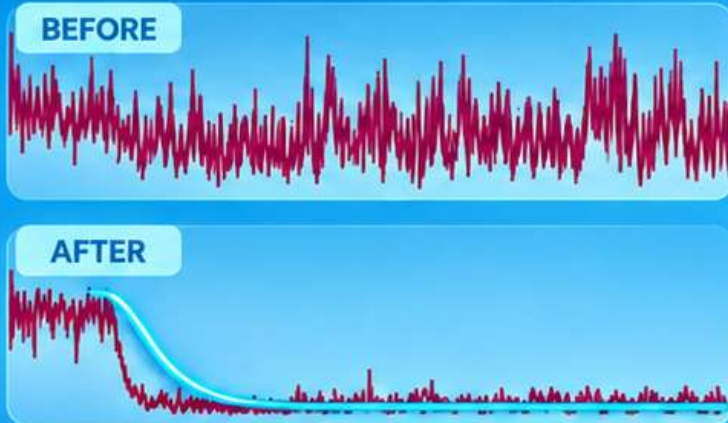
Automated repair of multiple active defects simultaneously—without excavating streets.



TALR: reduce losses, recover supply, sustain the gains

Treatment objectives for Devin

Reduce water loss



Illustrative reduction profile | Not measured telemetry

Seal multiple active defects

Treat hidden leakage within the existing network.

Turn losses into supply



Rapidly turn lost water into usable supply from the existing network.

Make the reduction last



Sustaining the reduction is the long-term objective.

Continued monitoring is needed to verify durability.

Finding the recovery opportunity

From network diagnosis to targeted water recovery



~22 km
Total Devin network



~15 km
Investigated network
Network mapping and loss measurement



13 zones
Targeted treatment
across Stages 1 & 2

Measured section losses
guided prioritization



Preparation and measurement

Establishing the evidence for prioritization

1 Review network information

Review supplied maps and DMA-zone data.



2 Verify in the field

Locate isolation valves and hydrants and test their functionality with the utility.



3 Measure real losses

Use the updated GIS map to investigate hydraulic sections and measure initial losses in L/h.



~15 km investigated within a ~22 km network

Diagnostic triage methodology

Prioritization based on initial measured water losses



Extreme criticality

>4,000 L/h

Immediate priority intervention

Zones 1, 2, 6



High criticality

1,000-4,000 L/h

Planned rehabilitation in the short term

Zones 3, 5, 7, 8, 9



Moderate criticality

<1,000 L/h

Preventive intervention to optimize performance

Zone 4



Measured real losses determined rehabilitation priorities.

Zone examples listed in the report's traffic-light classification.

Devin: two treatment stages

13 zones documented across both stages



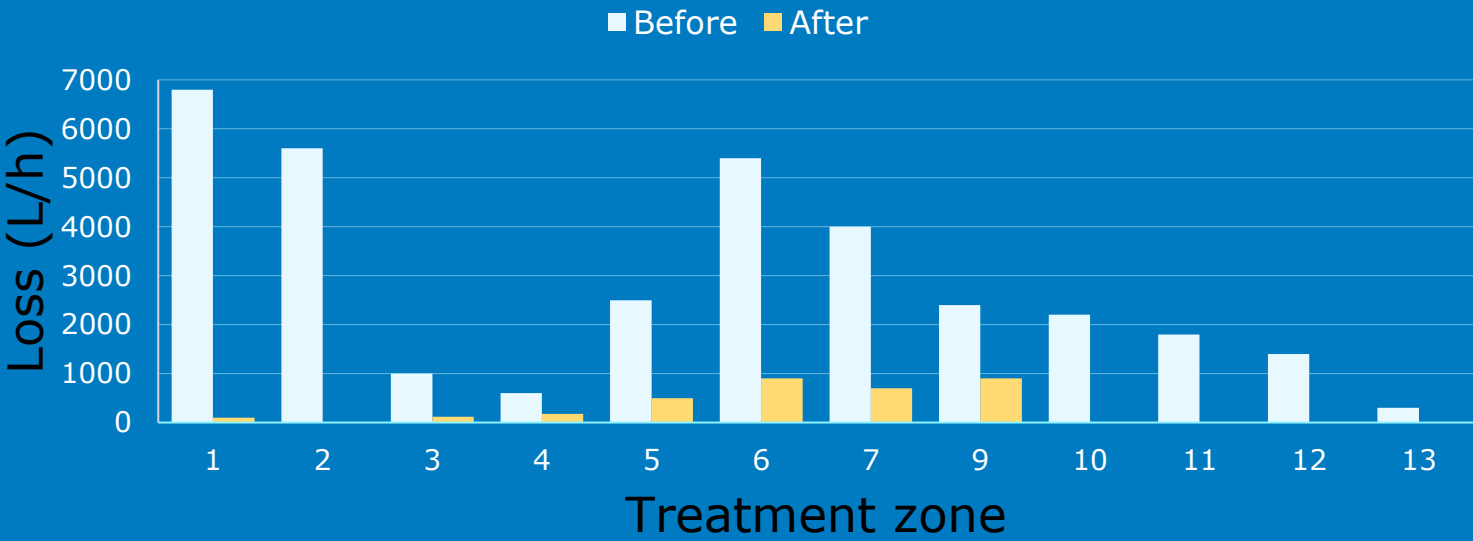
Stage 1
December 2025
4 reported zones

Stage 2
June 2026
9 reported zones

Measured results across the treatment zones

TALR • before-and-after section measurements

12 zones with paired measurements



90%

aggregate reduction

34,000 → 3,400 L/h

~8 L/s

Reported recovery estimate

Treated zones • 24-hour basis

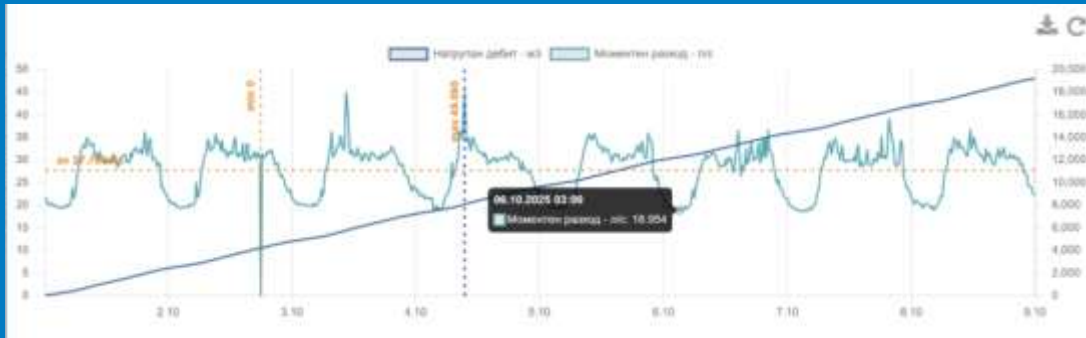
Zone 8: no final measurement. Zone 9 remained under observation.
90% is calculated from paired section tests; ~8 L/s is the report's separate recovery estimate.

Water recovery is visible in Devin's night flow

Whole-town telemetry • original report charts • matched flow axes: 0–50 L/s

BEFORE

1–8 October 2025

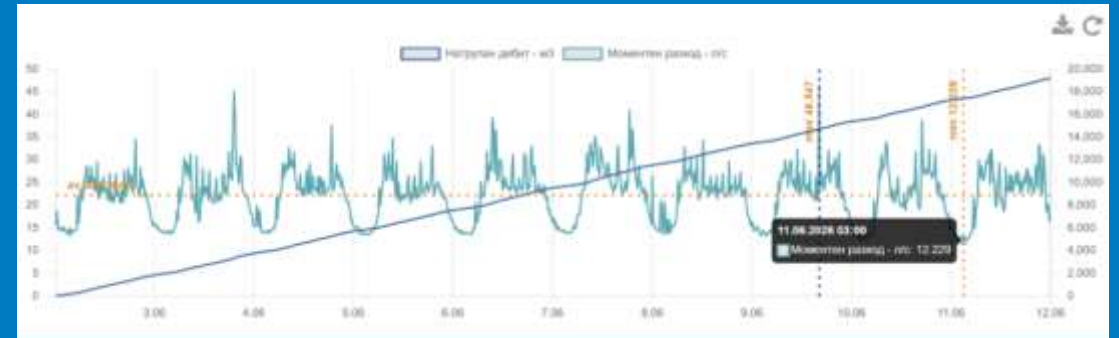


18.954 L/s

6 October 2025 • 03:00

AFTER

2–11 June 2026



12.229 L/s

11 June 2026 • 03:00

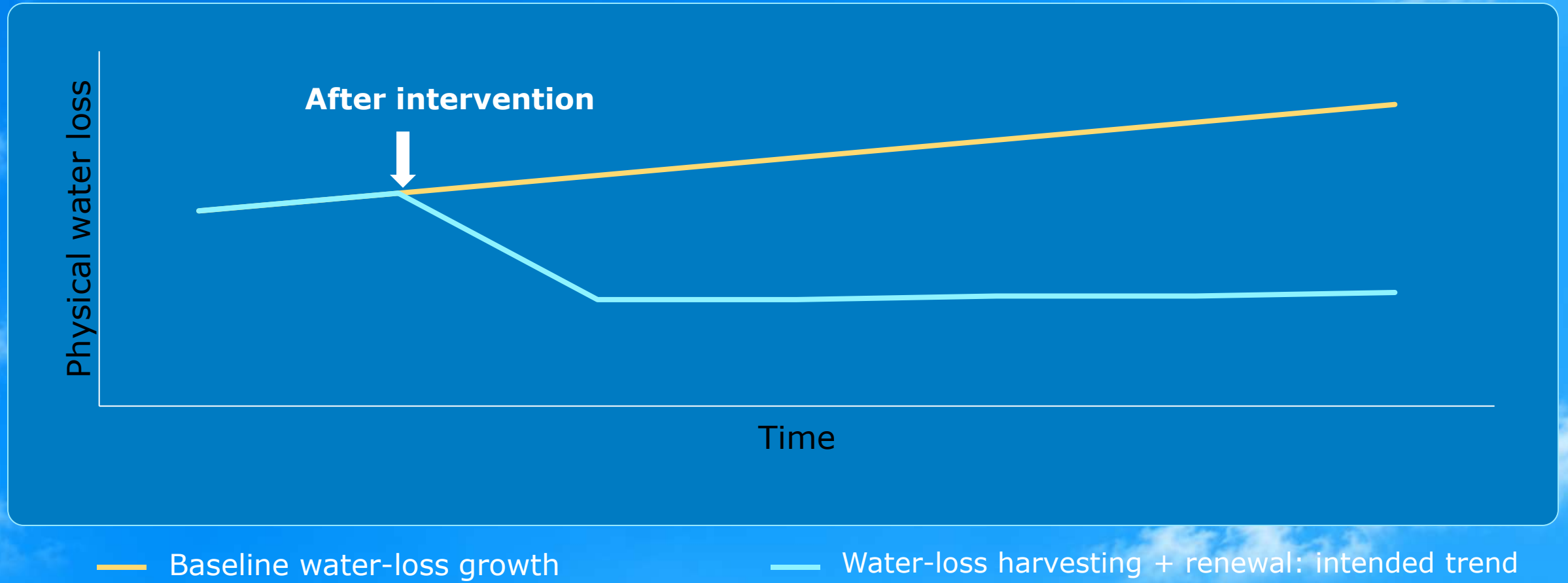
Selected night readings show a lower baseline after treatment.

Individual observations, not period averages or leakage-only measurements.

Turquoise: instantaneous flow • Blue: cumulative volume • June includes summer demand.

Beyond recovery: sustaining the gain

Combined intervention: recovery and lower post-intervention water-loss growth.



From the Devin pilot to a full network programme

Extend water recovery and targeted renewal across the whole network.

Prioritize the next sections

Use measured losses, network records and field findings to set priorities.



Combine treatment and renewal

Apply TALR across targeted sections; replace the minority of assets needing renewal.



Observe the outcomes

Observe recovered supply and track water-loss growth over time.



Sustainable supply and sustainable infrastructure — verifiable by results.

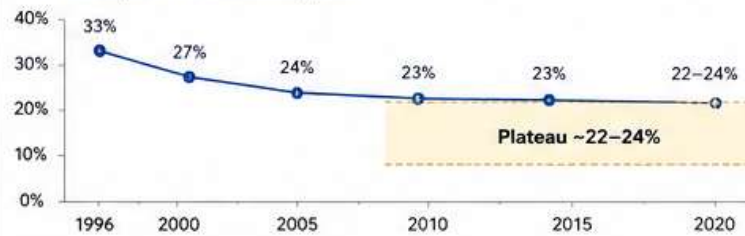
Backup Slides

Why NRR matters: the plateau effect

When find-and-fix recovery matches the natural rise in losses, net reduction stalls.

1 England & Wales

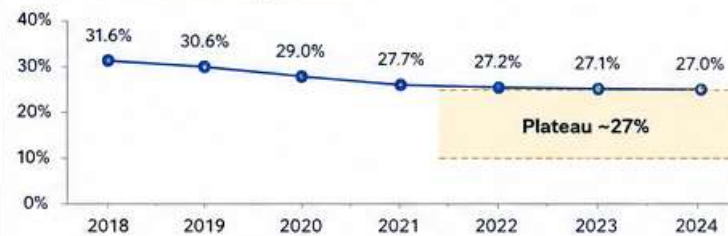
Leakage as % of water supplied



Sources: Water UK (2021) [1]; Ofwat (2020) [2]

2 Air Selangor (Malaysia)

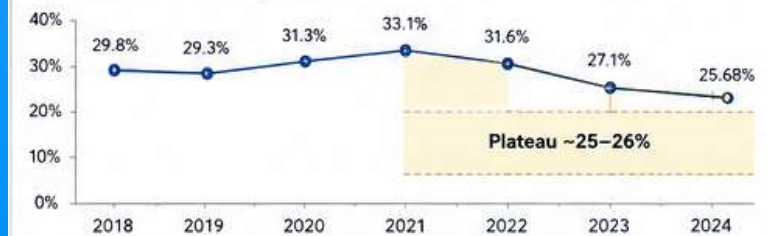
NRW as % of water produced



Source: Air Selangor Annual Reports 2018-2024 [5-7]

3 Bangkok MWA (Thailand)

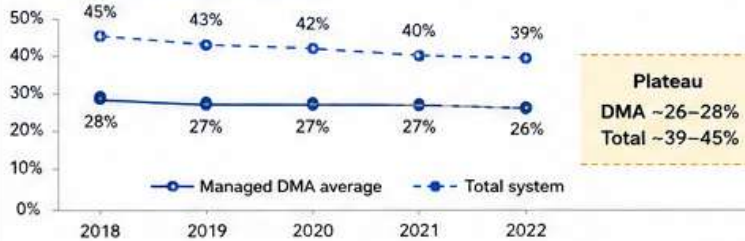
NRW as % of water produced



Sources: MWA Reports 2018-2024 [8-10]

4 Maynilad (Metro Manila, Philippines)

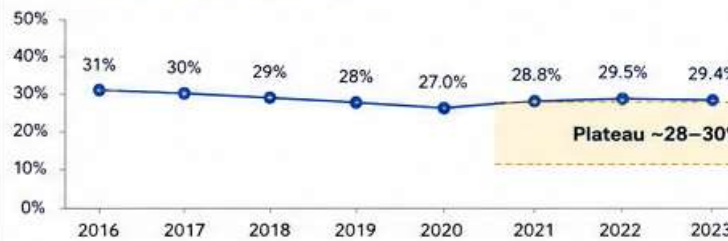
NRW as % of system input



Sources: Maynilad Sustainability Reports 2018-2022 [11-12]

5 Sabesp, São Paulo (Brazil)

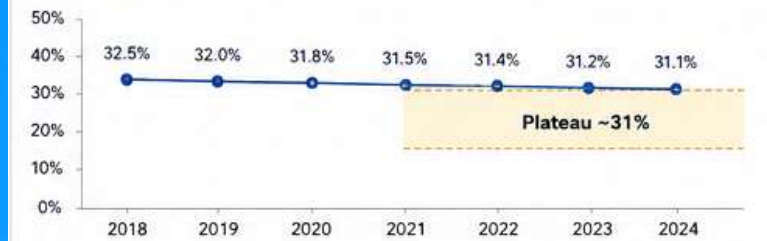
Total loss as % of system input



Sources: Sabesp Financial Statements 2016-2023 [13-14]

6 Aguas Andinas (Chile)

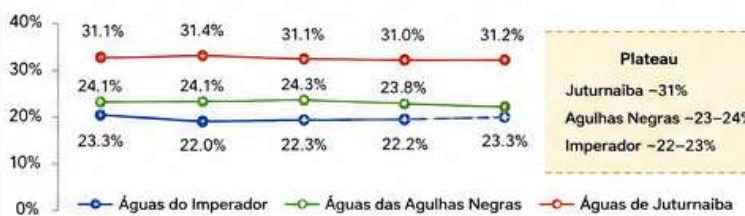
Non-billed water as % of production



Sources: Aguas Andinas Integrated Reports 2018-2024 [15-16]

7 Grupo Águas do Brasil – Utility Cluster (Brazil)

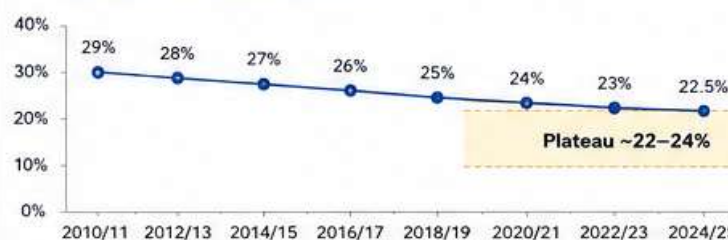
NRW as % of system input (midpoint of reported range)



Source: Grupo Águas do Brasil Sustainability Report 2018-2022 [17]

8 London / Thames Water (UK)

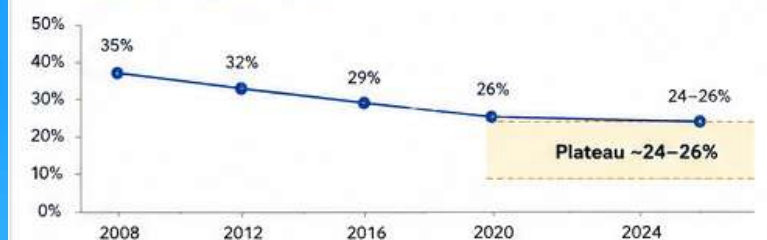
Leakage as % of water supplied



Sources: Thames Water Annual Reports; Environment Agency (2024/25) [19-20]

9 Cape Town (South Africa)

NRW as % of system input



Sources: City of Cape Town Water Services Reports [21-22]

SDG 6.4: sustainable water supply

Water recovery and lower NRR contribute together

THE UN TARGET • 2030

Use water more efficiently across all sectors; sustain freshwater withdrawals and supply; reduce water scarcity.

HOW PROGRESS IS TRACKED

6.4.1 Water-use efficiency

Economic value per cubic metre used

6.4.2 Water stress

Withdrawals relative to renewable water, allowing for ecosystem needs

OUR CONTRIBUTION

Water recovery + lower loss growth

Recovery makes water already abstracted and treated available to customers.

Lower NRR—the natural rate of rise in losses—helps sustain that recovered supply over time.

Sustainability and resilience

Together with targeted pipe renewal, this supports reliable supply and helps meet demand with less pressure for additional abstraction.