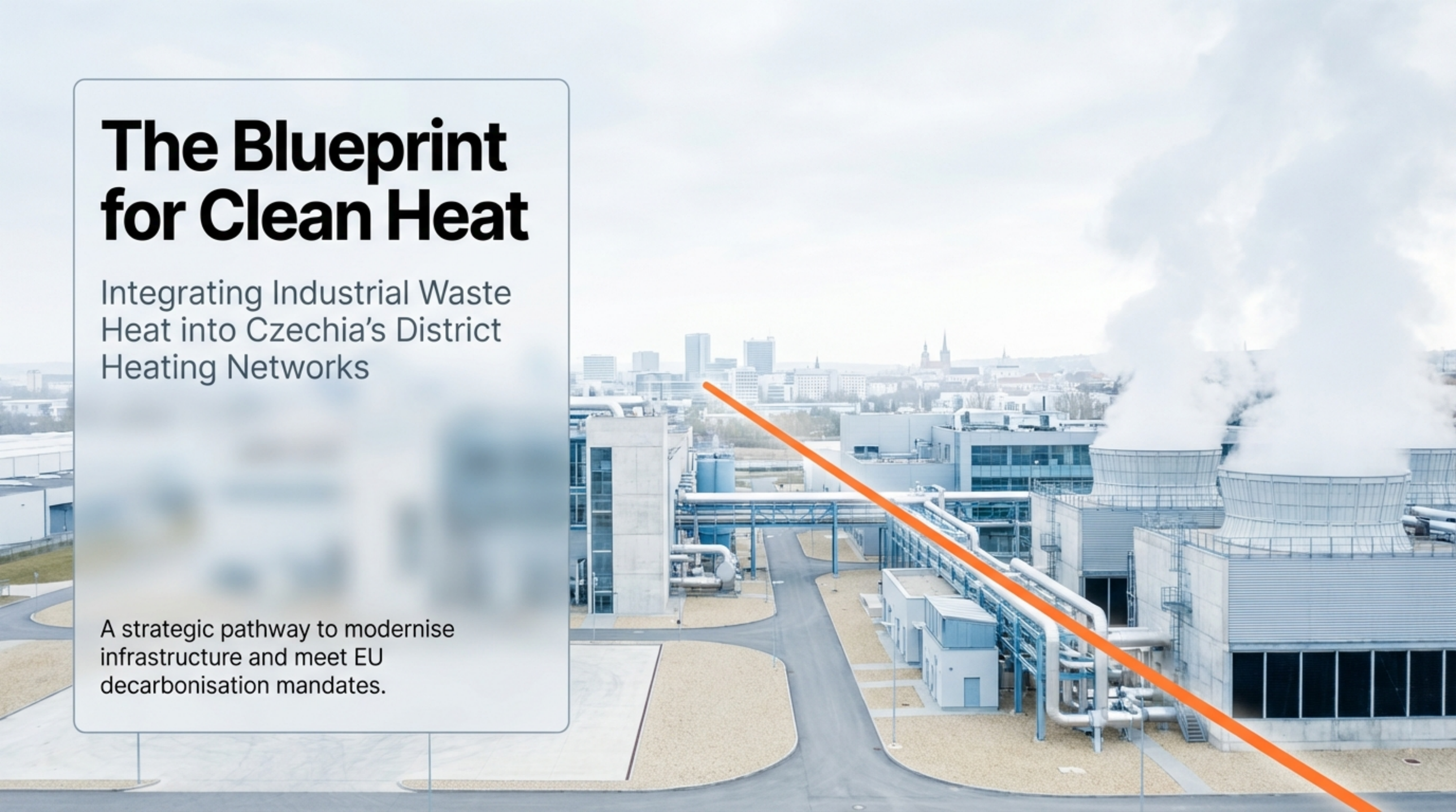
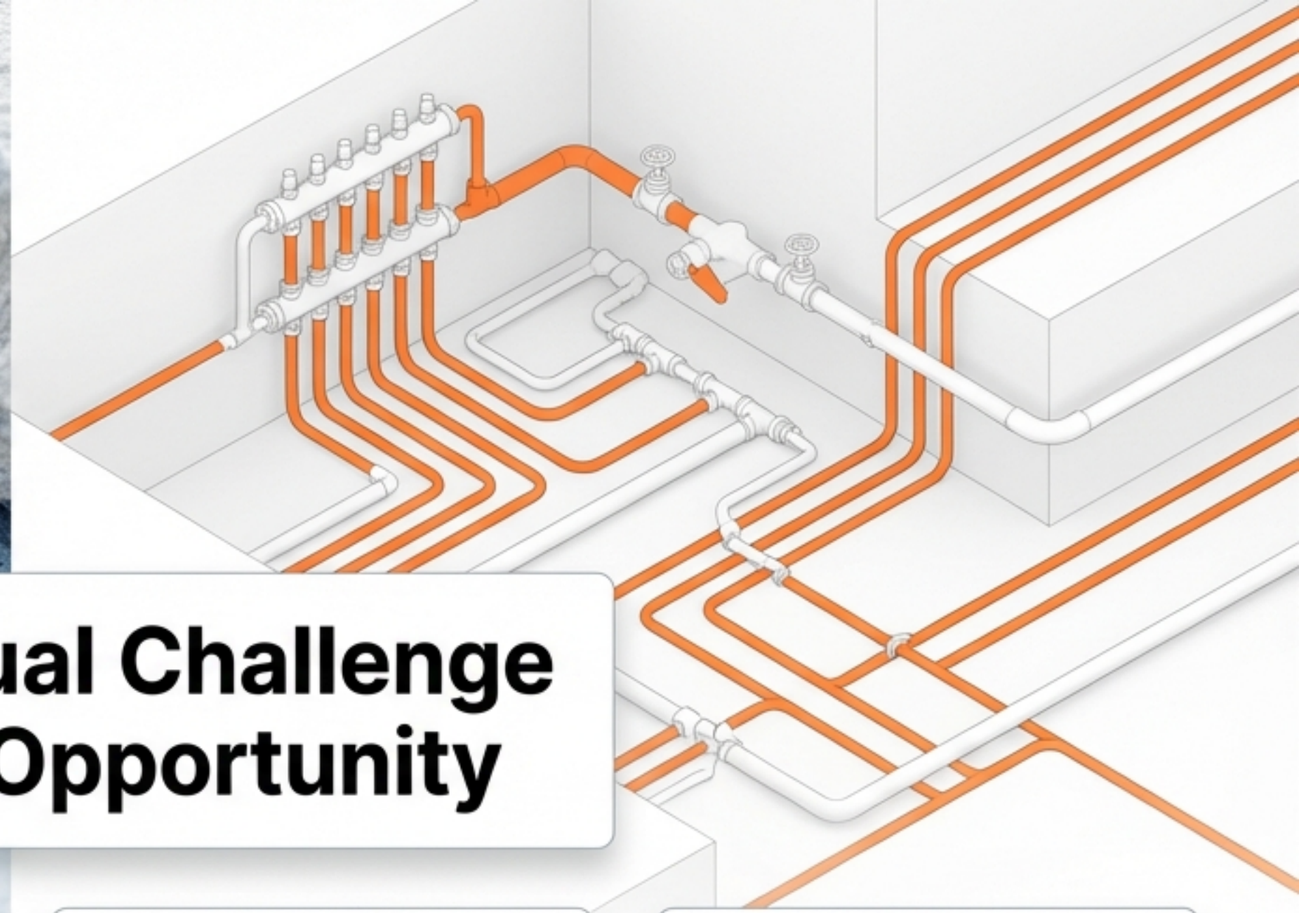
The Blueprint for Clean Heat

Integrating Industrial Waste Heat into Czechia's District Heating Networks

A strategic pathway to modernise infrastructure and meet EU decarbonisation mandates.





Czechia’s Dual Challenge & Singular Opportunity

The Legacy

30.3% of national energy currently relies on fossil fuels, with aging district heating infrastructure acting as a carbon liability.

The Mandate

Urgent EU targets (Recast EED) require binding local heating and cooling plans by **September 2025**.

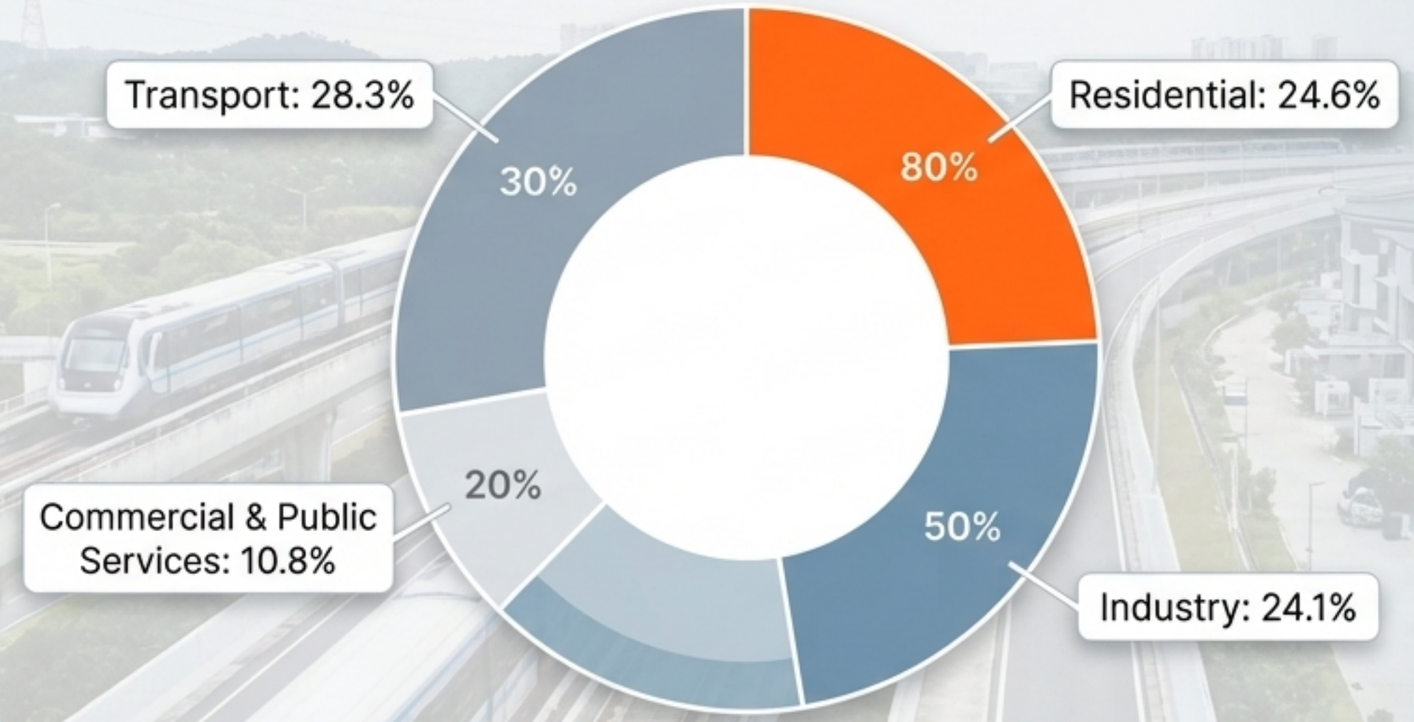
The Asset

5 PJ/annum of untapped, zero-marginal-cost **industrial waste heat (IWH)** is continuously dissipated into the atmosphere.

The Vector

Existing district heating networks—already serving **40%** of Czech households—provide the ultimate delivery mechanism.

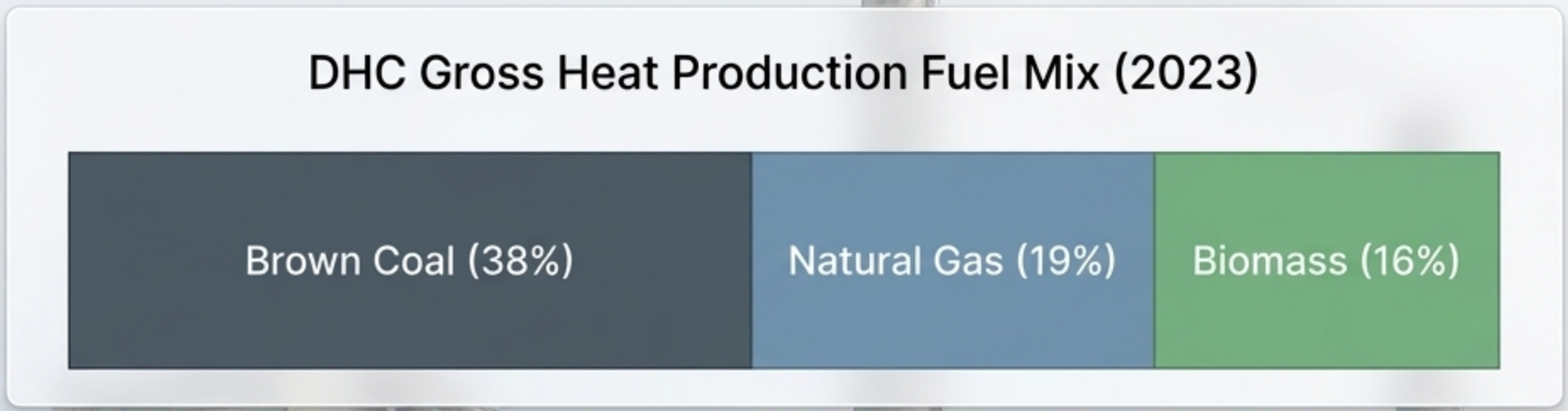
A Balanced Economy, Unbalanced Emissions



Critical Leverage Point

Space heating dominates residential demand, accounting for 72% of household energy consumption. The thermal sector is therefore the most critical target for national decarbonisation efforts.

The Current Thermal Engine



Czechia possesses one of Europe's most extensive district heating systems—boasting 37,912 MWt of installed capacity and over 7,500 km of trench length. However, powered predominantly by fossil fuels, this vast asset currently functions as a massive carbon liability.

The Approaching EU Mandate & The Governance Gap

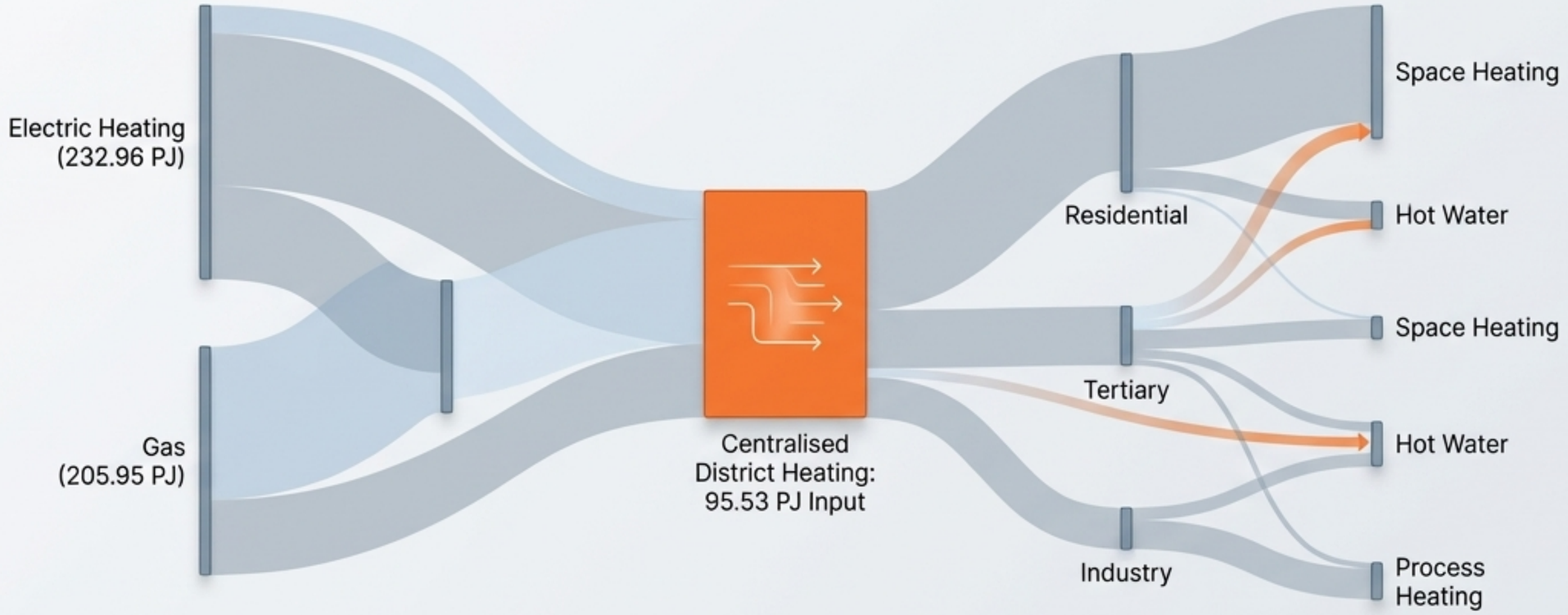
The Mandate

Under the Recast Energy Efficiency Directive (EED Art 25.6), integrated local heating and cooling plans are legally required by September 2025.

The Complication

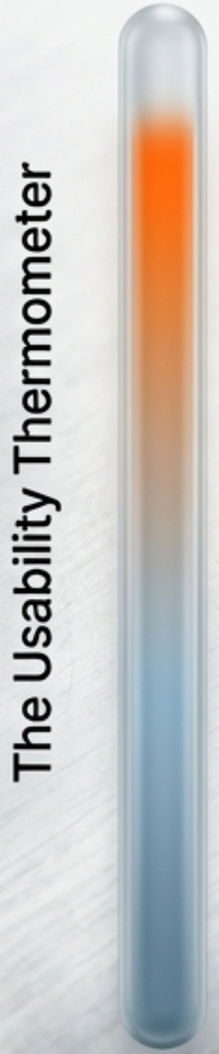
Czechia currently mandates energy plans without links to spatial or climate planning. This siloed approach creates a structural barrier, preventing the physical connection between industrial heat sources and urban demand.

Mapping the Thermal Metabolism



Insight: The physical flows reveal a highly centralised heating architecture. Decarbonising the 95 PJ District Heating node offers unparalleled systemic leverage, instantaneously delivering low-carbon heat to a massive residential user base.

Categorising the Hidden Resource



>400°C

High-Grade (>400°C):
Power generation or direct industrial reuse.

100°C–400°C

Medium-Grade (100°C–400°C):
Steam generation; ideal for direct injection into conventional District Heating networks.

<100°C

Low-Grade (<100°C):
Suitable for 4th Generation District Heating or upgradeable via large-scale industrial heat pumps.

Across varied sectors, 20% to 50% of total industrial energy input is ultimately lost as waste heat. It is a continuous, reliable byproduct of the nation's economic engine.

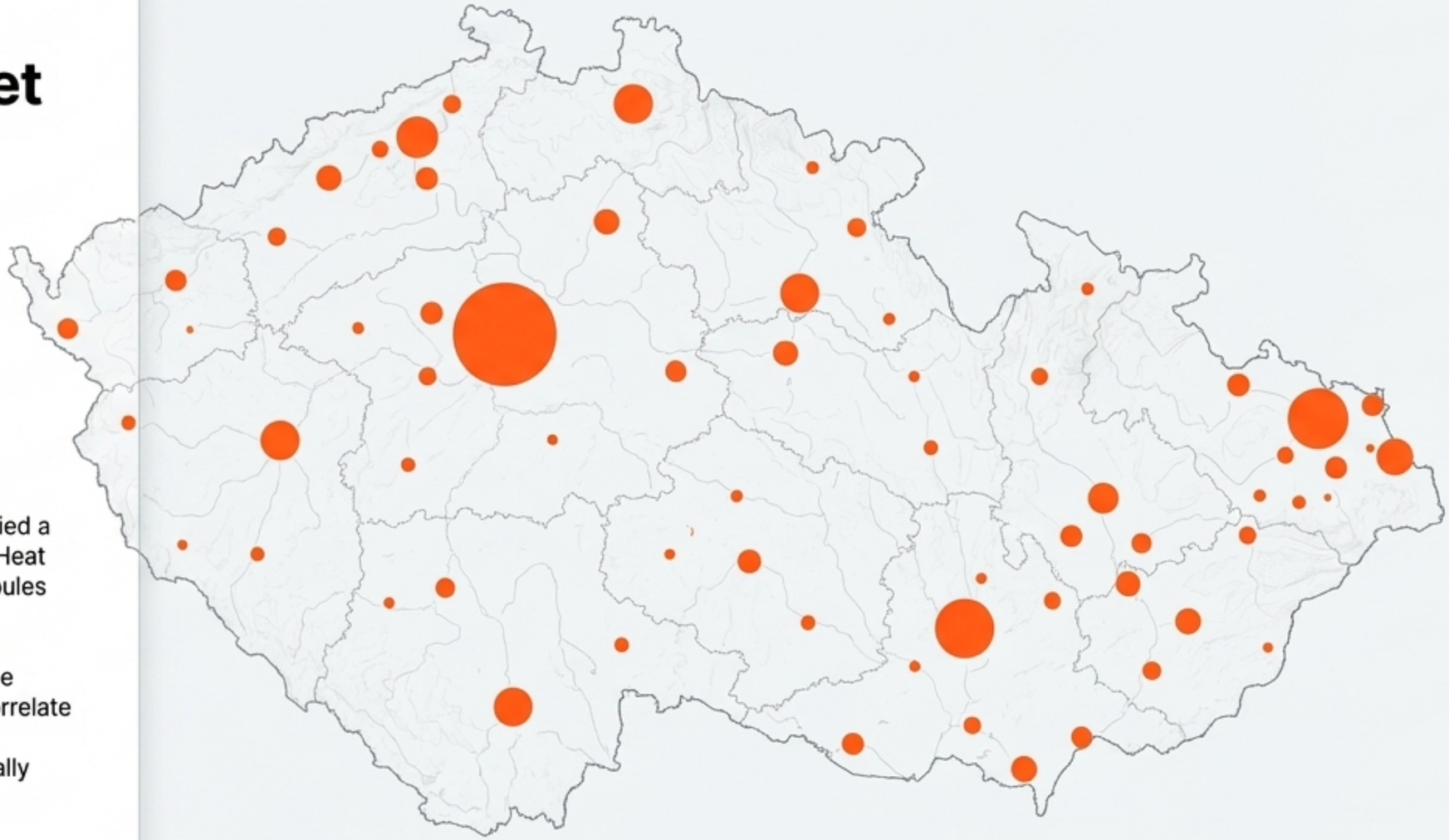
Locating the Indigenous Asset

5 PJ

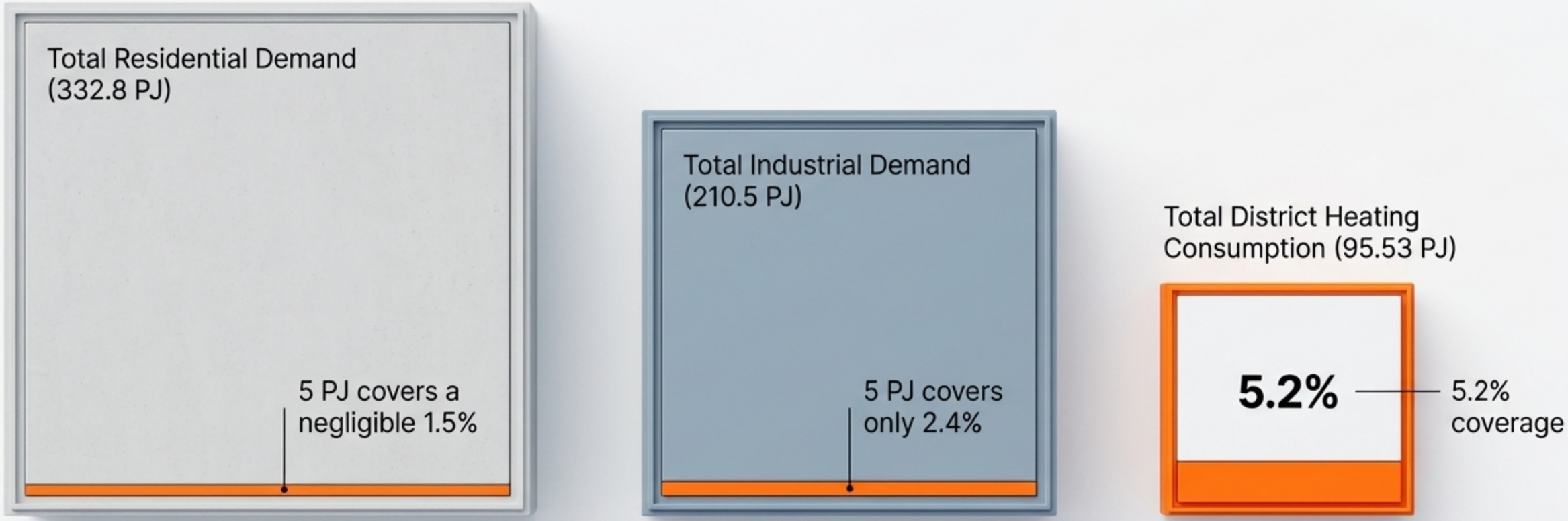
per annum

The Interreg CE-HEAT project has identified a technically recoverable Industrial Waste Heat (IWH) potential of approximately 5 Petajoules annually within the Czech Republic.

These GIS-based digital cadastres are the foundational data required to spatially correlate industrial heat sources with dense urban demand—proving the resource is physically adjacent to where it is needed most.

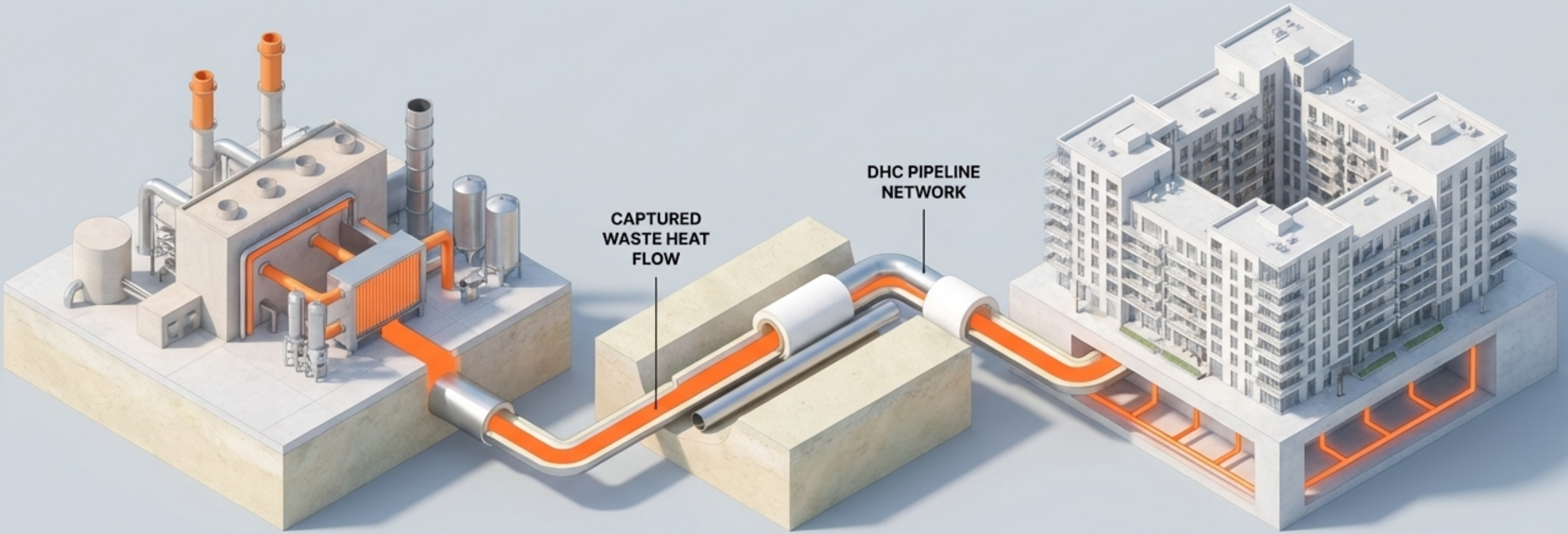


Precision Application over Dilution



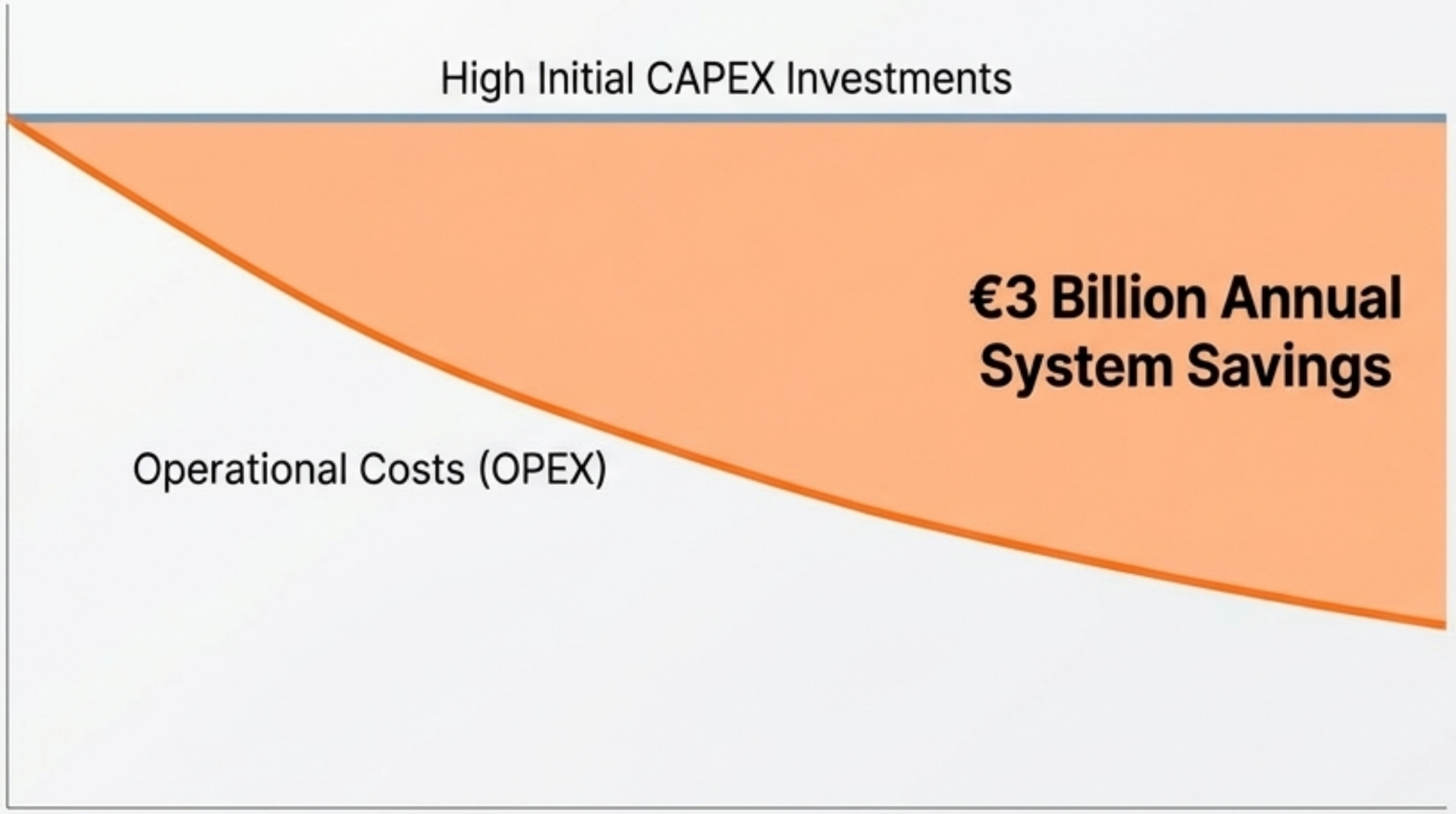
IWH is a highly concentrated resource. Funnelling it into the 95 PJ District Heating network is the most technically feasible and economically impactful decarbonisation strategy, preventing the resource from being diluted.

The Connective Tissue of the Energy Transition



Capturing waste heat from large industrial point sources and delivering it to thousands of individual buildings is physically impossible without an aggregation layer. Czechia's 7,500 km of existing DHC infrastructure dramatically lowers the barrier to entry, acting as a massive, ready-built integration vector that peer nations would have to build from scratch.

De-risking a €50 Billion Transition



The Model

Heat Roadmap Europe estimates that a necessary €50 billion investment in Czech thermal infrastructure will yield €3 billion in annual systemic savings by 2050.

The IWH Advantage

Injecting 5 PJ of zero-marginal-cost baseload waste heat aggressively improves these economics. It slashes day-to-day operating costs, reduces the need for new generation facilities, and significantly shortens the payback period.

Recommendation 1: Modernise & Decarbonise Infrastructure

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Fuel Switching:

Execute a funded roadmap to phase out coal in DH plants. Replace fossil baseloads with sustainable portfolios: large-scale heat pumps, solar thermal, and direct IWH integration (e.g., replicating the Temelín nuclear plant to České Budějovice pipeline model).

Network Efficiency:

Refurbish aging pipe networks to dramatically reduce heat loss. Upgrade systems to operate at lower temperatures (4th Generation DH), widening compatibility for low-grade waste heat sources.

Recommendation 2: Establish a National Heat Planning Framework

Mandate & Support:	Immediately transpose EED Art 25.6. Require municipal integrated heating/cooling plans, supported by a newly established national competence centre providing standardised methodologies and funding access.
Spatial Integration:	Legally bind energy supply planning directly to municipal land-use zoning and climate strategies.
Data Standardisation:	Institutionalise the CE-HEAT project's waste heat cadastres, evolving them into a permanent, publicly accessible National Thermal Atlas to guide infrastructure investment.

Recommendation 3: Create a Commercial Market for Waste Heat

Level the Playing Field

Reform energy taxation. Eliminate current discrepancies that financially penalise clean, centralised DHC production while favouring individual fossil fuel heating.

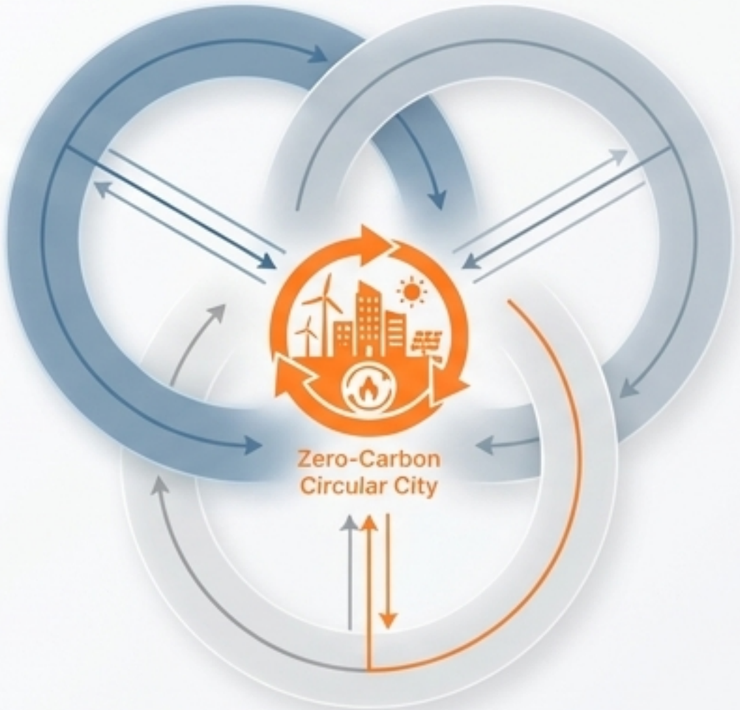
CAPEX Support

Deploy targeted grants and tax credits for the installation of industrial heat recovery equipment and connecting pipelines, lowering the barrier to entry for industrial operators.

Revenue Certainty

Facilitate regulated tariff structures or long-term off-take agreements. Provide the predictable ROI required for industrial facilities to justify supplying the grid.

A Synergistic Energy Future



Czechia's industrial legacy and its vast heating infrastructure are two sides of the same coin. Physical pipes fail without spatial planning, and both fail without commercial off-take agreements.

By structurally integrating these three pillars, Czechia will successfully transform its carbon-intensive heating sector into a resilient, low-cost, and secure circular energy model.