

BOILTE TECHNOLOGY LEADERSHIP ROADMAP

PREAMBLE: WE ARE REIMAGINING THE VERY NATURE OF HEAT

We don't just manufacture boilers. We are reimagining the very nature of heat.

This is not a sales plan or a marketing brochure. This is a manifesto of engineering evolution.

The Boilte Technology Leadership Roadmap (BTLR) is our publicly declared Research & Development (R&D) strategy for the period up to 2030.

The energy industry stands on the threshold of the greatest transformation since the Industrial Revolution. Hydrogen is replacing methane, carbon now has a price, and artificial intelligence is penetrating every molecule of fuel. At Boilte, we intend not merely to keep pace with these changes — we aim to set the direction.

This Roadmap is our invitation to strategic partners, investors, and visionary engineers to join us in creating heat that does not harm the planet.

OUR VISION: HEAT AS A DIGITAL ECOSYSTEM

By 2030, boiler equipment will cease to be just "hardware." A Boilte boiler will become an intelligent node within the energy system: it will sense fuel composition, predict weather patterns, trade flexibility, and earn carbon credits for its owner.

Our strategy rests on Three Pillars of Leadership:

Pillar	Essence
1. Adaptive Physics	Next-generation materials and heat exchange
2. Cognitive Combustion	Artificial Intelligence and Digital Twins
3. Green Economics	Hydrogen and carbon neutrality as a product

NEAR HORIZON (2024–2026): "INTELLIGENT PHYSICS"

1.1. Project "H2-Ready"

We are finalizing the development of a boiler line certified to operate on a natural gas blend with up to 30% hydrogen without loss of efficiency or warranty.

R&D Goal: Development of burner devices with variable geometry nozzles, adapting to the fluctuating Wobbe Index.

Pilot: Launch of an industrial boiler on a hydrogen-methane blend (20% H₂) at our own production facility in Q4 2025.

Expected Outcome by 2026:

- Certification of the entire hot water boiler line up to 10 MW for 30% H₂ operation.
- Start of series production of burners with adaptive geometry.

1.2. Industrial IoT — "Boilte Telemetry Core"

We are implementing factory-installed telemetry on all models rated above 200 kW. Every boiler will be shipped with a data acquisition unit transmitting operational parameters (temperature, pressure, flue gas composition, burner vibration) to a secure cloud environment.

R&D Goal: Creation of an annotated database for AI training.

Outcome: A lifelong digital model for every boiler manufactured — a "Digital Twin" in the cloud.

Expected Outcome by 2026:

- First 5,000 boilers connected to the telemetry system.
- Launch of predictive analytics to detect deviations 2–3 weeks before critical efficiency drop.

1.3. New Metallurgy: Austenitic Steel in Wet Sections

Initiation of trials for boiler shells made from high-chromium austenitic stainless steel to eliminate limitations related to feed water quality. The "InoxCore" Project.

Expected Outcome by 2026:

- First industrial prototypes with new steel shells.
- Removal of water hardness restrictions for models up to 1 MW.

MID HORIZON (2026–2028): "COGNITIVE COMBUSTION"

2.1. "Boilte Opti-Flame™" AI System

Launch of a proprietary Artificial Intelligence system for combustion control. Unlike standard controllers operating on rigid curves, Opti-Flame utilizes a neural network trained on telemetry data from thousands of boilers.

Functions:

- Predictive Analytics: The system predicts scale or soot formation 2–3 weeks before a critical efficiency drop occurs.
- Self-Learning: The AI adjusts the excess air ratio in real-time, compensating for burner wear, changes in gas density, and atmospheric pressure fluctuations.
- Digital Advisor: Provides recommendations to service engineers via AR (Augmented Reality) glasses.

Expected Outcome by 2028:

- Fuel savings of 5–8% through combustion optimization.
- NOx emission reduction of 15–20% without additional equipment.

2.2. "Digital Twin" Project

For every major project (boiler plants rated 5 MW+), a complete digital twin will be created on the Boilte SimSpace platform. The client receives not just a boiler, but a software replica for personnel training and emergency simulation without halting production.

Expected Outcome by 2028:

- 40% reduction in personnel training time.
- Ability to simulate any emergency scenario without risk to equipment.

2.3. 5th Generation Condensing Boiler "PureFlow"

An ambitious project aiming to achieve 109% efficiency (LHV) by utilizing the latent heat of vaporization, reducing flue gas temperature below 35°C.

Expected Outcome by 2028:

- Market launch of the first model with efficiency > 105%.
- 15% reduction in CO₂ emissions compared to the best current alternatives.

FAR HORIZON (2028–2030+): "ZERO-FOOTPRINT ENERGY"

3.1. Project "Boilte Hydrogen Pro"

Development of an industrial boiler operating on 100% 'green' hydrogen.

Challenge: Designing a combustion chamber that can handle hydrogen's high flame speed (8 times higher than methane) and prevent NOx formation.

Partnership: Establishing a joint laboratory to test new ceramic burner coatings.

Expected Outcome by 2030:

- Pilot industrial hydrogen boiler with 5 MW capacity.
- Certification for 100% H₂ operation.

3.2. "Boilte Carbon IQ" Carbon Footprint Management Platform

We are transforming the boiler house from an emission source into an asset for climate investment.

What is it? A hardware-software complex that:

- Verifies fuel savings and CO₂ emission reductions (compared to outdated equipment).
- Automatically generates reports compliant with MRV standards (Monitoring, Reporting, Verification) for carbon credit applications.
- Integrates with blockchain platforms for tokenizing 'green' certificates.

Pilot Project: Installing the Carbon IQ system at the facilities of the first 10 industrial partners to refine the mechanism for monetizing emission reductions.

Expected Outcome by 2030:

- 20 million tons of CO₂ cumulative reduction in clients' carbon footprint.
- Monetization of carbon credits for clients.

3.3. Solid-State Heat Storage (in partnership)

Commencing research into integrating Boilte boilers with electro-thermal accumulators based on basalt or graphite.

Concept: Convert surplus 'green' electricity (wind/solar) into high-potential heat and release it into the heating network via the boiler's heat exchanger, functioning as a giant thermal buffer for the energy grid.

Expected Outcome by 2030:

- Pilot integration project with renewable energy.
- Capacity to store up to 100 MWh of thermal energy per module.

THE PARTNERSHIP ECOSYSTEM

We recognize that technological leadership cannot exist in a vacuum. Boilte is open for cooperation:

1. Academic Track

A grant program for universities and young scientists focused on combustion physics and thermoscience.

2. Industrial Track

An open API for integrating Boilte control systems with the client's top-level industrial automation (SCADA).

3. Investment Track

Opportunities for equity participation in R&D spin-offs created to implement breakthrough Roadmap projects.

KEY SUCCESS INDICATORS (KSIs) BY 2030

Indicator	Target Value
Boilers connected within the Boilte Telemetry ecosystem	50,000
Revenue derived from products that did not exist in 2025 (hydrogen systems, digital services, Carbon IQ)	30%
Cumulative reduction in clients' carbon footprint	20 million tons CO ₂
Zero cost of ownership for standard facilities (achieved through energy efficiency and monetization of carbon credits)	Achieved

CONCLUSION: BETTING ON THE FUTURE

Boilte has chosen the path of technological leadership. We invest in engineering today so that heat becomes cleaner, smarter, and more economical tomorrow.

We invite dialogue with those who share our conviction: the future of energy is being created now. And it is being created by engineers, not marketers.

Join the Boilte Roadmap. Become an architect of the future.

Approved by:

Chief Technical Officer of Boilte