Murugappa Water Technology & Solutions Pvt. Ltd.

Engineering Sustainable Water Solutions for a Better Tomorrow



Presented by

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Chief Executive

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Trusted Partner in Sustainability

Who We Are

Murugappa Water Technology & Solutions Pvt. Ltd. (MWTS) is a leading player in water treatment engineering services in India. We provide end-to-end solutions from concept to commissioning, for a wide range of industries.



40+
Years of Experience

500+
Projects Executed

Our Offerings

- Raw Water
- Process Water
- Effluent Treatment
- Reuse / Recycle
- ZLD & Resource Recovery

Industries We Serve

- Sugar
- Pharma
- Food & Beverage
- Automotive
- FMCG
- Leather
- Textile
- Chemical

Our 4 ACES Approach

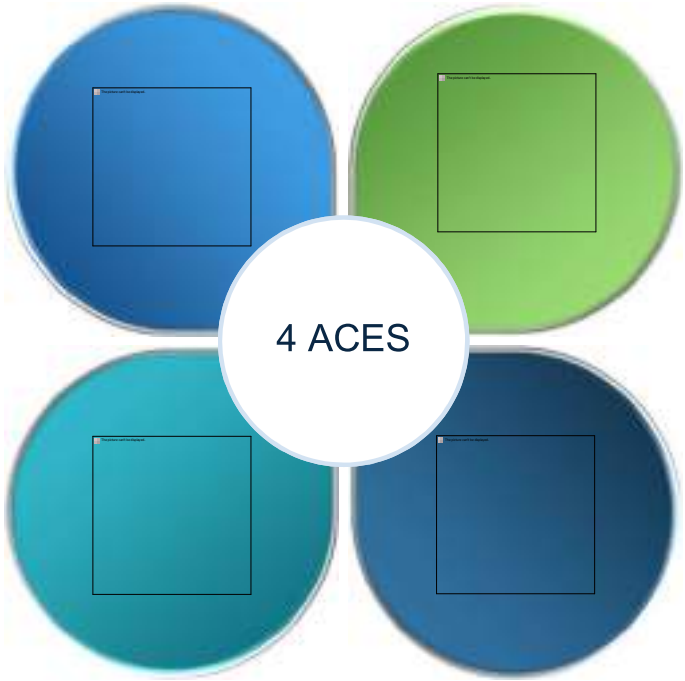
Integrated. Efficient. Sustainable.

Automation

Smart systems for better control

Chemistry

Optimized processes for superior results



Engineering

Robust design and execution

Services

Reliable support across the lifecycle

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Our Sustainability Commitments

Working towards a better, more sustainable future



Together for a Sustainable Future

9TH INDIA INTERNATIONAL WATER WEEK 2026
WATER LEADERS' FORUM (WLF-3)

Technology Pathways for Industrial Water Efficiency

From measurement to basin-level impact; Going beyond Water Neutrality



THE ARGUMENT IN FIVE STEPS

Water efficiency is not a target. It is a sequence.

Each step follows from the one before it — the technologies matter only in the order they are applied.

I

The deficit is already here

India crossed the water-stress line two decades ago. Industry holds a small share of use - and most of the growth.

II

We measure the wrong thing

Efficiency is counted in liters withdrawn. Quality, end-use and basin return go uncounted - and mostly unmeasured.

III

The pathway is sequential

Understand, reduce, optimize, reuse. Each rung costs more and reaches further. Most plants are still on the first.

IV

The fence line is the real limit

A plant can be best-in-class and still fail. The aquifer does not recognize the property line.

V

Which is why positive, not neutral

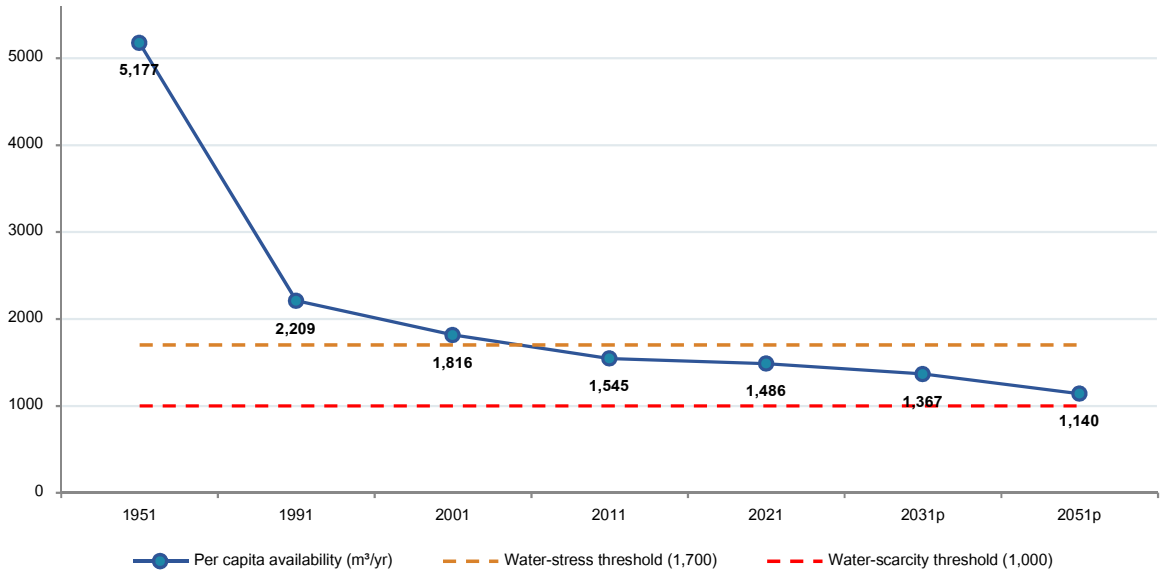
Returning more than we draw - measured in liters and yield - is the only arithmetic that closes the gap.



ACT 1 · THE DEFICIT IS ALREADY HERE

We crossed the line in the 2000s - the rest is consequence

Per capita availability against the Falkenmark water-stress and scarcity thresholds



18% / 4%

of the world's people, on this share of its freshwater

1,486 m³

per person in 2021: a 71% fall from 1951

Rank 13

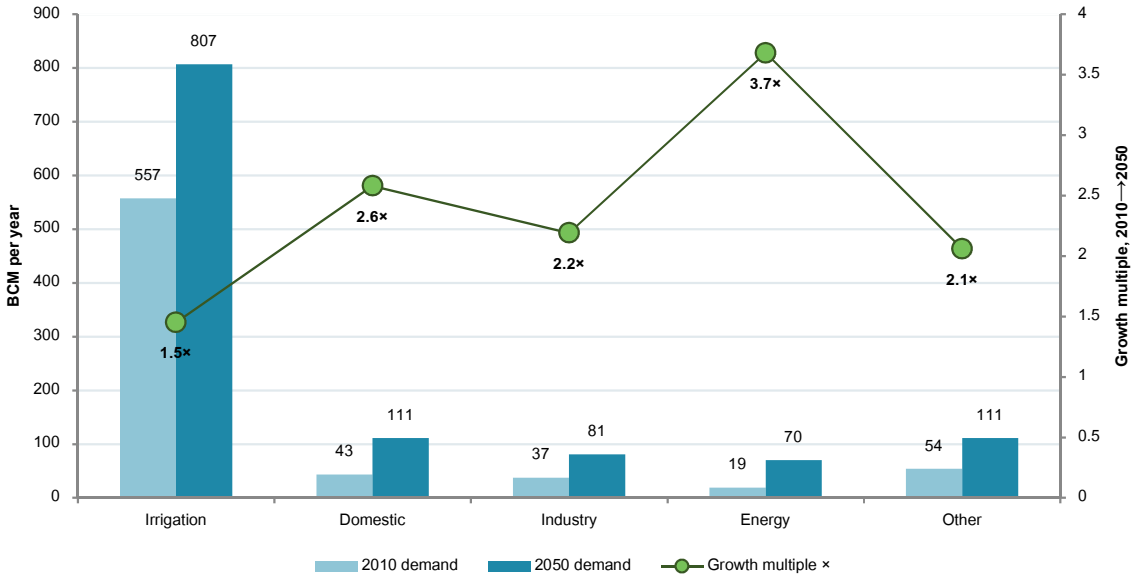
globally for water stress, with more people than the other 16 countries combined

Sources: Central Water Commission, Reassessment of Water Availability in India (2019); Ministry of Jal Shakti; WRI Aqueduct Water Risk Atlas.

ACT 1 · THE DEFICIT IS ALREADY HERE

Industry and energy grow fastest, from the smallest base

Sectoral demand in 2010 and 2050, with the growth multiple on each sector



35%

of additional demand to 2050 comes from industry, energy and domestic use - from a base of just 14% of today's withdrawal

$70 Trillion

31% of global GDP exposed to water stress by 2050. India is one of four countries holding half of it

8.2 TWh

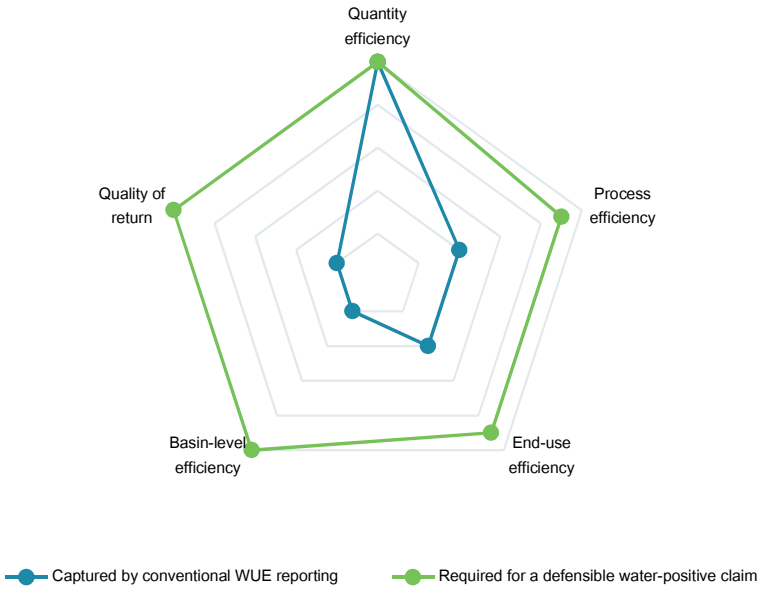
of Indian thermal generation lost 2017–2021 for want of cooling water

Sources: National Commission for Integrated Water Resources Development (1999) sectoral projections; IWMI; WRI.

ACT 2 · WE MEASURE THE WRONG THING

Water use efficiency is not one number — it is five

What conventional WUE reporting captures, against what water positivity requires



Most corporate water reporting sits on the first axis alone.

Quantity

Volume withdrawn per unit of output. The conventional metric - necessary, never sufficient.

Quality

The condition water is in when it leaves. A litre returned polluted is not a litre returned.

Process

Losses inside the process itself, before any treatment step is reached.

End-use

How much treated water does useful work - cooling, boiler feed, process duty.

Basin-level

What returns to the catchment, and whether the aquifer actually recovers.

Framework as applied by MWTS. Scoring is illustrative of reporting coverage, not a measured index.

ACT 2 · WE MEASURE THE WRONG THING

And in most plants, we barely measure at all

The first intervention is not a membrane. It is an instrument.

1 Measure

Water mapping and balance; metering at every major draw and discharge

2 Make visible

Losses surfaced per process line, not aggregated to one plant figure

3 Model

Digital twin built on existing SCADA, logs and sensor data — no new hardware

4 Optimize

AI-guided setpoints, predictive maintenance, instrument drift detection



~35% of the balance reconciled

"If you don't measure, you can't improve."

22 million L

recovered per year at a beverage plant - plus 3.6% better water usage ratio, with no new hardware

Doughnut is illustrative of typical closure gaps in unaudited industrial water balances, not a surveyed statistic. Case: Pani published case study, Gulf-region beverage bottler.

ACT 3 · THE PATHWAY IS SEQUENTIAL

Five rungs: Rising cost, Rising reach

Rungs 1–3 are operational and largely low-capex. Rung 4 is where most corporate programs stop. Rung 5 is where the basin is.

01

Understand

Water mapping, metering, balance closure

02

Reduce

Low-hanging losses; minimal intervention

03

Optimize

In-the-line treatment before end-of-line; resource recovery

04

Reuse & recycle

Higher capex - cooling towers, boilers, utility water

05

Water positive

Outside the fence: watershed, recharge, basin

MWTS deploys across rungs 1–5: Digitalization · Ultra C-Membrane · High Recovery RO · Ultra ZEELD · Hybrid Resource Recovery

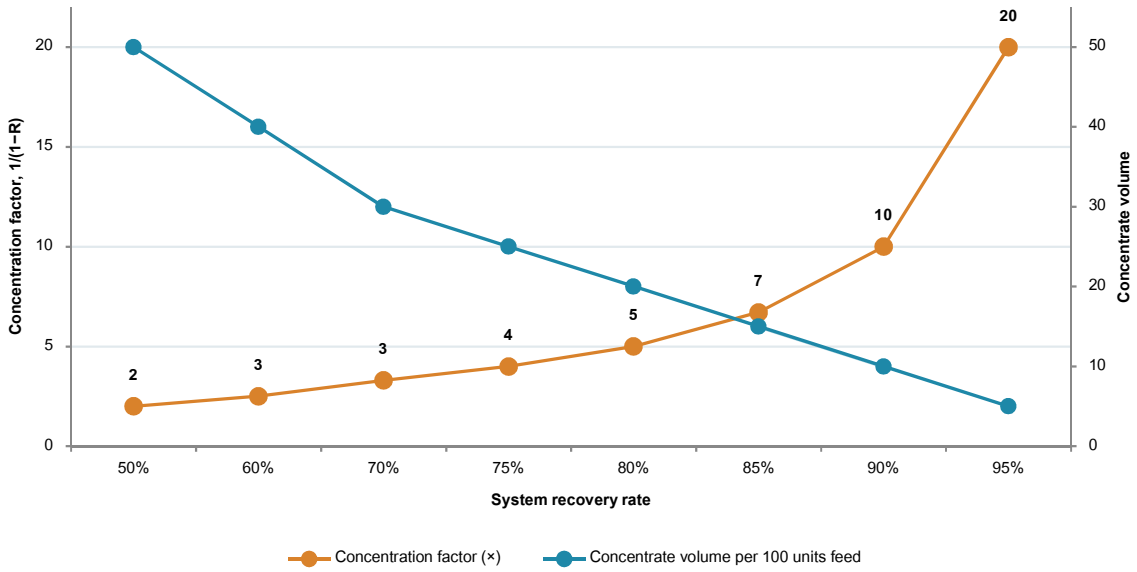


Technology names as published by MWTS. Capex and intervention complexity rise with each rung.

ACT 3 · THE PATHWAY IS SEQUENTIAL

Why recovery gets hard - and what breaks the wall

Concentration factor rises non-linearly with recovery. Scaling, not membrane area, is the binding constraint.



75% ⟶ 90%

recovery achieved on an operating plant by flow-reversal retrofit — not a new build

−60%

concentrate volume, cutting disposal load and downstream evaporator duty

−20% / −50%

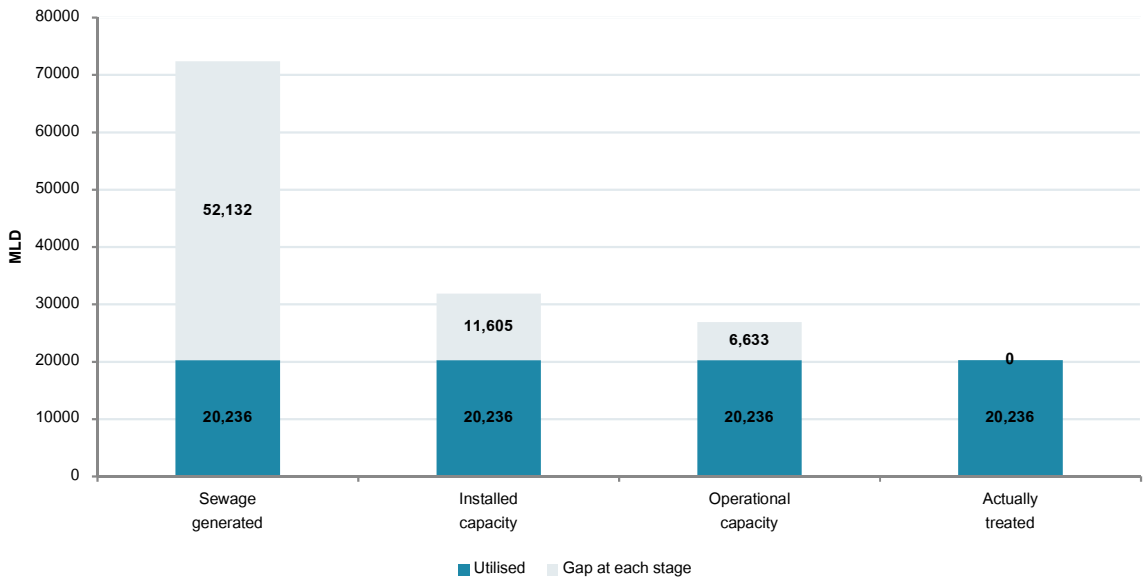
cooling tower make-up and blowdown, from raising cycles of concentration three to six

Curves derived from mass balance: concentration factor = 1/(1−R). Field evidence: ROTEC flow-reversal retrofit; US DOE FEMP BMP No. 10 for cooling towers.

ACT 3 · THE PATHWAY IS SEQUENTIAL

The largest untapped industrial source is water we already used

India's urban sewage cascade — generation to actual treatment (MLD)



52,132 MLD

discharged untreated every day — a secure, non-monsoon-dependent feedstock already flowing past the gate

28%

of generated sewage is actually treated. Installing capacity is not the same as operating it

~38% NRW

of urban supply lost before it reaches a user. JUSCO Jamshedpur cut its own from 36% to 10%

Sources: CPCB, National Inventory of Sewage Treatment Plants (March 2021), data as on 30.06.2020; Observer Research Foundation (2025).

ACT 4 · THE FENCE LINE IS THE REAL LIMIT

Efficiency inside the fence cannot close a basin-level gap

A plant can reach best-in-class water use and still fail - the aquifer does not recognize the property line

Inside the fence

What a plant controls

- Withdrawal reduction
- Process optimization
- Reuse and recycling
- Zero / minimal liquid discharge

Beyond the fence

What the basin requires

- Watershed and recharge structures
- Catchment restoration
- Supply-chain water benefit
- Verified in liters and yield

Measurement is what joins the two.
A liter claimed beyond the fence is worth exactly what its verification method can defend.



Volumetric water benefit accounting methods (e.g. WRI VWBA) are increasingly used to validate off-site savings.

ACT 5 · POSITIVE, NOT NEUTRAL

The future of water management is not a choice between infrastructure and technology

Infrastructure	Technology	Treatment	Governance	Reduce/Reuse
gives capacity	gives visibility	gives quality	gives accountability	gives resilience

WATER POSITIVE INDIA FORUM · 8 SEPTEMBER 2026 · MUMBAI

At the inaugural Water Positive India Forum this September, industry, policymakers, technology providers and academia convened to move water from an efficiency metric to a shared national responsibility.

Measure it. Reduce it. Reuse it. Then give back more than you take.

APPENDIX

Sources and verification notes

Reference list for the figures used in this presentation

01 Water resources & per capita

CWC, Reassessment of Water Availability in India (2019): 1,999.20 BCM average annual water resources ; CWC's Assessment of Water Resources of India (2024) revises this to 2,115.95 BCM for 1985–2023.

02 Water stress ranking

WRI Aqueduct Water Risk Atlas (2019; Aqueduct 4.0, 2023). India 13th among extremely high stress countries.

03 GDP exposure & thermal loss

WRI, "25 Countries Face Extremely High Water Stress" (2023); 8.2 TWh Indian thermal generation lost 2017–2021.

04 Sectoral demand

NCIWRD (1999) projections; growth multiples computed from those values.

05 Sewage cascade

CPCB National Inventory of Sewage Treatment Plants (March 2021), data as on 30.06.2020: 72,368 MLD generated.

06 Non-revenue water

Observer Research Foundation (2025): Indian urban average ~38%; CPHEEO benchmark below 15%.

07 RO recovery physics

Concentration factor = 1/(1−R), derived from mass balance. Field evidence: ROTEC flow-reversal retrofit.

08 Cooling towers

US DOE FEMP Best Management Practice No. 10: cycles of concentration 3⟶6 reduces make-up ~20%, blowdown ~50%.

09 Digital twin case

Pani published case study, Gulf-region beverage bottler: 22 million L/yr, 3.6% water usage ratio improvement.

10 Illustrative, not surveyed

The WUE radar scores and the water-balance closure doughnut are illustrative of reporting coverage, not measured indices.

Thank You

For your time and attention



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