AMB

NEER PVT.LTD.

# Complete Scaling Management

## From Chemical Dependency to Chemical Free Technology.
## From Continuous OPEX to Measurable ROI.

Advanced Mineral Balance Technology | Engineered in Collaboration with Germany & Japan

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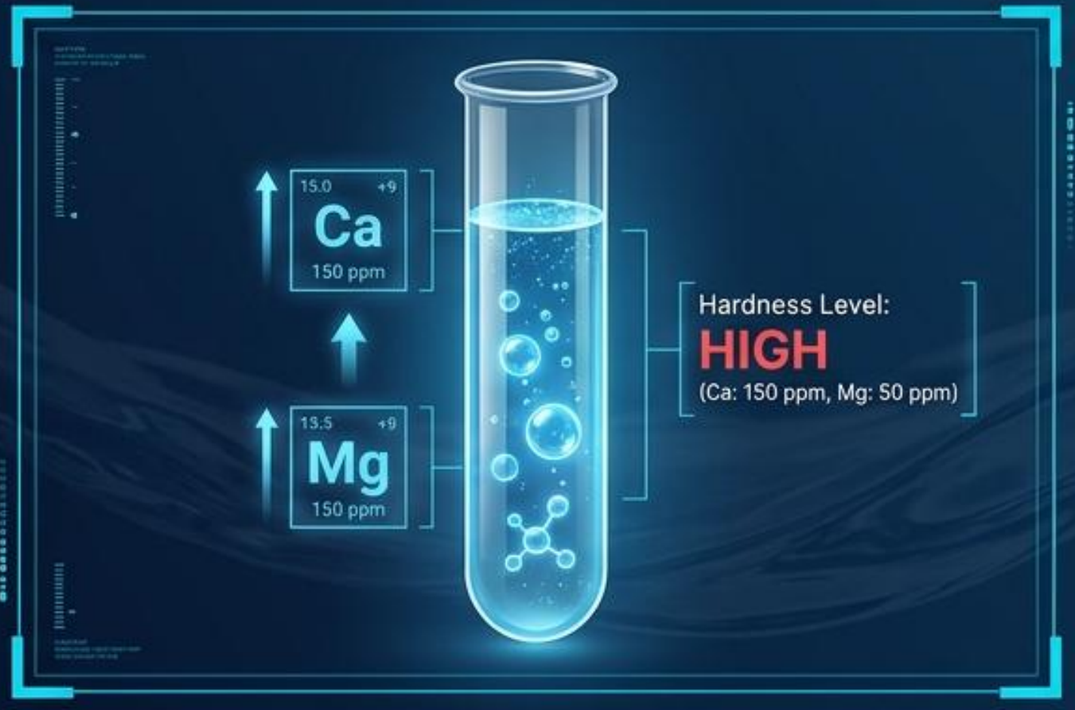
# The Hardness Illusion

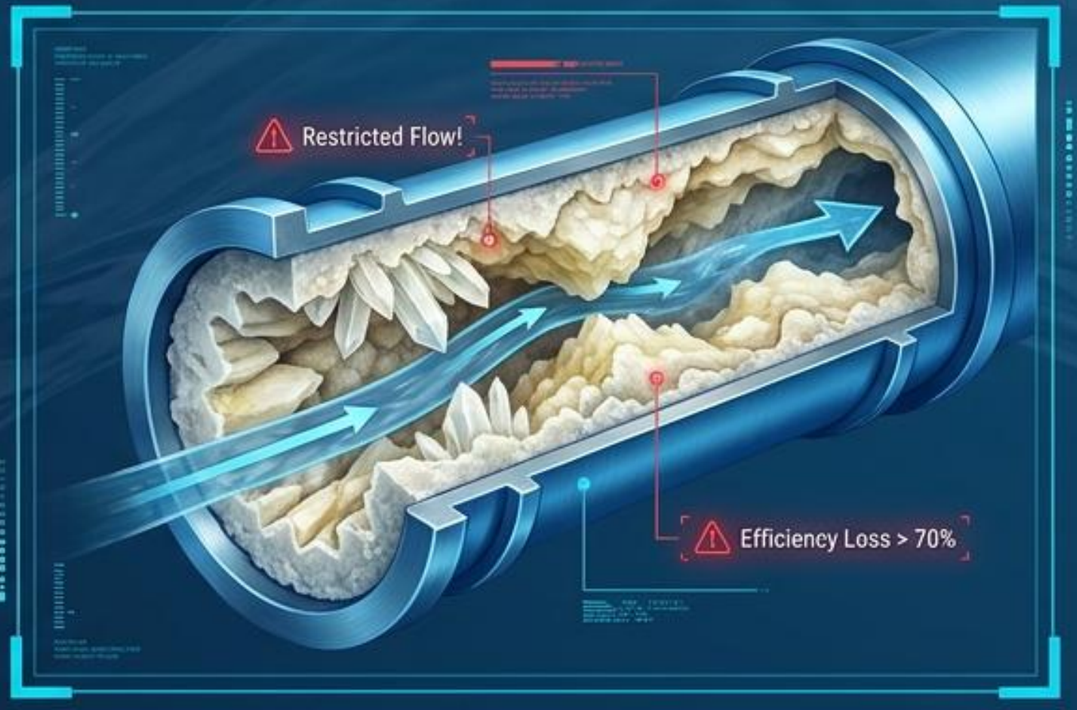
Industrial water treatment has traditionally revolved around a single, familiar measurement: Hardness (Calcium and Magnesium). Based on this metric, industries continuously deploy softeners, RO systems, and expensive chemical dosing.

But hardness and scaling are not the same problem.

Controlling hardness does not mean scaling is completely controlled. Scaling is the actual operational failure—the stubborn deposits destroying heat-transfer surfaces, membranes, turbines, and boilers.




**Conventional Focus:** Laboratory Hardness




**Operational Reality:** Equipment Failure

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# The Mindset Shift

The questions that move a facility from conventional to advanced treatment.

## Conventional Thinking

"My hardness is under control."

"We have an RO system in place."

"We are dosing chemicals to manage the problem."

"Water treatment is a fixed OPEX."

## Advanced Thinking

"Is my scaling actually under control?"

"What is the true cost of managing scaling before and after the RO?"

"Let advanced technology (AMB) eliminate the need for continuous chemical intervention?"

"Water treatment can become an investment with a measurable ROI."

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# The Million-Dollar Question in Water Treatment

Industrial water treatment has traditionally revolved around one familiar measurement: Hardness (Calcium & Magnesium).

Based on this, industries install softeners, RO systems, and continuous chemical dosing.

**"If hardness is controlled, can we confidently say that scaling is completely controlled?"**

Hardness and scaling are not the same problem. Scaling is the actual operational problem affecting heat-transfer surfaces, turbines, boilers, and cooling towers.



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# The Silica Blindspot

Conventional chemical treatment may successfully control measured hardness, yet silica-related deposits can continue to create stubborn, hard, and difficult-to-remove scaling.


Softeners address Calcium & Magnesium.

Silica interactions and complex mineral structures **remain active**.

Stubborn, highly adherent scaling on critical equipment.

**The Vraj Iron & Steel Case:** Persistent turbine scaling was observed even with DM water, with trace silica identified as a critical contributor. To control complete scaling, **silica must be part of the conversation**.

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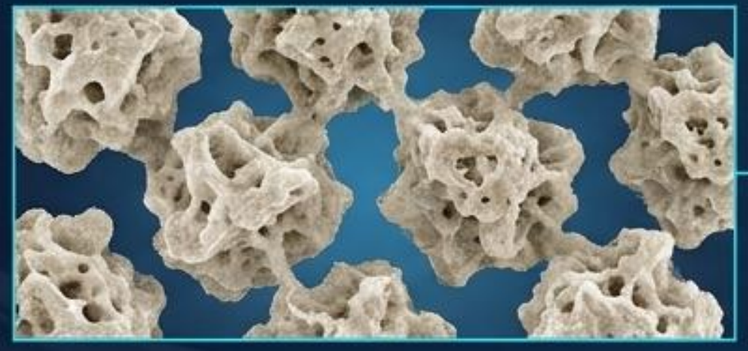
# Hardness Creates Scale. Silica Makes It Permanent.

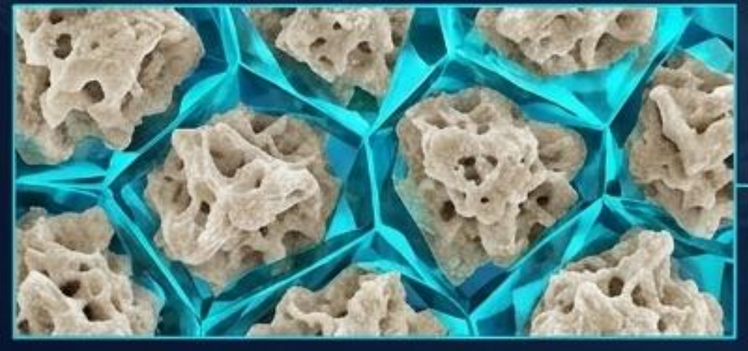
To achieve complete scaling control, the conversation must expand beyond Calcium and Magnesium.

Silica is the true binder in industrial water systems. It densifies and binds mineral deposits together, making the resulting scale hard, glassy, permanent, and exceptionally stubborn to remove.

Without silica acting as this structural glue, standard scale remains soft, porous, and highly manageable.



Manageable, soft deposits without a binding agent



Silica densifies and locks deposits into glassy, permanent layers

**Hard, Glassy Scale**
(with Silica)

Dense, crystalline structures; permanent.

**Soft, Porous Deposits**
(Tiny Soft Colloids)

Loose, amorphous structures; manageable.

Power Of AMB tech.

Root Cause of hard Scale is- Silica

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# The Hidden Cost Chain of Scaling

Scaling is rarely just a cleaning problem. It triggers a cascading chain of operational inefficiencies.

**Mineral Deposition:** Scaling & Bio-film formation increases.

**Thermal Blockage:** Heat-transfer efficiency deteriorates.

**Energy Spike:** System consumes more energy to compensate.

**Chemical Cycle:** Chemical dosing and blowdown continue.

**Resource Drain:** Fresh water is consumed; ETP load increases.

**Asset Degradation:** Maintenance increases; membrane & equipment life plummets.

**AMB aims to break this chain by attacking the root—the mineral deposition mechanism—rather than managing symptoms.**

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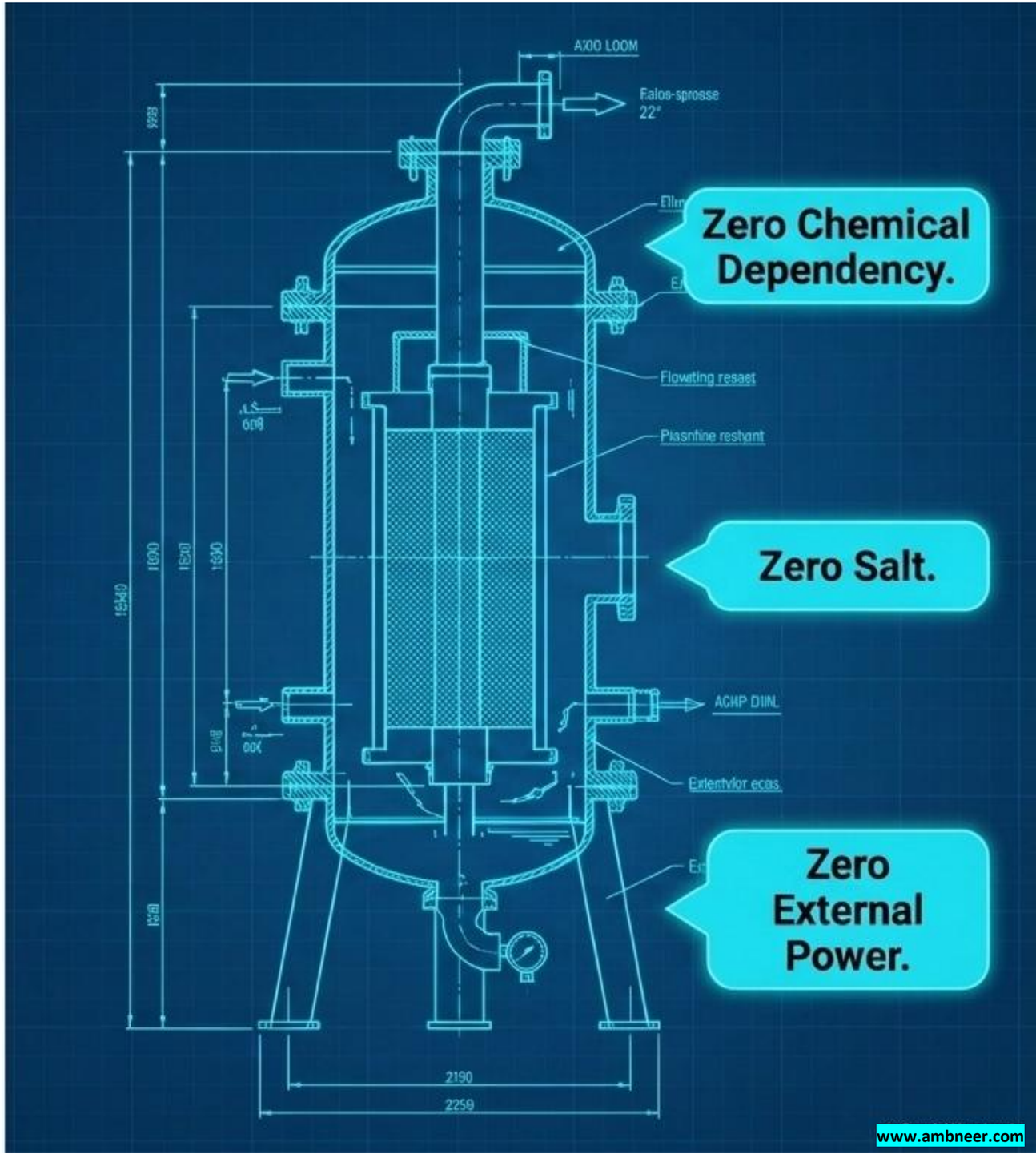
# Advanced Mineral Balance (AMB) Technology

AMB NEER is an advancement in industrial water treatment based on physical principles rather than conventional chemical dosing.

It uses engineered composite media to influence the mineral system, converting scale-forming constituents (including silica) into soft, non-adherent colloidal forms.

**The objective is not to simply remove hardness or chemically alter water, but to make it closer to its ideal form for industrial use.**

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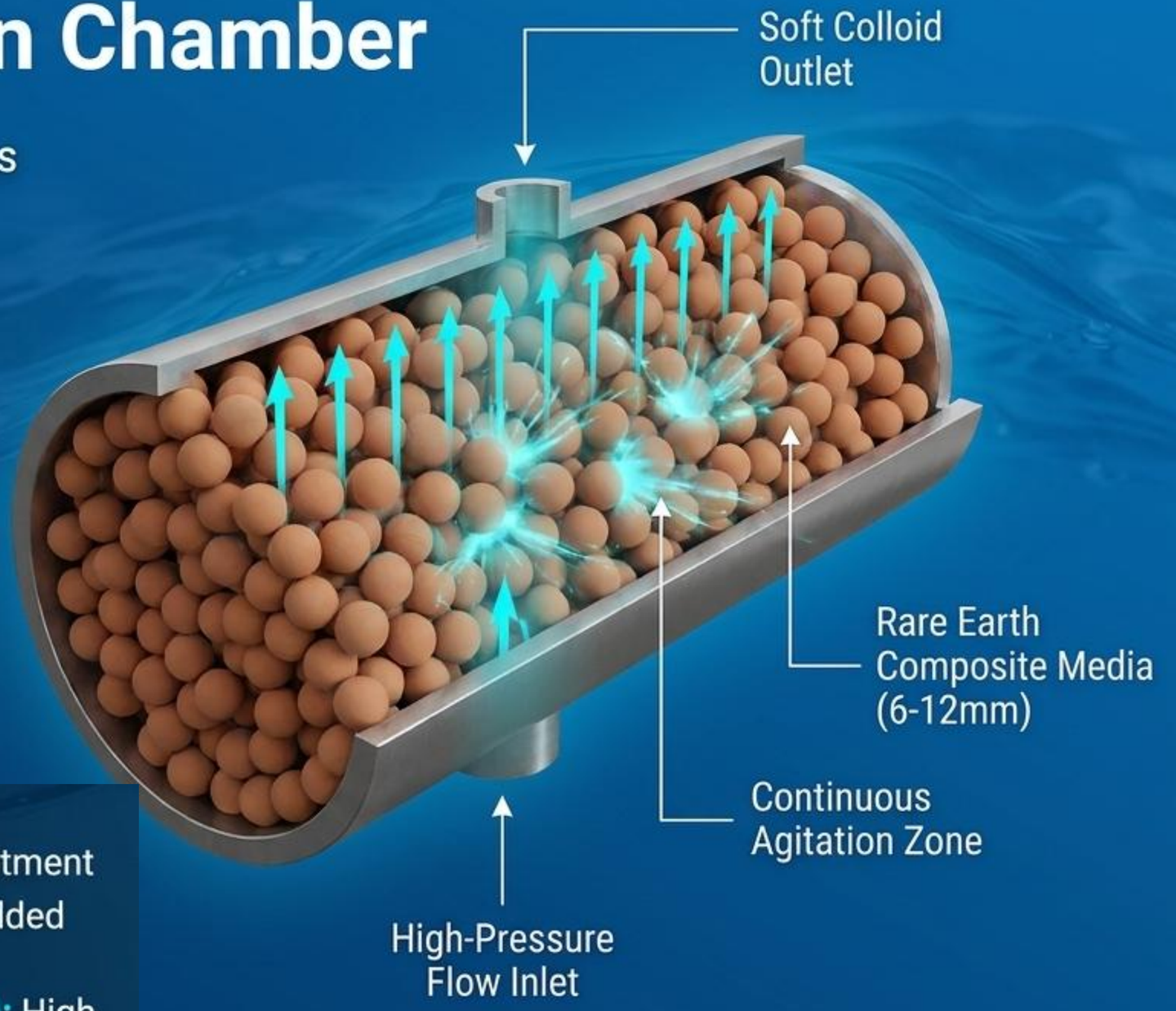
# Inside the Activation Chamber

The core of AMB technology is a continuous mechanical process happening inside a high-pressure cylindrical vessel.

Water operates at a specifically designed flow velocity, forcing continuous, calculated agitation of a 6–12 mm customized, metal-embedded composite. This mechanical collision converts scale-forming minerals (including silica, calcium, and magnesium) into tiny, soft, non-adherent colloids.

**Key Specs:**

- **Technology:** Physical Water Treatment
- **Media:** Customized metal-embedded composite (rare earth minerals)
- **Cation Exchange Capacity (CEC):** High

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# The Five Principles of Physical Water Treatment

A precise sequence of physical and electrokinetic reactions requiring no chemical additives.

## 1. Resonance

Specific vibration frequencies of the composite break mineral bonds.

## 2. Piezoelectric Effect

Flow pressure distorts the composite's lattice structure, creating a charge differential.

## 3. Peltier Effect & Thermoelectricity

Particle collisions generate micro-heat, changing the micro-heat, changing the water's charge from negative to positive.

## 4. Interfacial Electrokinetic Phenomenon

Constant friction breaks hydrogen-oxygen bonds, drastically lowering surface tension.

## 5. Cationization

A net positive charge repels calcium and magnesium ions, resulting in Low Tension Ionized Water.

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# The Diagnostic Comparison

The fundamental differences between continuous chemical dependency and physical technology.

| Parameter | Traditional Softener | AMB Technology |
|---|---|---|
| Installation Space | Large footprint required | Minimum installation space. |
| Manpower | Dedicated manpower required | No manpower required. |
| Downtime Cost | High downtime cost | No downtime required. |
| Water Wastage | Huge water wastage (backwash & rinse) | ZLD or very minimum water loss. |
| Process | Sodium-based ion exchange with regular resin regeneration | Natural ceramic bead agitation converting ionized minerals to inert forms. |
| Minerals Addressed | Only Calcium & Magnesium | All ionized minerals including Silica (a major cause of scaling). |

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# The AMB 360° Proposition

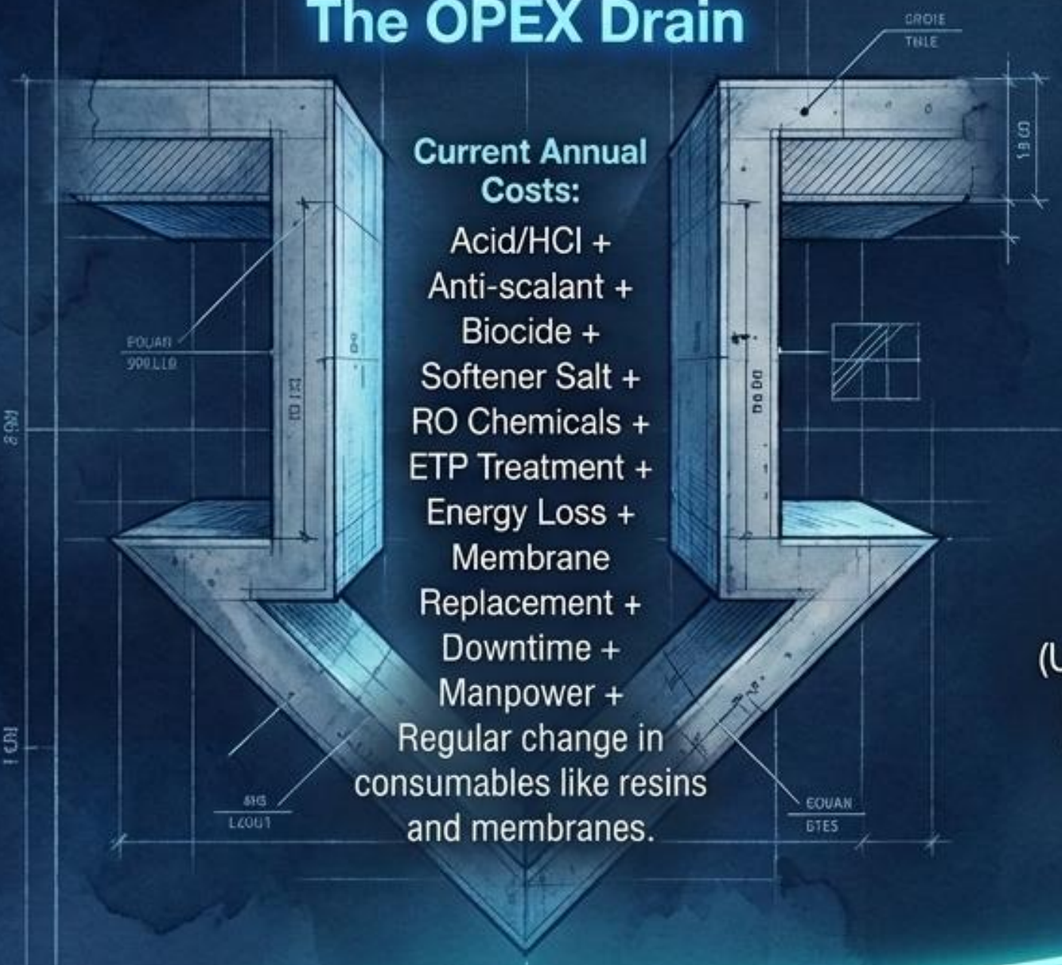
Addressing the operational consequence, not just a single laboratory parameter.


No Scaling → No Fouling → Better Heat Transfer → Lower Energy → No Chemical Dependency → Less Blowdown → Lower ETP Load → Longer Equipment Life → Better ROI.

# Converting Recurring OPEX into a Measurable Return

Traditional Softener or RO

## The OPEX Drain



**Current Annual Costs:**

Acid/HCl + Anti-scalant + Biocide + Softener Salt + RO Chemicals + ETP Treatment + Energy Loss + Membrane Replacement + Downtime + Manpower + Regular change in consumables like resins and membranes.

AMB Technology

## The ROI Curve

**The AMB Advantage:**
Capital Investment + Minimal Recurring Cost.
Zero Manpower, hassle free technology.

**Proof Point:**
Similar boiler and cooling-tower installations have demonstrated potential ROI within approximately two years.

**Strategic Bonus:**
Extended asset longevity (UF systems, RO membranes, heat exchangers, turbines) creates a secondary tier of financial benefit.

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# Water as a Strategic Resource

Driving sustainability and ETP load reduction.

Every additional cycle of concentration, every unnecessary blowdown, and every litre sent for ETP treatment carries a hard cost.


As regulatory expectations increase, reducing the quantity of water entering the ETP is becoming as important as treating the water itself. AMB naturally supports ZLD-oriented strategies.

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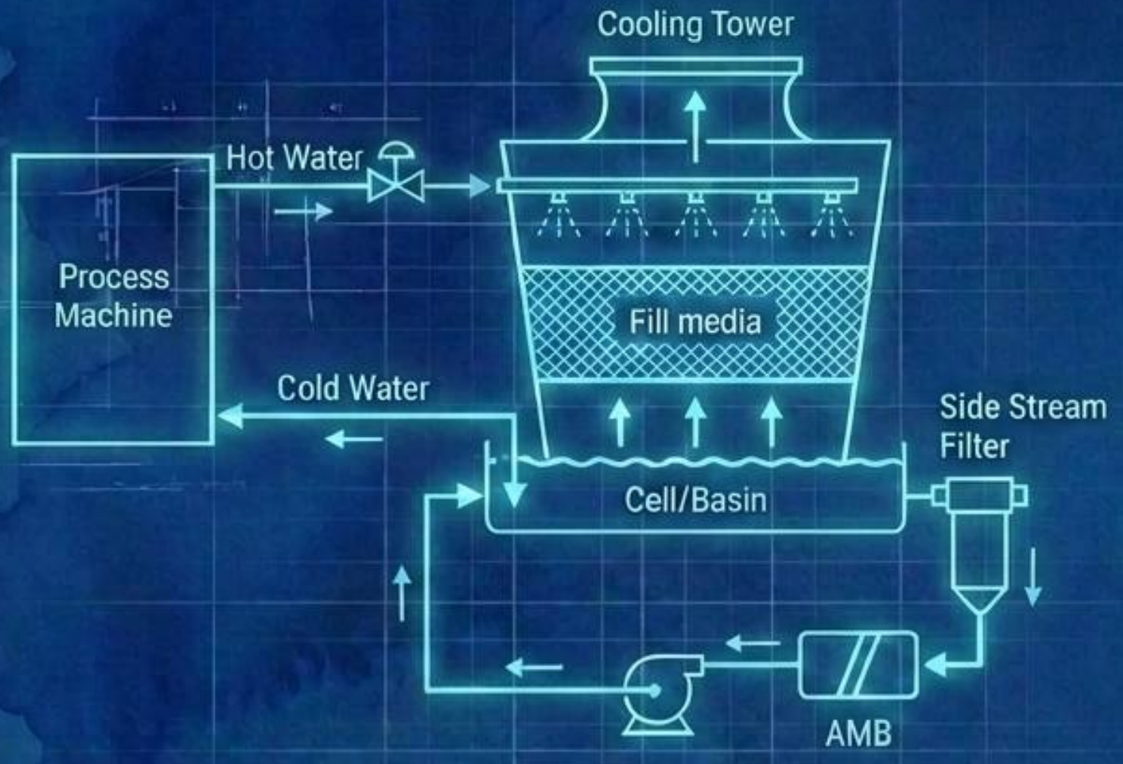
# Application Domain: Cooling Towers




**Objective:** AMB Advantage: Reduced chemical, water, ETP load, heat loss & zero maintenance increase efficiency.

**Capabilities:** Control calcium, magnesium, and silica-related scaling; suppress corrosion and rust; support corrosion control.

**Configuration Profile:** The supplied 2500 TR cooling-tower proposal uses a side-stream, multi-pass configuration designed to progressively treat basin water without disrupting primary circulation.

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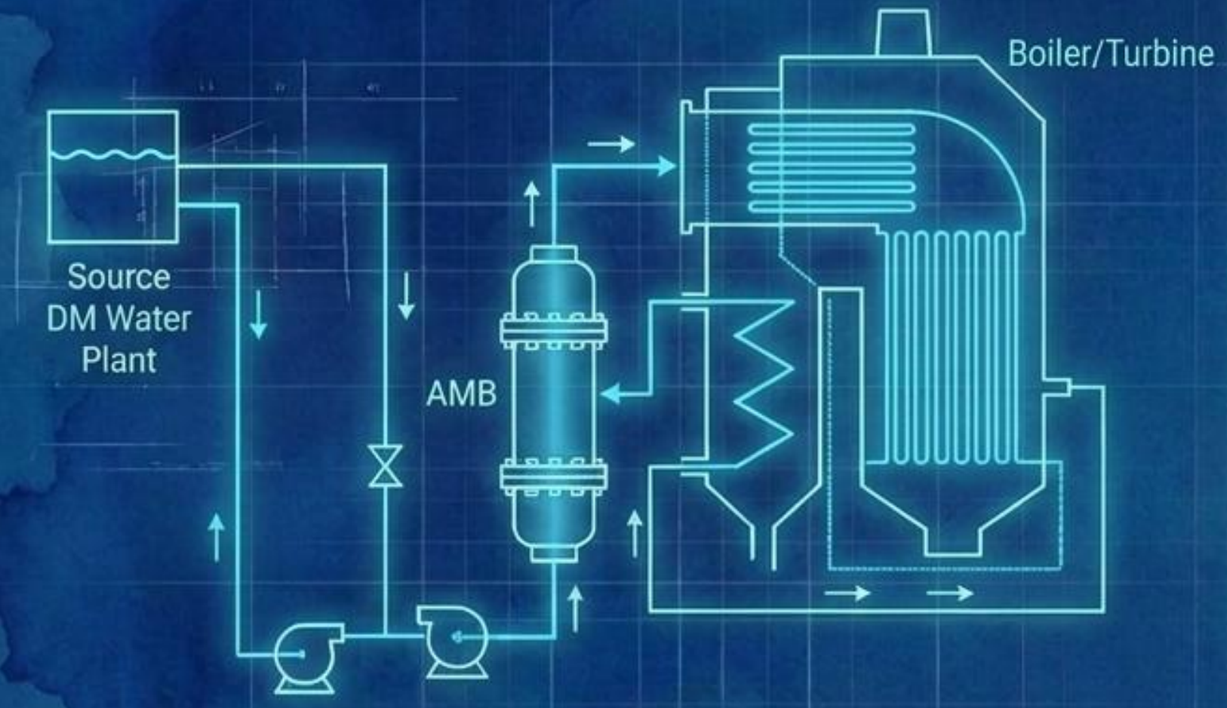
# Application Domain: Boilers & Turbines




**Configuration:** Positioned at the pre-boiler feed stage to actively condition the water system before it enters high-temperature, high-pressure environments.

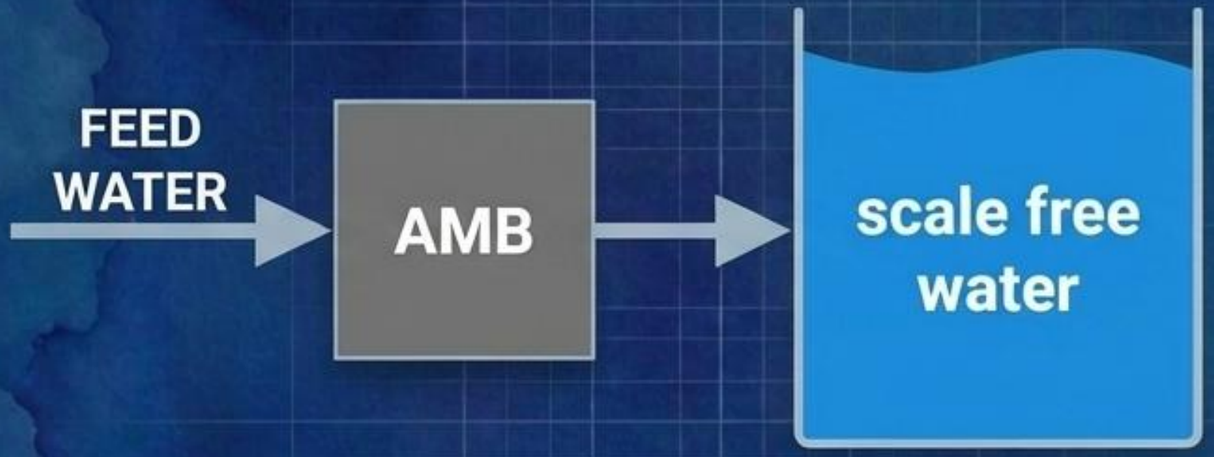
**The Complexity:** Boiler and turbine applications are highly sensitive; even micro-deposits destroy heat transfer and efficiency.

**The Vraj Iron & Steel Case:** Persistent, glass-like turbine scaling was observed despite having a well-designed DM water-treatment system. Trace silica was the root cause.

**The Solution:** AMB is positioned upstream of RO / at the pre-boiler-feed stage to actively condition the mineral system (including residual silica) before it enters high-temperature environments.

Gemini Notebook

# Application Domain : RO & Pre Treatment




**The Problem:** Heavy reliance on HCl, acid, and anti-scalants to protect expensive UF and RO membranes from choking.

**The Strategy:** Install AMB as an upstream technology to address the mineral scaling mechanism at the root.

**The Impact Metrics:** Less chemical dosing → Less scaling → Less membrane stress → Longer membrane life → Lower replacement cost.

**Value Extension:** Goes beyond simple acid savings; eliminates chemical handling risks and reduces associated downtime.

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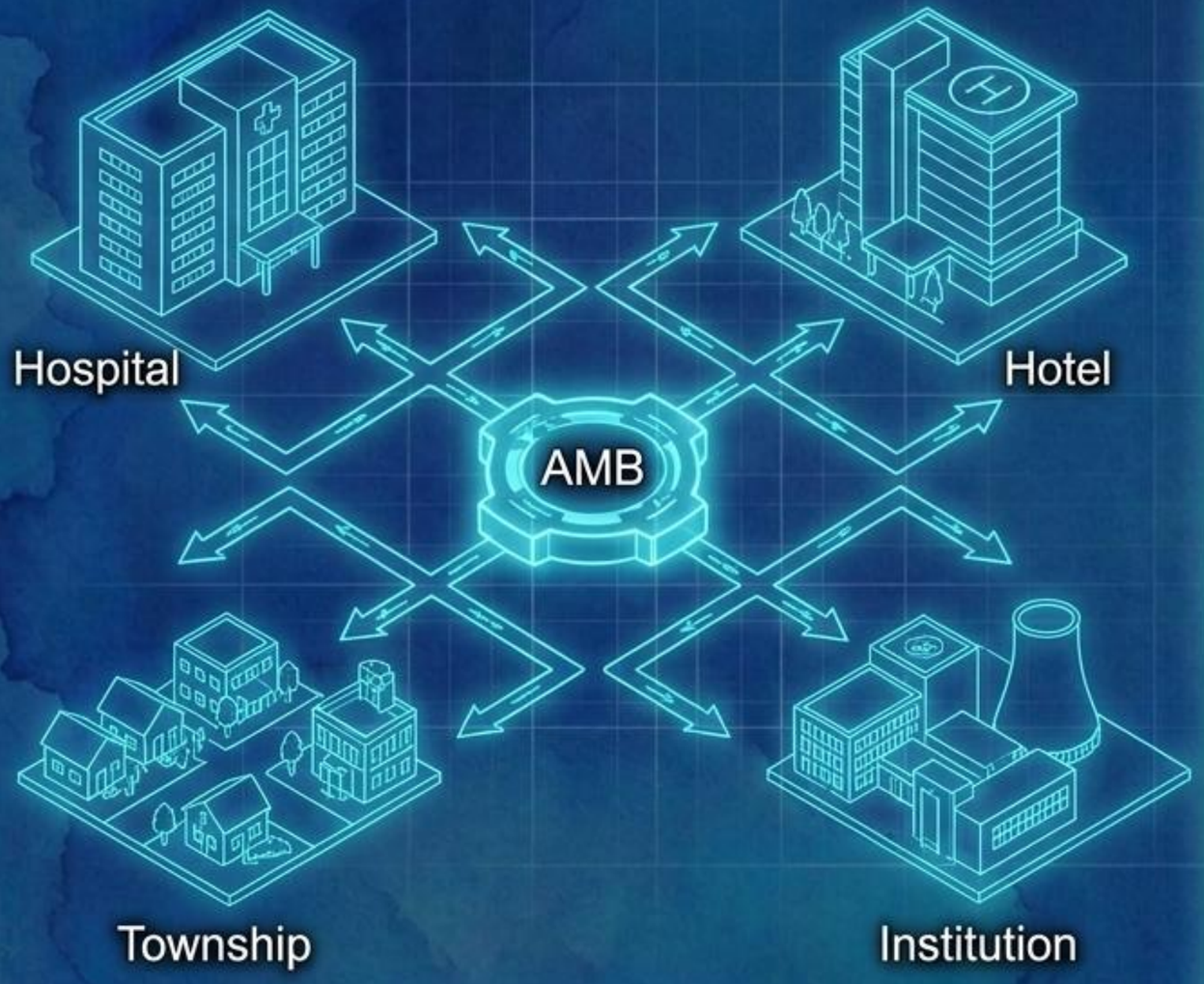
# Application Domain: Plant Utilities & Commercial Facilities




**The Philosophy:** Make treated water more usable for its intended application, across the entire facility.

**Broad Evaluation:** AMB can be deployed wherever utility or process water is creating scaling, fouling, repeated cleaning, or chemical-dependency issues.

**Strategic Shift:** This opens AMB evaluation across total plant utilities, rather than limiting the technology to a single equipment package.

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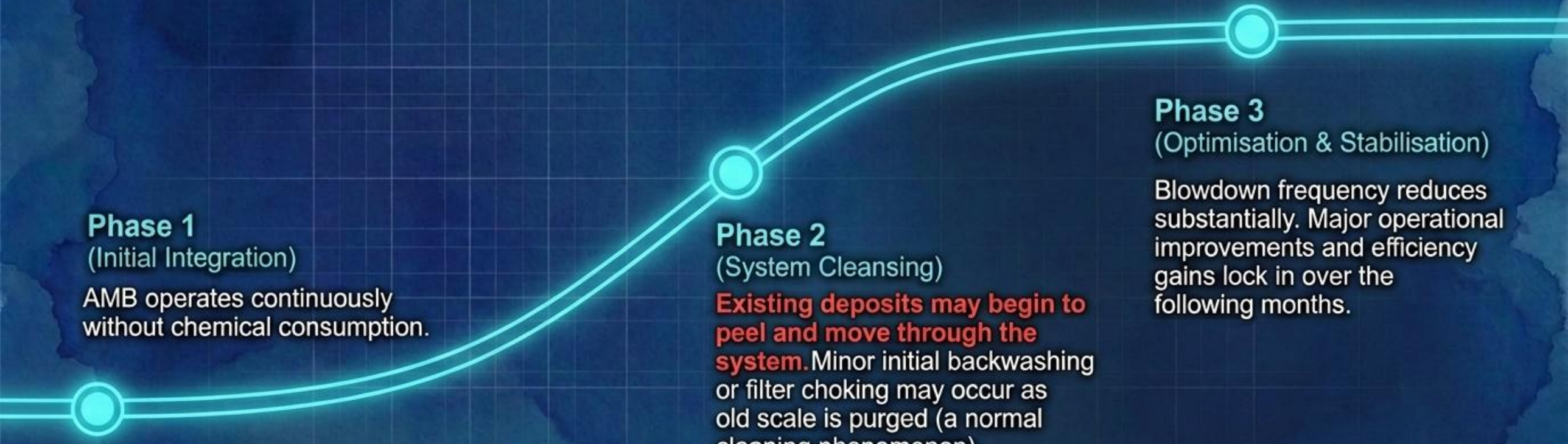
# What Happens After Installation?

A realistic view of adoption, stabilisation, and system transformation.



**Phase 1**
(Initial Integration)

AMB operates continuously without chemical consumption.

**Phase 2**
(System Cleansing)

**Existing deposits may begin to peel and move through the system.** Minor initial backwashing or filter choking may occur as old scale is purged (a normal cleaning phenomenon).

**Phase 3**
(Optimisation & Stabilisation)

Blowdown frequency reduces substantially. Major operational improvements and efficiency gains lock in over the following months.

**AMB is a permanent system transformation, not an overnight chemical switch.**

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# The Actionable Path

We do not replace existing systems blindly. We prove the economics first.


**1. IDENTIFY:** Isolate major water-treatment challenges and recurring OPEX.

**2. STUDY:** Plant feasibility study covering flow, hardness, silica, OPEX, and equipment.

**3. DESIGN:** Engineer the specific AMB configuration for the application.

**4. IMPLEMENT:** Integrate AMB with minimum disruption to existing operations.

**5. MEASURE:** Track chemical/water savings, blowdown, and equipment performance.

**6. SCALE:** Replicate across boilers, cooling towers, and RO systems once economics are proven.

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# Founding Leadership: Ashish Saboo

## Director & Strategic Product Visionary

- **Credentials:** M.Tech (BITS Pilani) | Ex-Faculty, BITS Pilani | CEERI (Research) | Research Analyst – DRDO (ADA Labs) & Cummins Research, Pune | Market Development Leader – Enagic Kangen Water (Japan).
- **23+ Years of Technocratic Leadership:** Extensive background in engineering validation, advanced systems research, and market scaling.
- **Advanced Systems Research:** Contributed to high-impact durability and performance design at DRDO and Cummins Research.

**Strategic Vision:** "Technology creates impact only when it is scalable through strong distribution, and delivers clear value for both partners and customers."

We invite your organisation to identify one high-impact water-treatment challenge and evaluate the measurable **technical** and **financial** **opportunity** with AMB NEER.

# SUSTAINABLE TODAY. STRONGER TOMORROW.

***Our Planet. Our Responsibility. Our Future.***

**JAPANESE TECHNOLOGY**

Customized for Indian Water
for Indians.

**AMB is**

**CAPEX**
**with ROI**

**WATER SOFTENER & RO is**

**CAPEX**
**with OPEX**

**CHOOSE WISELY.**


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**Let's build a Water Positive World. Together.**