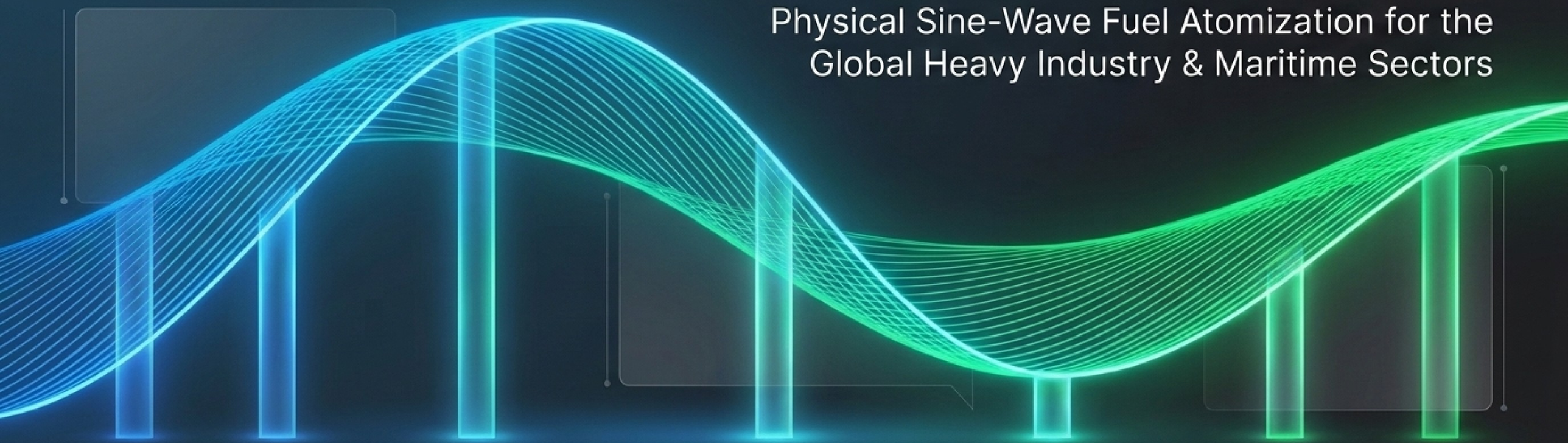
세상에 이로운 기술!

DCM E-TECH

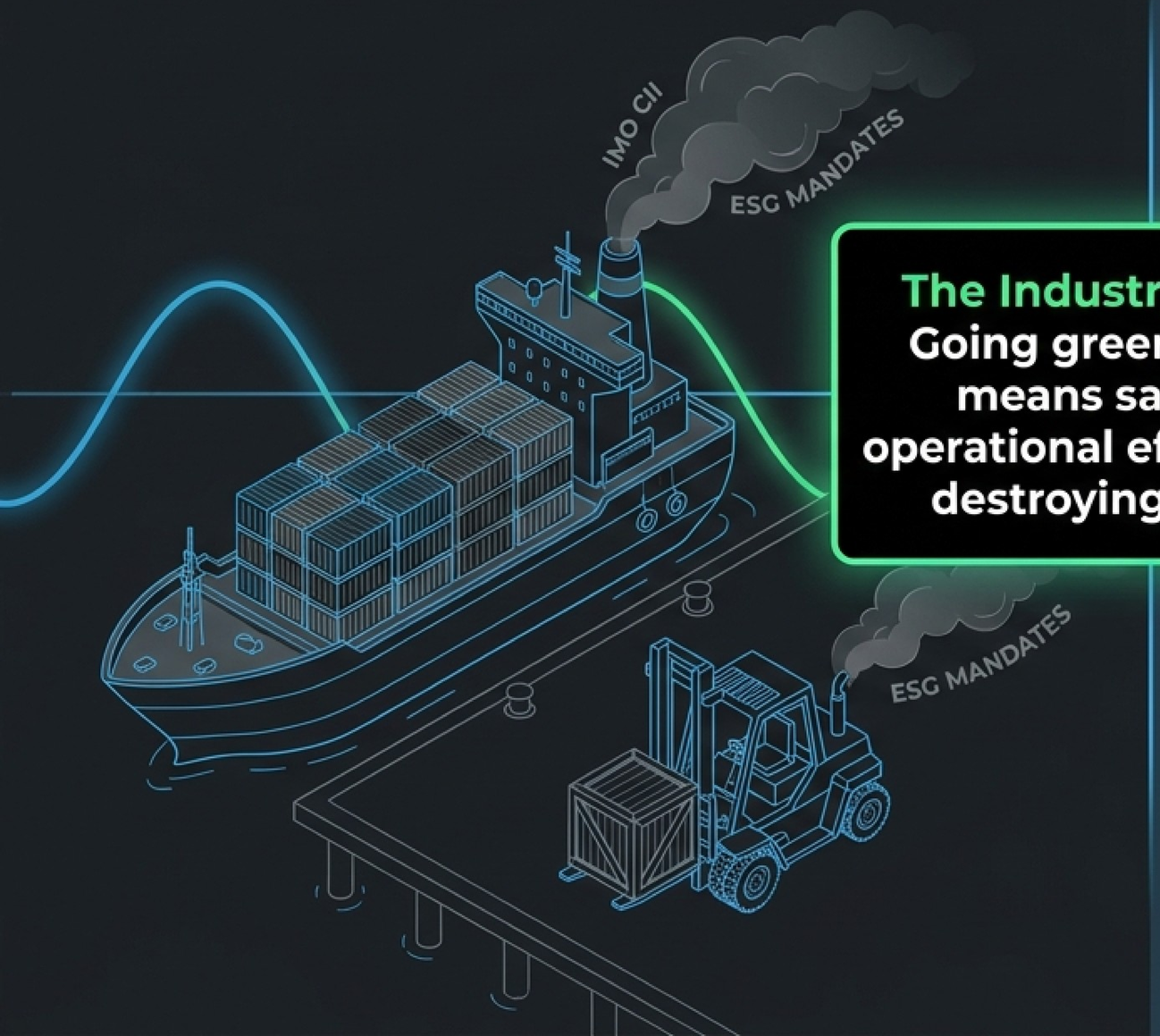
Bridge to Green Transition

Physical Sine-Wave Fuel Atomization for the Global Heavy Industry & Maritime Sectors



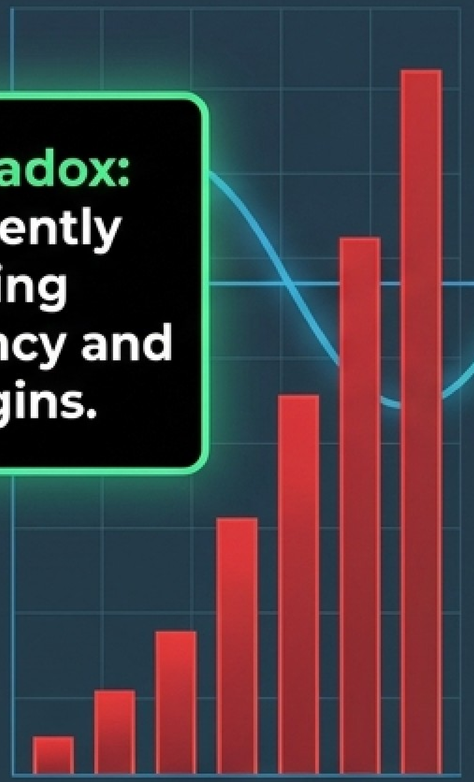
DCM E-TECH

THE PRESSURE



The Industry Paradox:
Going green currently means sacrificing operational efficiency and destroying margins.

THE COST



MASSIVE CAPEX
(EV TRANSITION)

RISING OPEX &
REDUCED MARGINS

RISING OPEX &
REDUCED MARGINS

THE FLAWED LOGIC OF AFTER-TREATMENT

1. BAD COMBUSTION | Injecting dense, clustered fuel into the cylinder.

Restrictive bottleneck

2. THE SYMPTOM | Generating Diesel Particulate Matter (DPM), Soot, and unburned sludge.

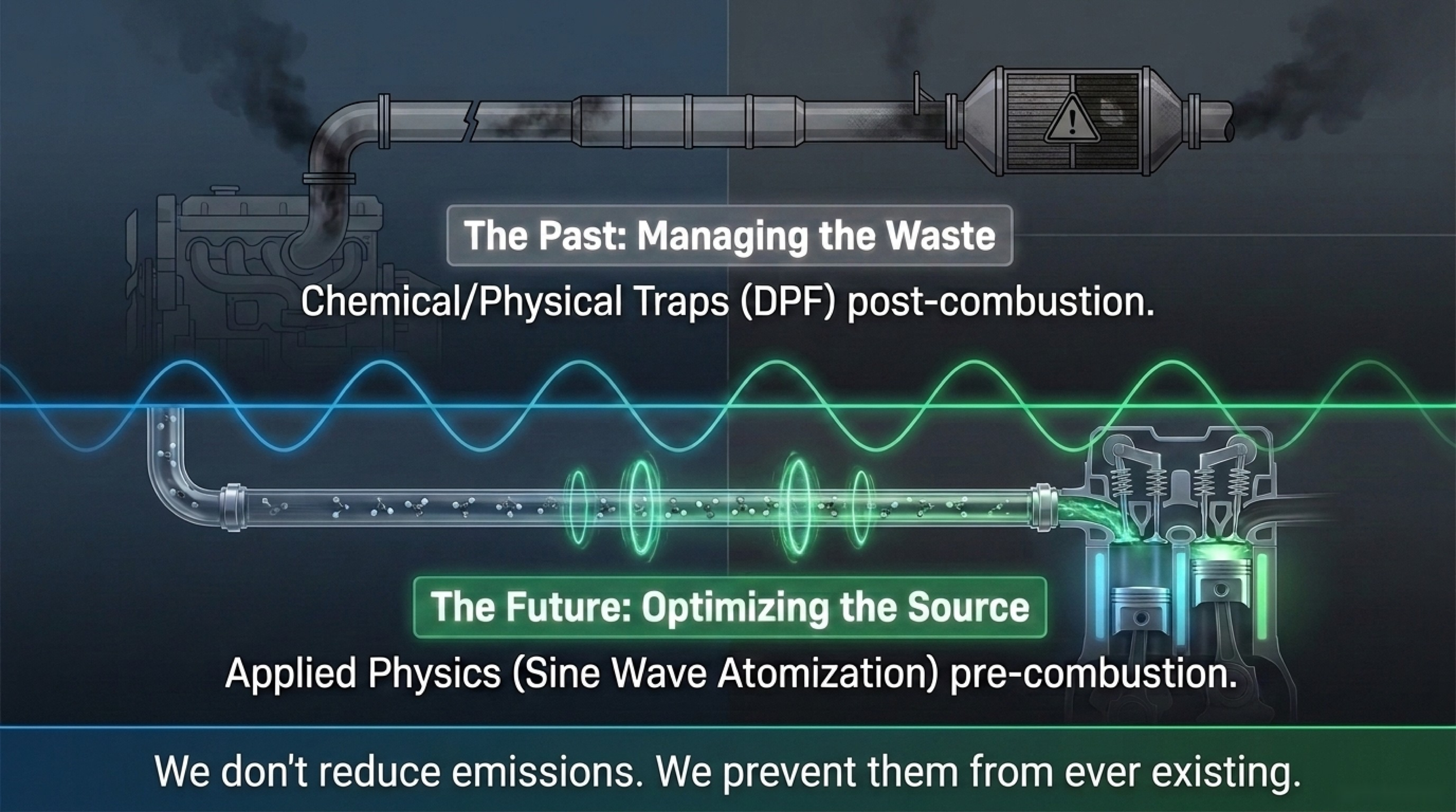
Restrictive bottleneck

3. THE BAND-AID | Catching the soot in a post-combustion filter (DPF).

→

THE OPERATIONAL REALITY

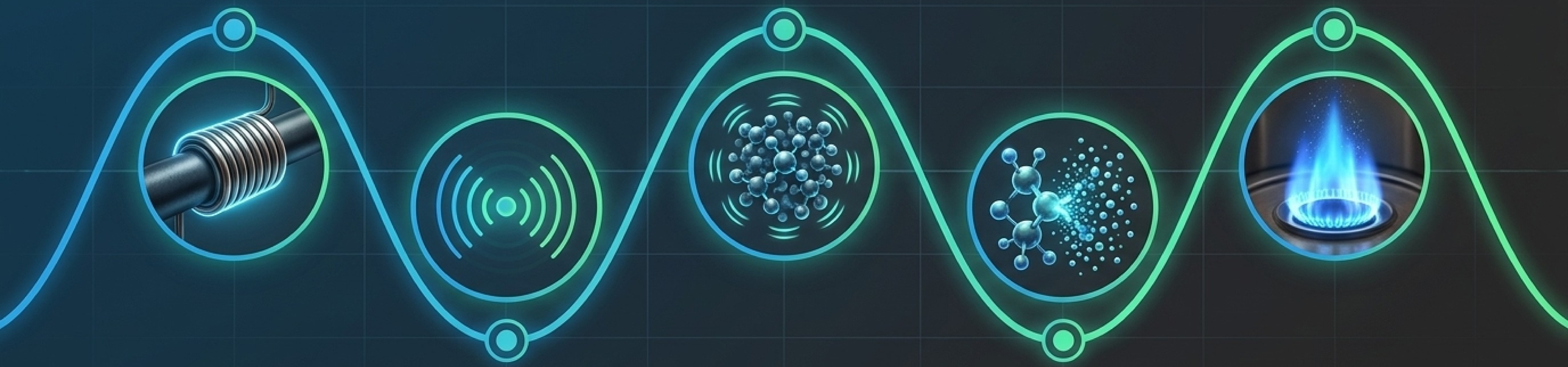
- **Hardware Penalty:** Exhaust restriction causes backpressure, choking the engine.
- **Fuel Penalty:** Forces a 3% to 5% drop in fuel efficiency (forced regeneration).
- **Maintenance Nightmare:** Filters clog. Requires forced downtime. Fails entirely in low-speed yard equipment.


The Past: Managing the Waste
Chemical/Physical Traps (DPF) post-combustion.
The Future: Optimizing the Source
Applied Physics (Sine Wave Atomization) pre-combustion.
We don't reduce emissions. We prevent them from ever existing.

Step 1: Mount (Non-Invasive)
Exterior wrapping of the fuel line. Zero cutting, zero drilling.

Step 3: Vibrate (Disruption)
Wave energy induces powerful micro-vibrations in dense hydrocarbon clusters.

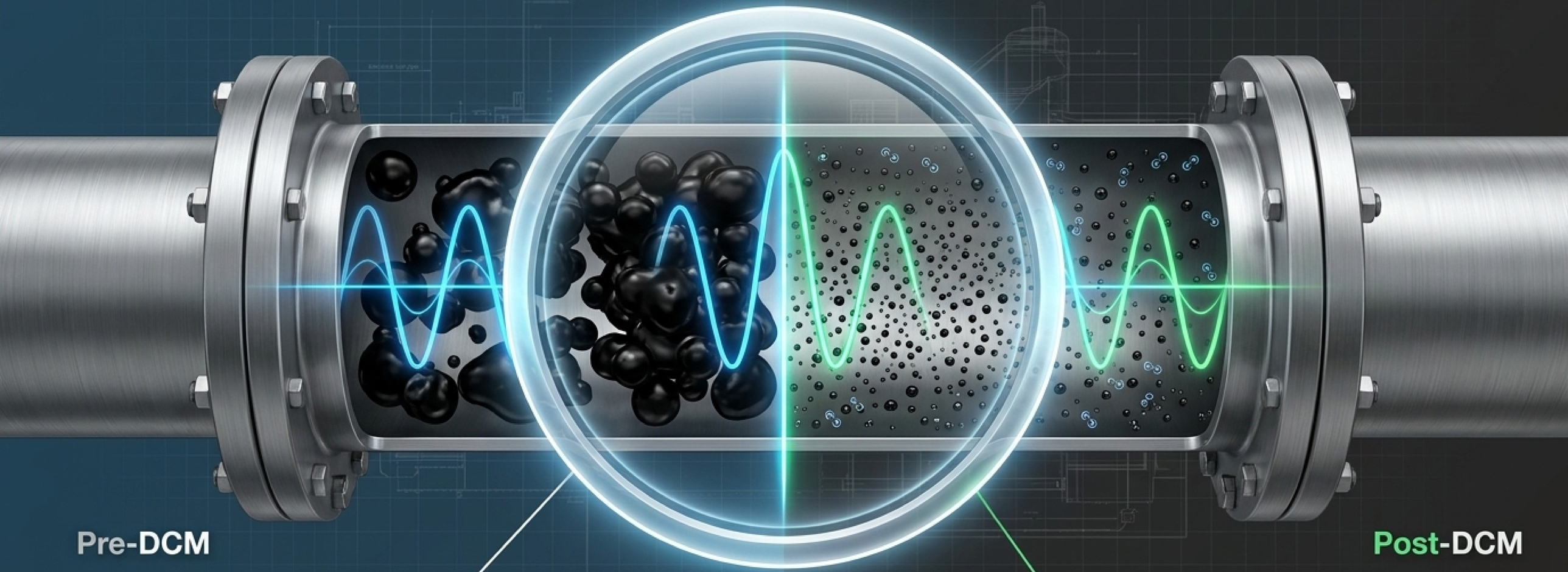
Step 5: Combust (Optimization)
Fuel is injected as an ultra-fine mist. Maximum oxygen contact area achieved (+8.34%).
Result: Complete combustion.



Step 2: Irradiate (Sine Wave)
Intelligent module broadcasts an optimized sine wave frequency through the pipe wall.

Step 4: Deconstruct (Atomization)
Intermolecular forces weaken. Giant molecular clumps shatter into a uniform, nano-scale state.

The Molecular Disruption Lens



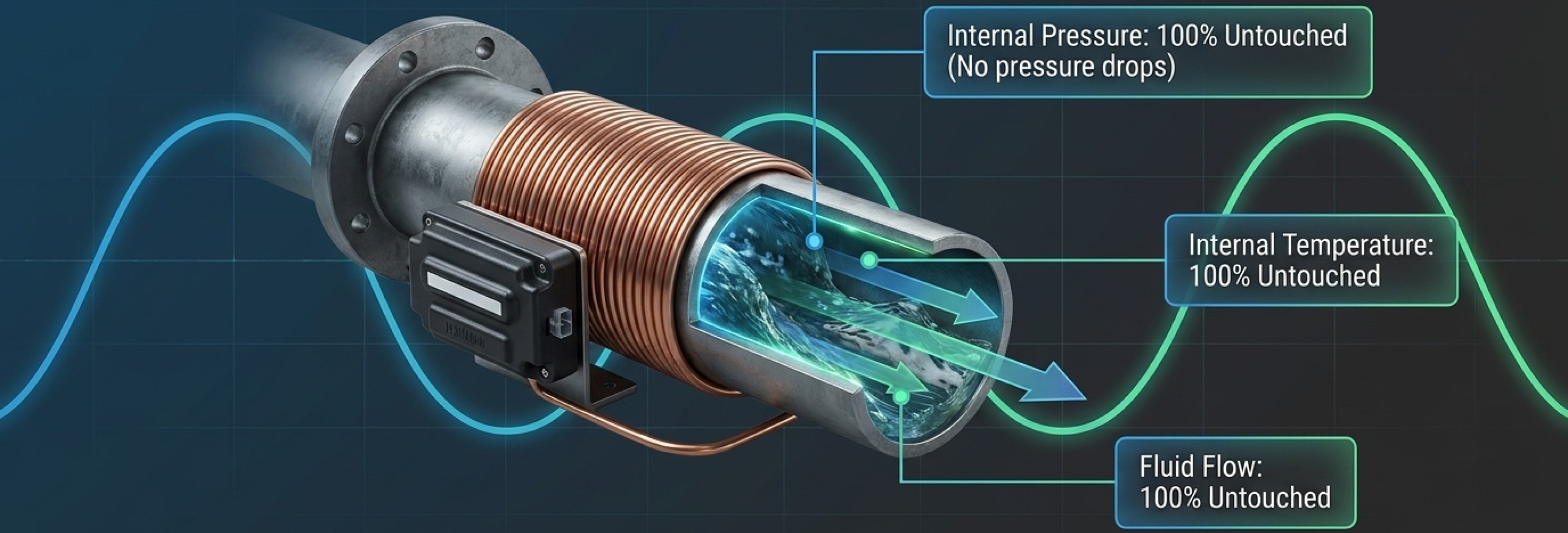
Pre-DCM

Pre-DCM: Low surface area.
Oxygen cannot penetrate the cluster.
Results in unburned carbon (soot/PM).

Post-DCM

Post-DCM: +8.34% Valid Surface Area.
Oxygen perfectly surrounds every micro-droplet.
Results in total thermal release and zero soot generation.

The Zero-Interference Wrapper



The Engineering Guarantee: Absolute zero risk of Vapor Lock, pump seizing, or flow interruption during critical HFO ↔ MGO change-over procedures. **100% Risk-Free.**

Industrial Durability Profile

Full-Potting Epoxy Seal

Internal circuitry is 100% molded and sealed. IP67 rated against extreme dust, moisture, and saltwater intrusion.

Heat-Resistant ABS Housing

High-strength polymer prevents deformation in high-heat engine rooms and eliminates salt-breeze corrosion.

Anti-Vibration Dampening

Internal fillers act as physical dampers, protecting the circuitry from the violent, sustained vibrations of marine and heavy machinery engines.

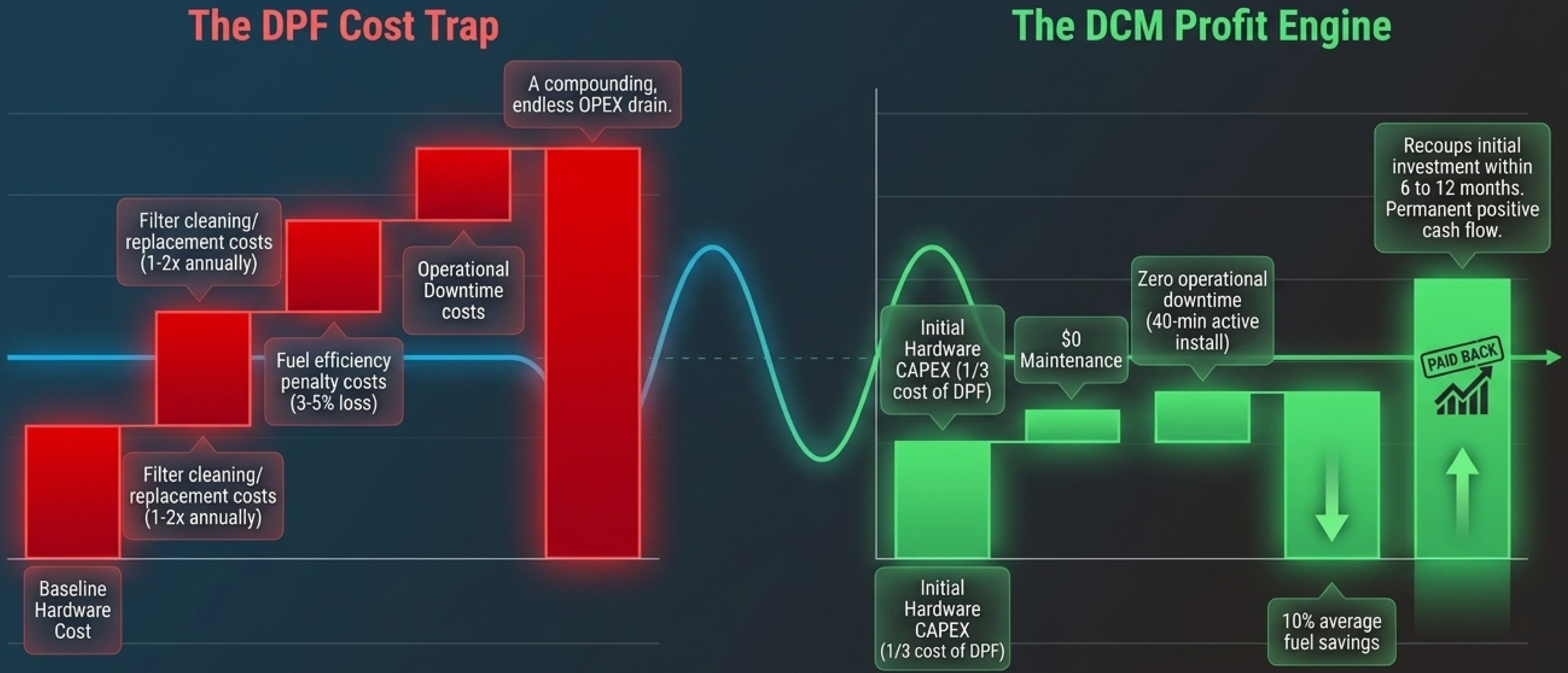
Electrical Safety

Ultra-low power consumption (<1W). Polarity-Free automatic matching eliminates any risk of short circuits from miswiring.

Pre-Treatment vs. After-Treatment Diagnostic

Traditional DPF (After-Treatment)		DCM E-TECH (Pre-Treatment)
Post-combustion Capture (Trap & Burn)	**Approach**	**Pre-combustion Optimization** (Physics-based Atomization)
Invasive exhaust restriction (Engine Backpressure)	**Hardware Impact**	**100% Non-invasive exterior wrap** (Zero Interference)
-3% to -5% (Forced regeneration penalty)	**Fuel Efficiency**	**+10%** (Complete combustion unlock)
High (Frequent filter cleaning, high downtime)	**Maintenance**	**Zero** (Solid-state, permanent installation)
Fails (Exhaust temps too low for regeneration)	**Low-Speed Viability**	**Perfect** (Works independent of engine speed/load)

The Total Cost of Ownership (TCO) Waterfall



PREMIUM B2B ENGINEERING

KOLAS Test Agency Test Results

Particulate Matter (PM/Dust) - Measured in harsh, low-speed industrial applications.

Total Hydrocarbons (THC)

Fuel Efficiency - Conservatively proven across heavy applications.

Key Takeaway: Data validated by national-level environmental testing agencies—moving beyond “estimated potential” to certified operational reality.

The Competitive Landscape

Chemical Additives (e.g., SulNOx)

Pros

Low upfront cost.

Cons

Extremely sensitive to fuel quality/water mix.

Endless OPEX drain (constant consumable purchases).

Lacks long-term industrial reliability.

Invasive Retrofits (e.g., FUELSAVE, Burners)

Pros

Structurally permanent.

Cons

Massive initial CAPEX.

Requires engine teardowns, pipe cutting, and severe operational downtime.

High engineering risk.

The DCM Hybrid Advantage (The Sweet Spot)

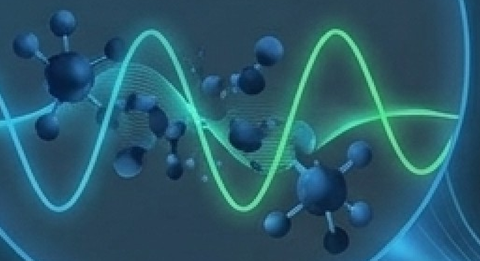
Pros

Delivers the structural permanence of a hardware retrofit, but with the zero-downtime, zero-CAPEX ease of an additive.

A solid-state physical solution that maintains 100% factory engine integrity.

PREMIUM B2B ENGINEERING

Physics
(Sine wave disrupting molecular clumps)



Hardware
(Non-invasive exterior coil)

Economics
(Zero OPEX, +10% fuel)

$0 +10%

Sinewave disrupting molecular clumps

Zero OPEX, +10% fuel

By solving the problem at the molecular level, we eliminate the physical constraints of the hardware. By eliminating the constraints of the hardware, we erase the financial burden of compliance. The bridge to the green transition is paved with economic efficiency.

Global Scalability Portfolio

DCM 1000 - 3000

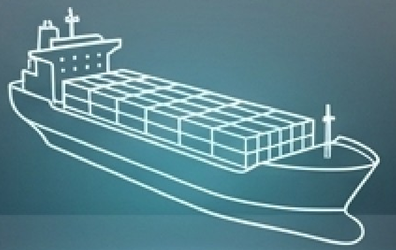
Forklifts, small logistics equipment (12V, <0.4W).

DCM 5000 - 7000

Transporters, heavy yard equipment, commercial trucks (12V/24V, <0.6W).

DCM 9000

Large special equipment, heavy-duty buses.



DCM Marine

The apex tier. Custom AC 220V systems engineered specifically for high-temperature piping and extreme Heavy Fuel Oil (HFO) marine engine/boiler environments.

One core physical principle, infinitely scalable across the entire global B2B supply chain.

THE 3-HORIZON RADAR: GLOBAL STRATEGY

PREMIUM B2B ENGINEERING: STRATEGIC EXPANSION

HORIZON 3

Global ESCO (Energy Service Company) Lock-in

Scaling via a zero-friction financial model for international shipowners.

HORIZON 1

Land-Based Heavy Equipment PoC

Securing robust, undeniable data in the harshest industrial yard conditions.

HORIZON 2

Marine Retrofit Market

Applying the technology to global shipping fleets to conquer the IMO CII challenge.

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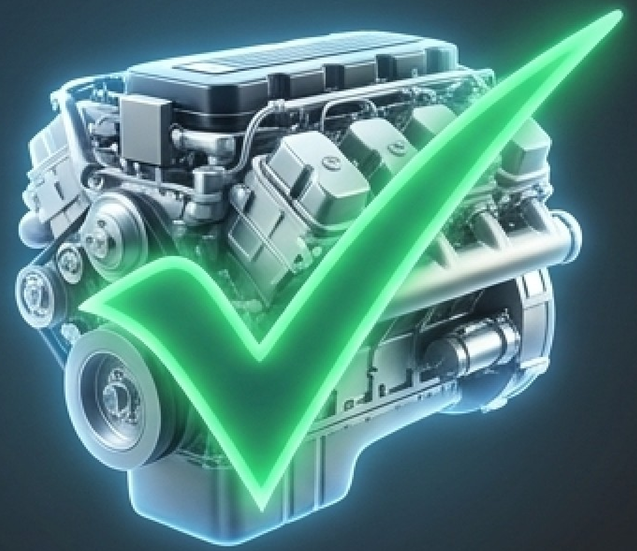
Horizon 1 Deep Dive: Industrial Yards & Heavy Logistics



The Arena & The Threat

Major industrial yards, port logistics, and heavy machinery depots. Facing intense ESG scrutiny, worker health risks from DPM exposure, and the looming multi-million dollar threat of forced electrification (EV transitions).

The DCM Immediate Fix

Equip existing aging diesel fleets in under 40 minutes per machine. Instantly slash PM by up to 80%, protect worker health, and achieve ESG compliance while squeezing 10% more efficiency out of legacy assets. Avoiding massive EV CAPEX.

Horizon 2 Deep Dive: Conquering Marine Heavy Fuel Oil

The HFO Challenge

Marine-grade bunker fuel is incredibly viscous with giant molecular chains.
Even 1,000-bar mechanical injection pumps fail to fully atomize it, resulting in massive soot and failing IMO CII (Carbon Intensity Indicator) grades.

The DCM Retrofit Solution

The sine wave physics are perfectly suited for HFO.

By breaking the high-viscosity molecular bonds prior to injection, DCM ensures complete combustion of the dirtiest fuels on earth.

The Result: Immediate improvement in IMO CII ratings, keeping aging vessels legally compliant and commercially viable in global ports without dry-docking or engine swaps.

Horizon 3 Deep Dive: The Global ESCO Model

The Barrier: Global shipowners are hesitant to deploy high-CAPEX green technologies across massive fleets of 50+ vessels.

Roadmap to Global Standardization

Rendered a slide with to the Resonant Wave design system

Phase 1: **Yard Data Mastery**

Securing definitive KOLAS certification based on grueling heavy-machinery field data.

Phase 2: **Maritime Certification**

Leveraging land-data to accelerate official Marine Type Approval (e.g., KR - Korean Register of Shipping) for main and auxiliary marine engines.

Phase 3: **Global Exhibition & Export**

Utilizing major maritime exhibitions (Posidonia, Nor-Shipping) to launch directly to international fleet managers.

Phase 4: **Standardized Newbuild Options**

Shifting from retrofitting old ships to becoming a standard ‘Premium Green-Tech Option’ specified in the catalogs of major global shipbuilders.

Practicing Sustainable Development Through DCM's Green Bridgehead.

DCM E-TECH provides the missing link. By mastering the physics of fuel atomization, we transform environmental compliance from a heavy tax into a measurable operational advantage.

DCM E-TECH

Contact / Web Information