Decarbonising Malta's Thermal Sector

A Quantitative Analysis of Waste Heat Potential and the Case for a National District Energy Network

Strategic Insights from The Heat Vault Company

Executive Summary: The Strategic Mismatch

The Vulnerability

Malta is an isolated grid 100% reliant on imported fuels and decentralised electric cooling, creating severe summer grid strain.

The Opportunity

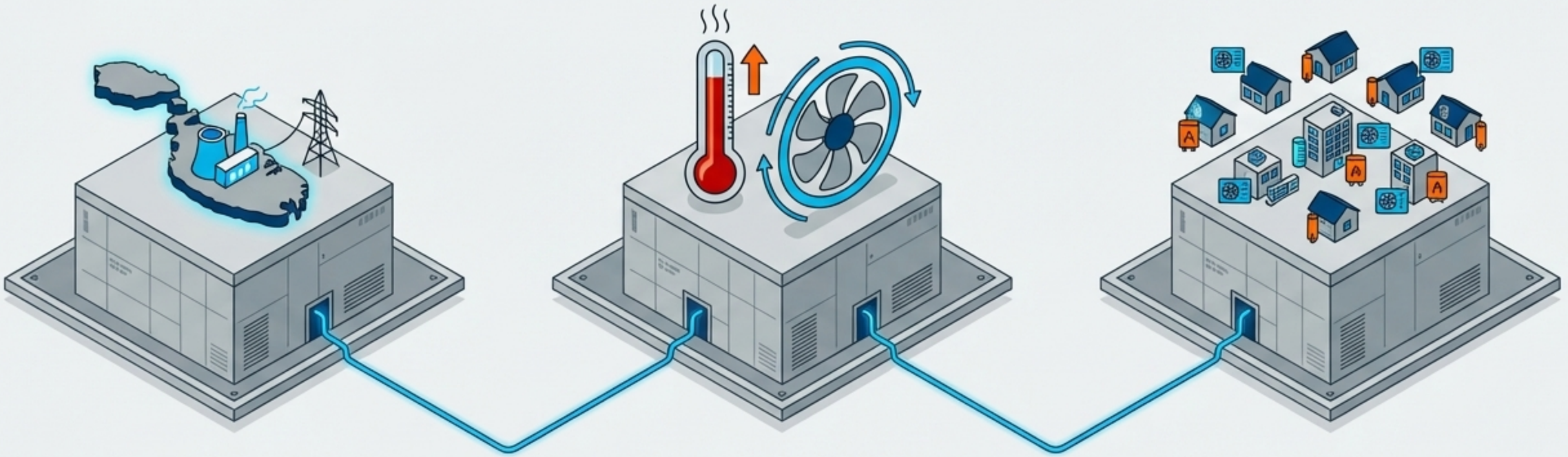
>1,225 GWh/year of technically recoverable industrial waste heat is currently dissipated into the environment.

The Mandate

Malta currently has no legal framework for local heating & cooling planning, missing the critical EU Recast Energy Efficiency Directive (EED) September 2025 deadline.

Premium consultancy

Malta’s Baseline: A Vulnerable, Isolated Profile



Island Isolation

Predominant reliance on imported Liquefied Natural Gas (LNG) and a single 200 MW HVAC interconnector to Sicily. High vulnerability to global price shocks.

The Cooling Driver

Low final energy consumption per capita, but a temperate Mediterranean climate drives massive, highly seasonal electricity demand for space cooling.

100% Decentralised

Zero district heating or cooling networks. Every building relies on individual, on-site systems (electric ACs, resistance heaters, gas boilers).

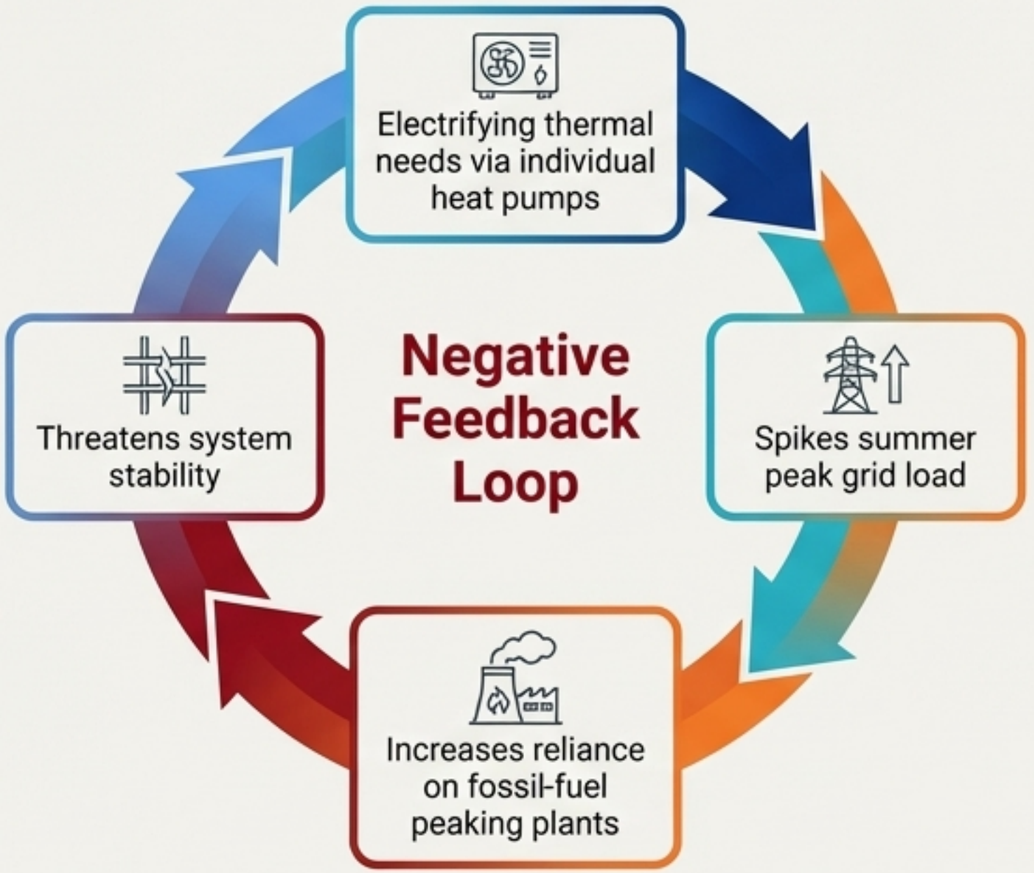
The Strategic Mismatch: Mandates vs. Mechanics

The EU EED Mandate

Article 25.6 mandates local authorities (>45,000 inhabitants) to prepare dedicated heating and cooling plans by **September 2025**.

Malta's current regulatory framework: Non-existent.

The Cooling Paradox



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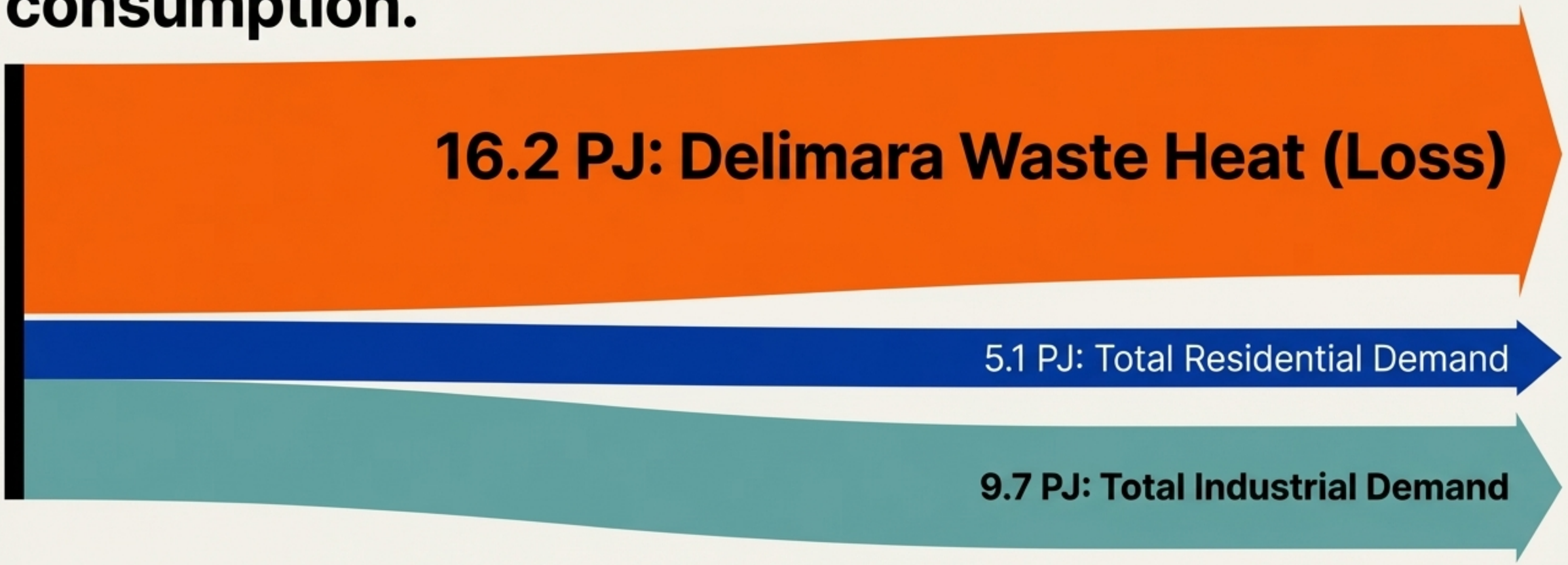
The scale of the loss dwarfs national consumption.



The thermal energy actively discarded by Malta's power generation is substantially larger than **the entire** final energy consumption of its residential and industrial sectors combined.

Over 95% of industrial waste heat is concentrated in just two locations

Thermal Asset Portfolio

Hub 1: Delimara Power Station Complex

~950 GWh/year

Sources:	Phase 4 CCGT (Medium/High Grade), Phase 3 Engines (Low/High Grade), Phase 2A/2B (High Grade).
Status:	Active baseload & peaking

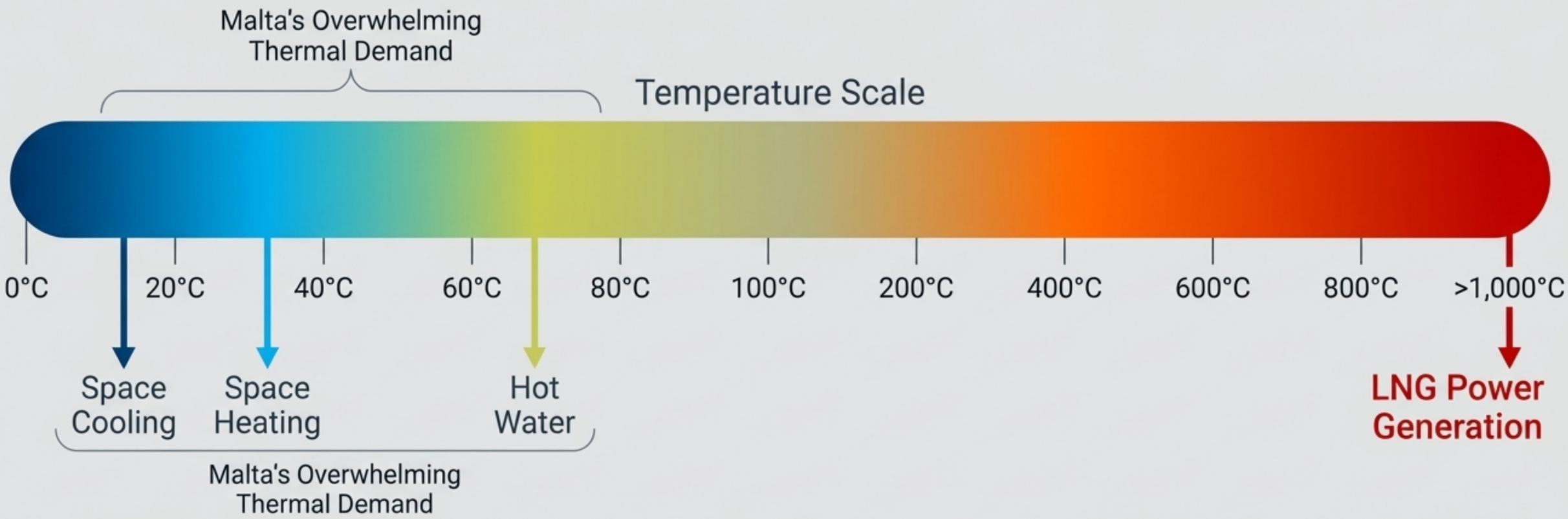
Hub 2: ECOHIVE WtE Facility (Maghtab)

~275 GWh/year

Source:	Moving grate combustion (Waste-to-Energy).
Status:	Under development

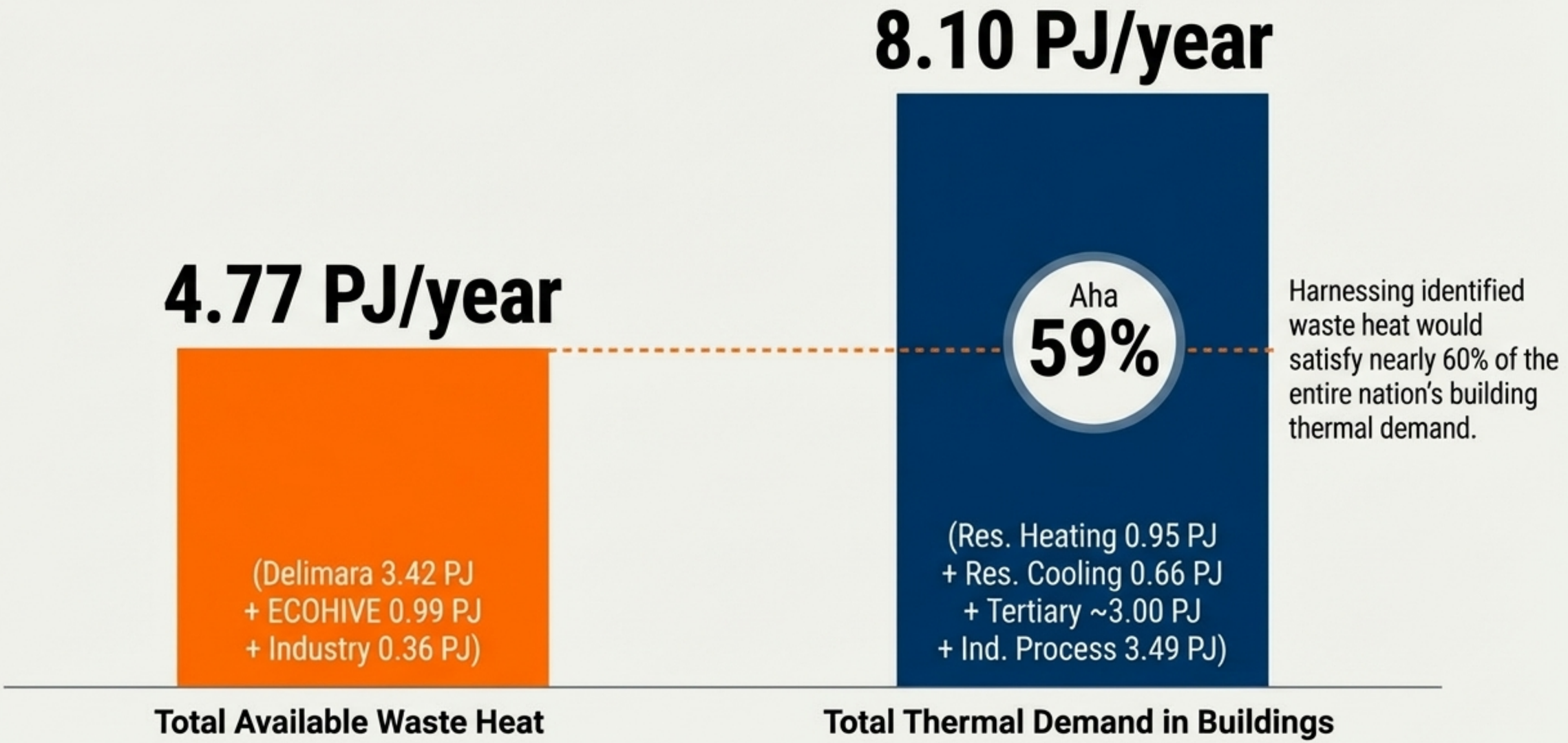
Small, diffuse industrial sources (food/beverage, pharma) provide a negligible 50-100 GWh/year. The strategy must focus on the two mega-hubs.

Thermodynamic Mismatch: Powering Low-Grade Needs with High-Grade Heat

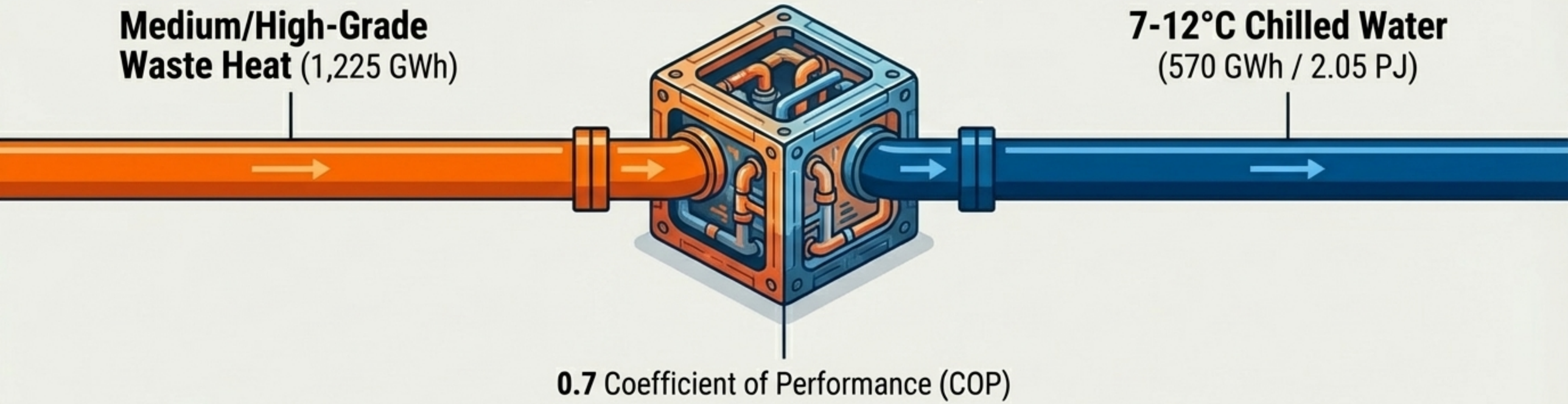


Malta's demand is overwhelmingly low-grade. Using high-grade electricity—generated from 1,000°C combustion—to satisfy low-grade 12°C thermal comfort needs is thermodynamically irrational. **Waste heat is the perfect thermodynamic match.**

The National Heat Balance: Indigenous supply covers 59% of building demand.



The Technological Key: Non-Electric Cooling



The Process

A continuous water/lithium bromide absorption cycle utilises incoming waste heat, rather than grid electricity, to produce zero-carbon chilled water.

The Impact

2.05 PJ of non-electric cooling perfectly matches the 1.83 PJ currently consumed by residential electric air conditioning. We can cool the nation while bypassing the electrical grid.

The Geographic Opportunity: The Southern Thermal Hub

The Insight

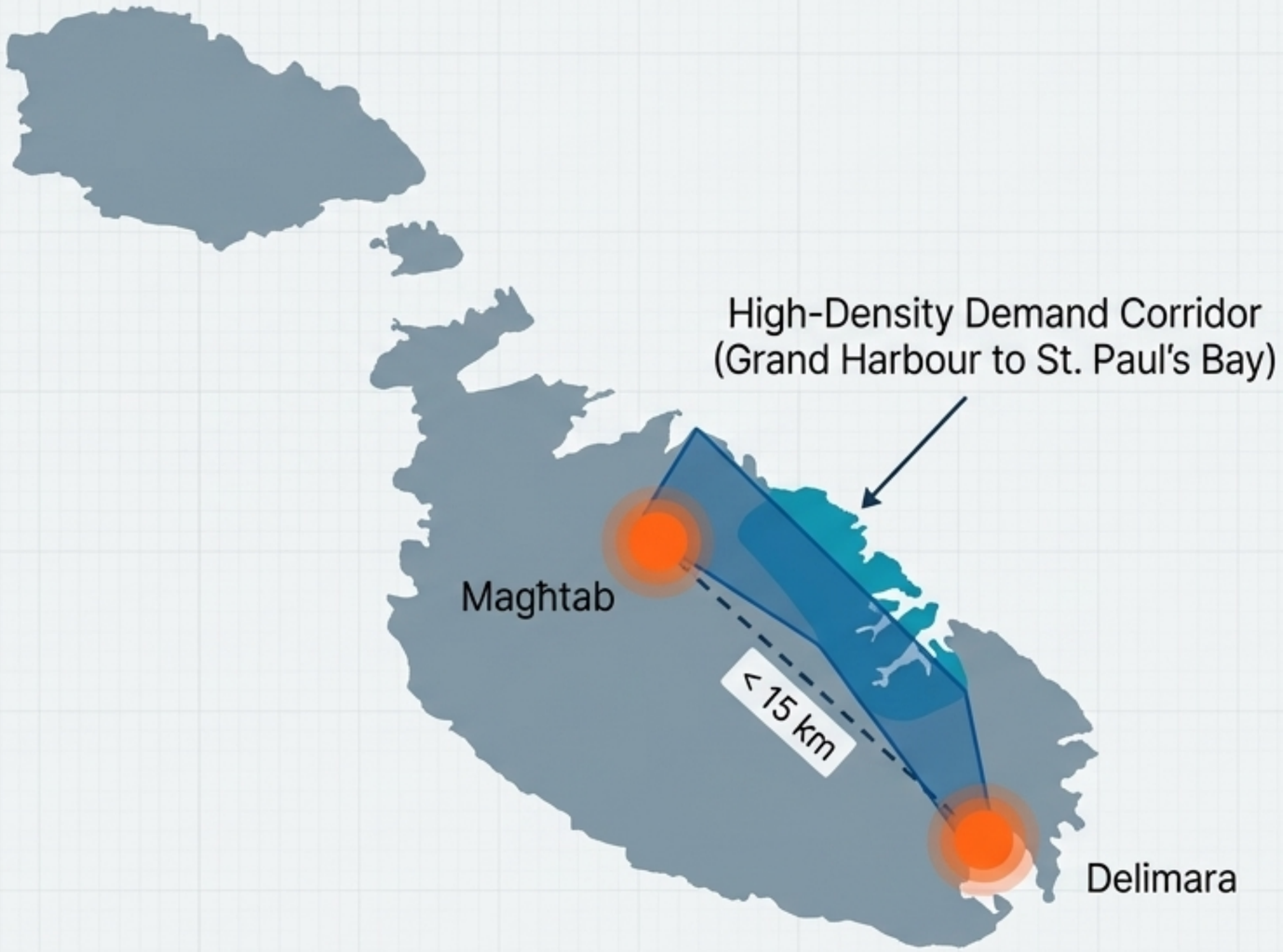
The two mega-sources of waste heat are situated less than 15 kilometres apart.

The Sink

This 15km corridor directly overlays Malta's highest concentration of residential, commercial, and tourist developments.

The Conclusion

Proximity of source to sink dramatically improves capital economics, requiring only a single, high-capacity thermal backbone rather than a fragmented pipeline network.



Paradigm Shift: Decentralised vs. District Energy

Current Paradigm: 100% Decentralised

Grid Impact: Extreme summer strain; peaking vulnerability.

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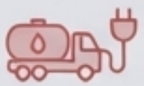
Resource Use: **16.2 PJ of thermal energy actively discarded.**

Heat venting to the atmospherd.



Fuel Exposure: **100% reliant on imported LNG and electricity.**

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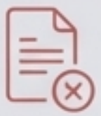

Compliance: Fails EU Sept 2025 EED local planning mandates.

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Proposed Paradigm: Centralised District Energy

Grid Impact: **Massive peak shaving; non-electric cooling.**

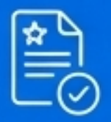
Massive, balanced power; non-electric cooling.

Resource Use: Harnesses 1,225 GWh indigenous waste heat.

Closed-loop thermal recovery system.

Fuel Exposure: Severs the link between cooling demand and imported gas.

Independent, self-sufficient energy system.



Compliance: Exceeds EU Recast EED obligations.

Exceed EU Recast EED obligations.

Policy Enablers 1 & 2: Frameworks & Audits

Enact National H&C Planning Framework

Urgency:
Mandated by Sept 2025 EU EED deadline.

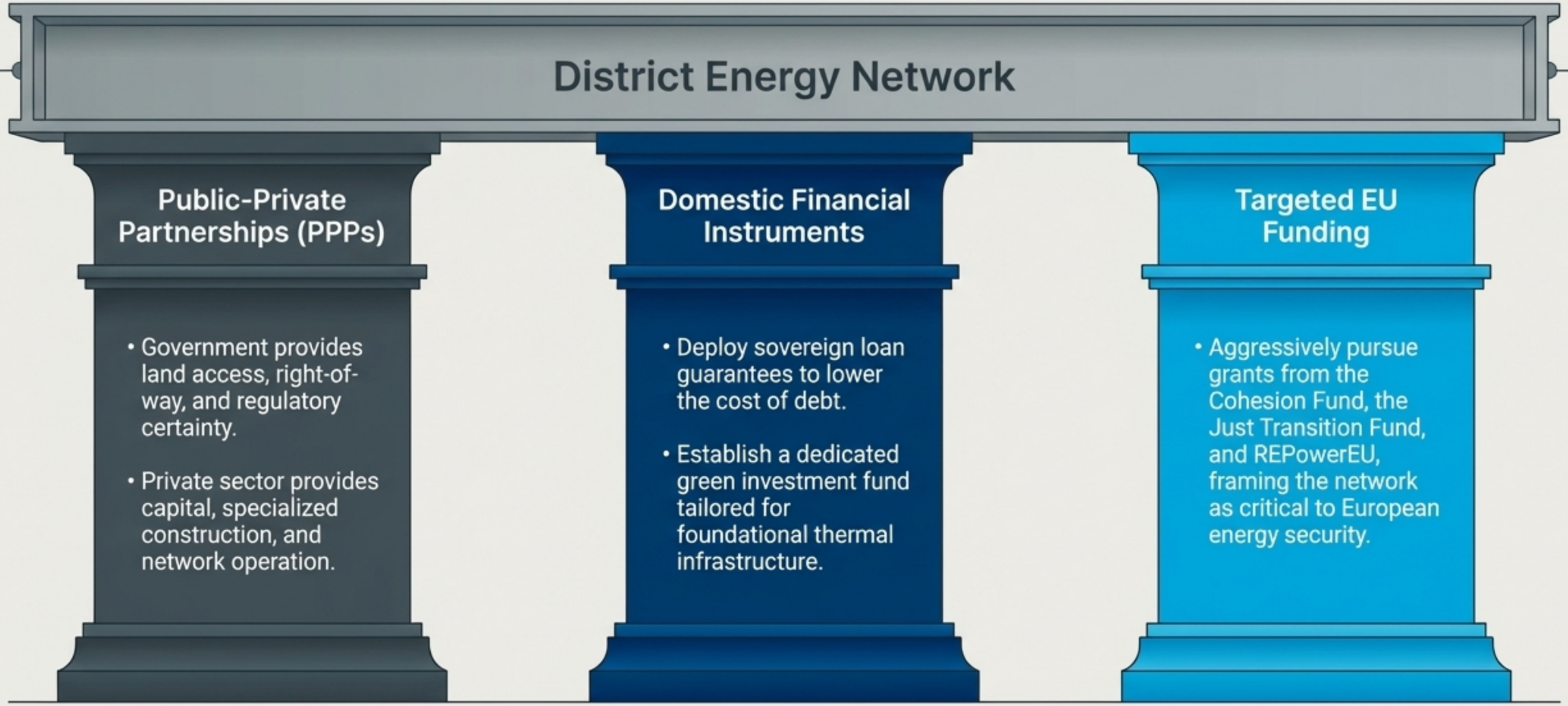
Step:
Empower the Energy and Water Agency to oversee mandatory local H&C plans for urban clusters >45,000 inhabitants. Establish clear zoning rules for District Energy.

Mandate Waste Heat Audits & Offtake Plans

Urgency:
Transform waste from an externality into a commercial asset.

Step:
Require REWS to mandate public waste heat audits for all large combustion plants (Delimara, ECOHIVE). Operators must provide binding plans for third-party thermal offtake.

Policy Enabler 3: De-Risking the Capital Investment



The 10-Year Implementation Roadmap

Phase 1: Foundation (Years 1-2)

- Commission bankable feasibility study for the Southern Thermal Hub.
- Enact the national EED compliance framework.
- Approve a pilot 'anchor' project near Delimara to establish a revenue stream.

Phase 2: The Thermal Backbone (Years 3-5)

- Construct the core transmission pipeline connecting Delimara and ECOHIVE.
- Install primary heat exchangers and absorption chillers at the source.
- Connect the initial anchor projects.

Phase 3: Network Expansion (Years 5-10+)

- Phased distribution rollout to the high-density Grand Harbour to St. Paul's Bay corridor.
- Implement connection subsidies and favorable zoning regulations.

Redefining Maltese Energy Security

Malta's single greatest opportunity for decarbonisation is already being generated. By capturing 1,225 GWh of indigenous waste heat, Malta can secure its energy independence, stabilise costs, and meet EU climate mandates without overwhelming its electrical grid.

The energy is already there. We only need to build the missing link.