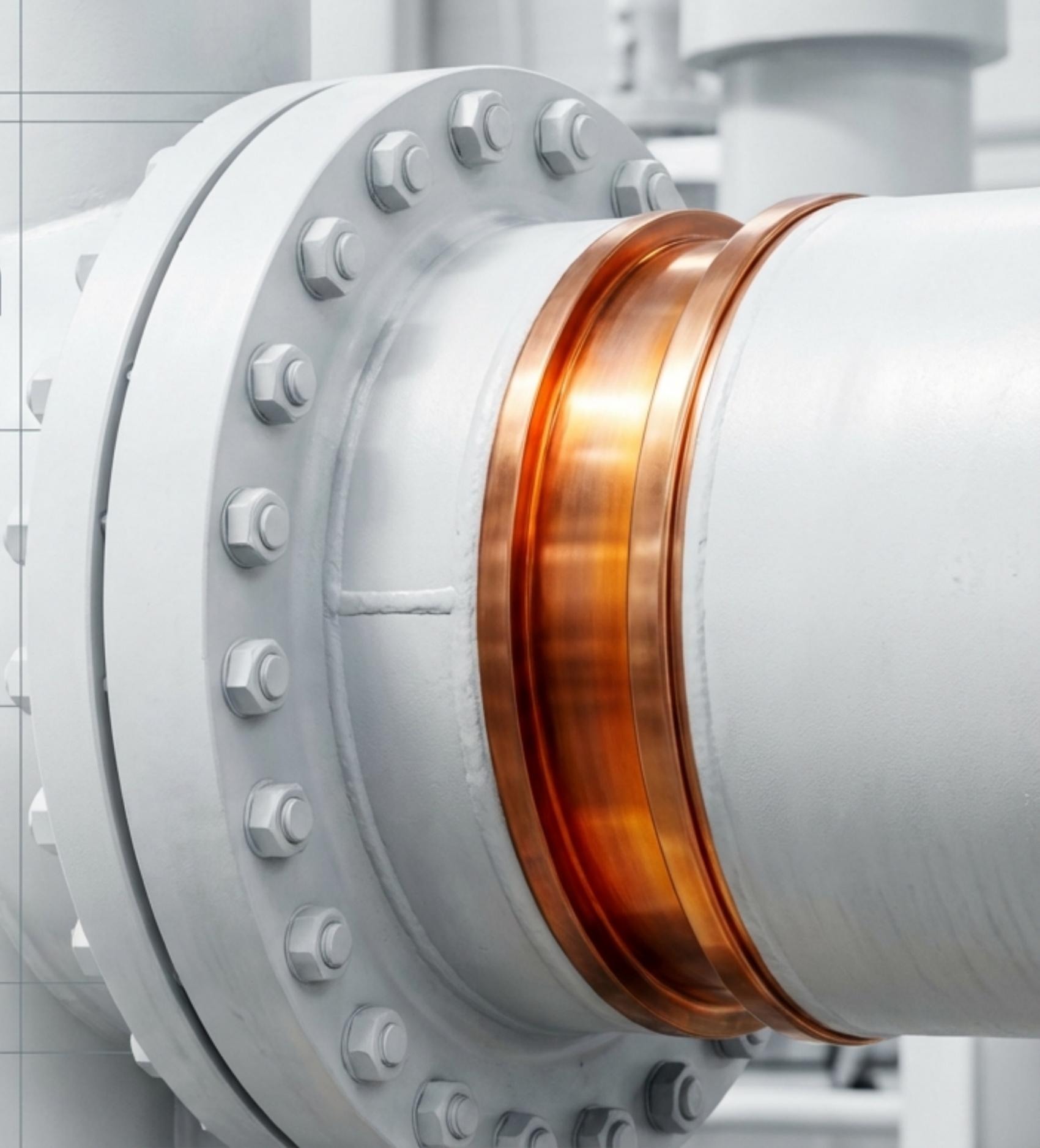


# Unlocking Belgium's Hidden Thermal Reserve

A quantitative blueprint for displacing imported fossil fuels by recovering 15 TWh of indigenous industrial waste heat.

Prepared for strategic planners,  
investors, and policymakers.



# THE EPICENTRE OF BELGIUM'S CARBON PROBLEM



**36,405 ktoe  
(424 TWh)**

Total Final Energy  
Consumption (2023).



**88%**

The proportion of  
residential energy  
dedicated purely  
to low-temperature  
space and water  
heating.

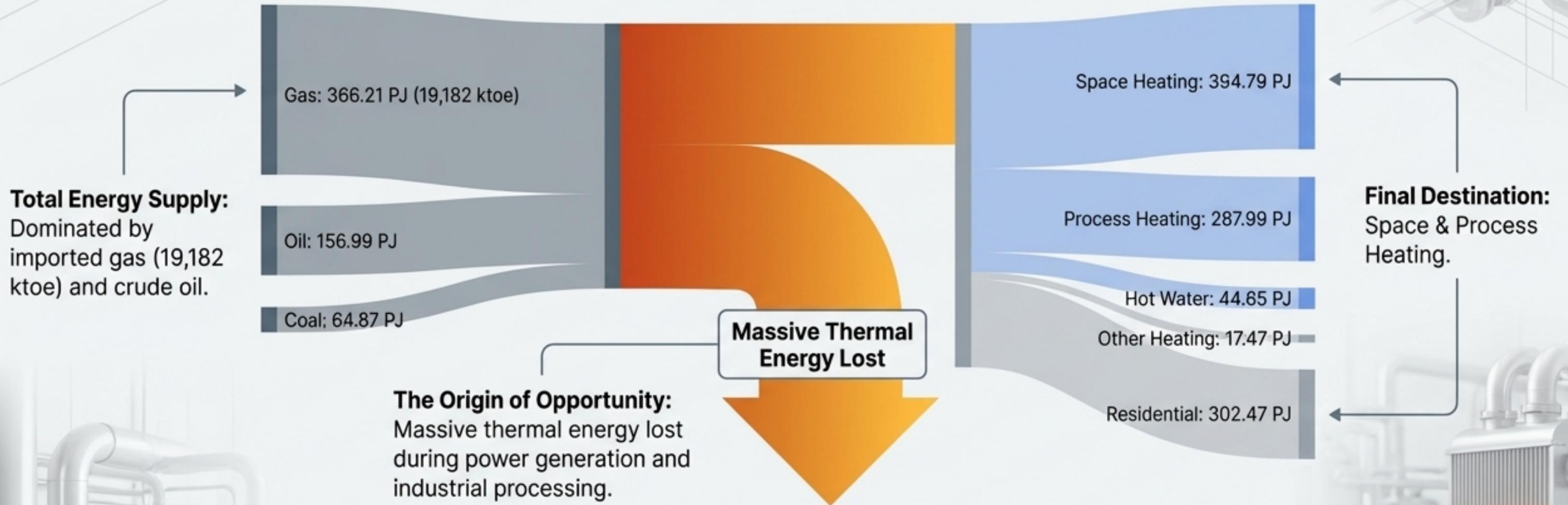


**71%**

Belgium's total  
energy import  
dependency,  
heavily skewed  
toward natural  
gas and crude oil.

**Synthesis Text:** Decarbonisation is often framed around the electricity grid or electric vehicles, but the mathematical reality is stark: the single largest, most intractable obstacle to 2050 climate neutrality is the thermal demand of buildings and industry.

# The Architecture of Wasted Energy



**Total Energy Supply:**  
Dominated by imported gas (19,182 ktoe) and crude oil.

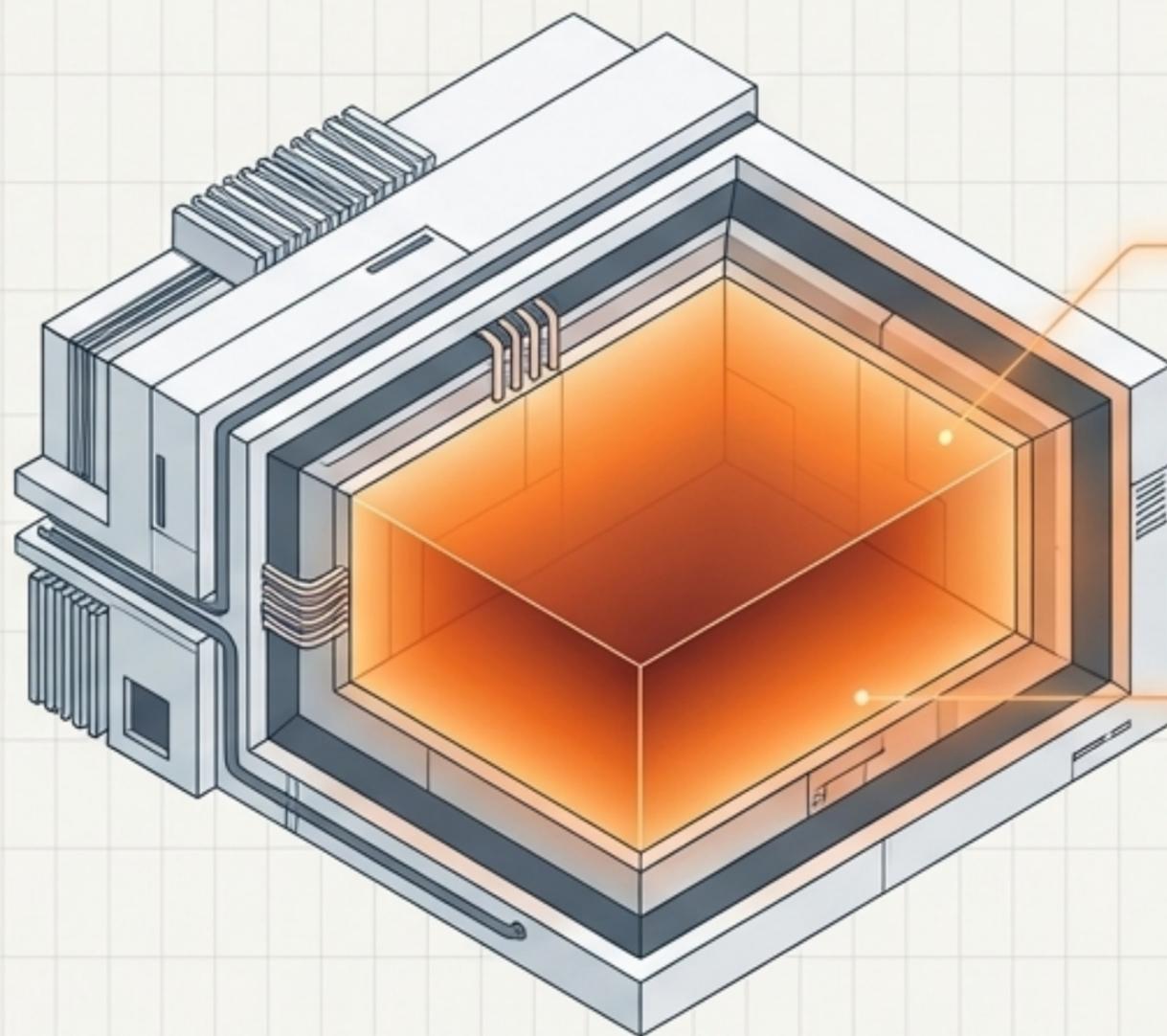
**Final Destination:**  
Space & Process Heating.

**Massive Thermal Energy Lost**

**The Origin of Opportunity:**  
Massive thermal energy lost during power generation and industrial processing.

The current energy blueprint is linear and highly inefficient. Before we import more clean energy, we must capture what we already produce and discard.

# THE 15 TERAWATT-HOUR INDIGENOUS ASSET



**10–15 TWh / Year**

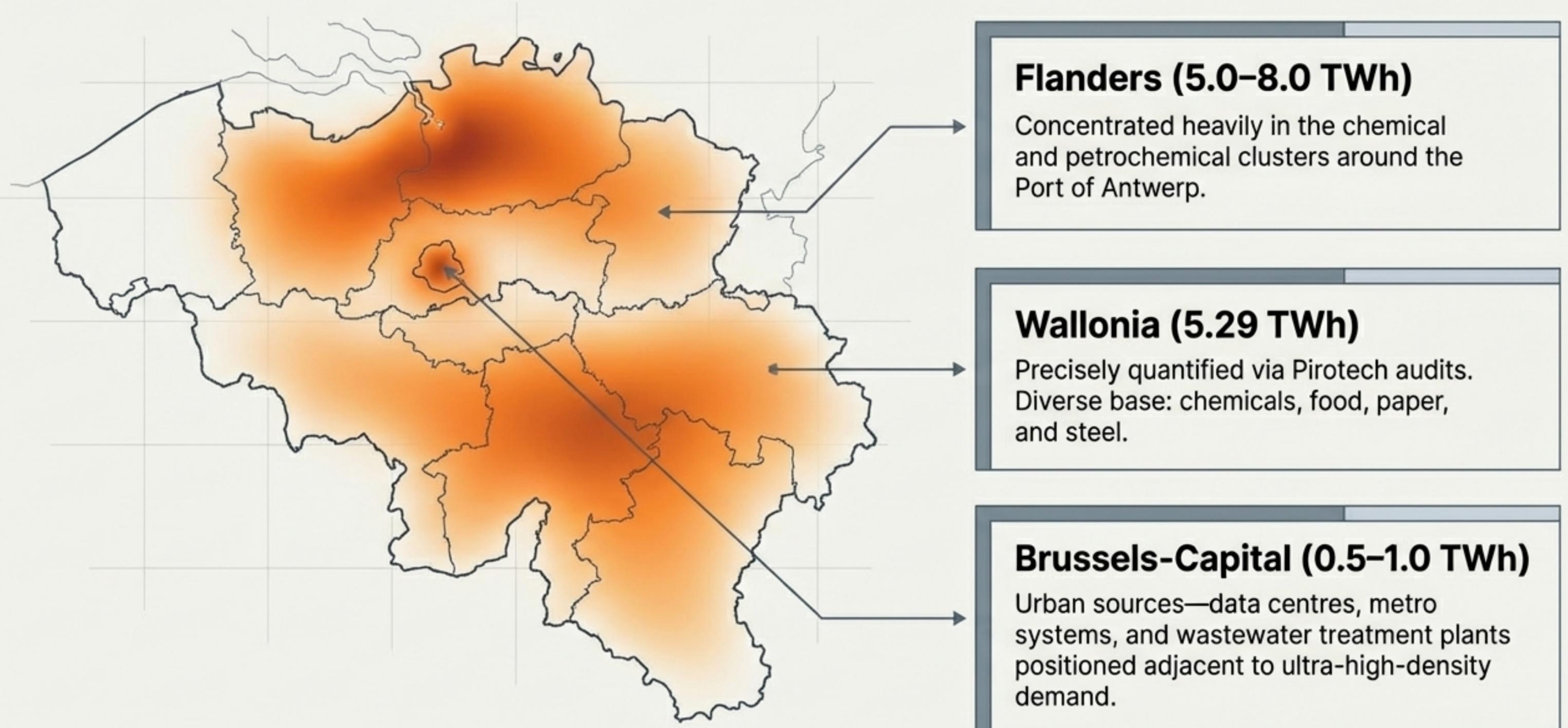
Total estimated national recoverable thermal potential.

**Equivalency**

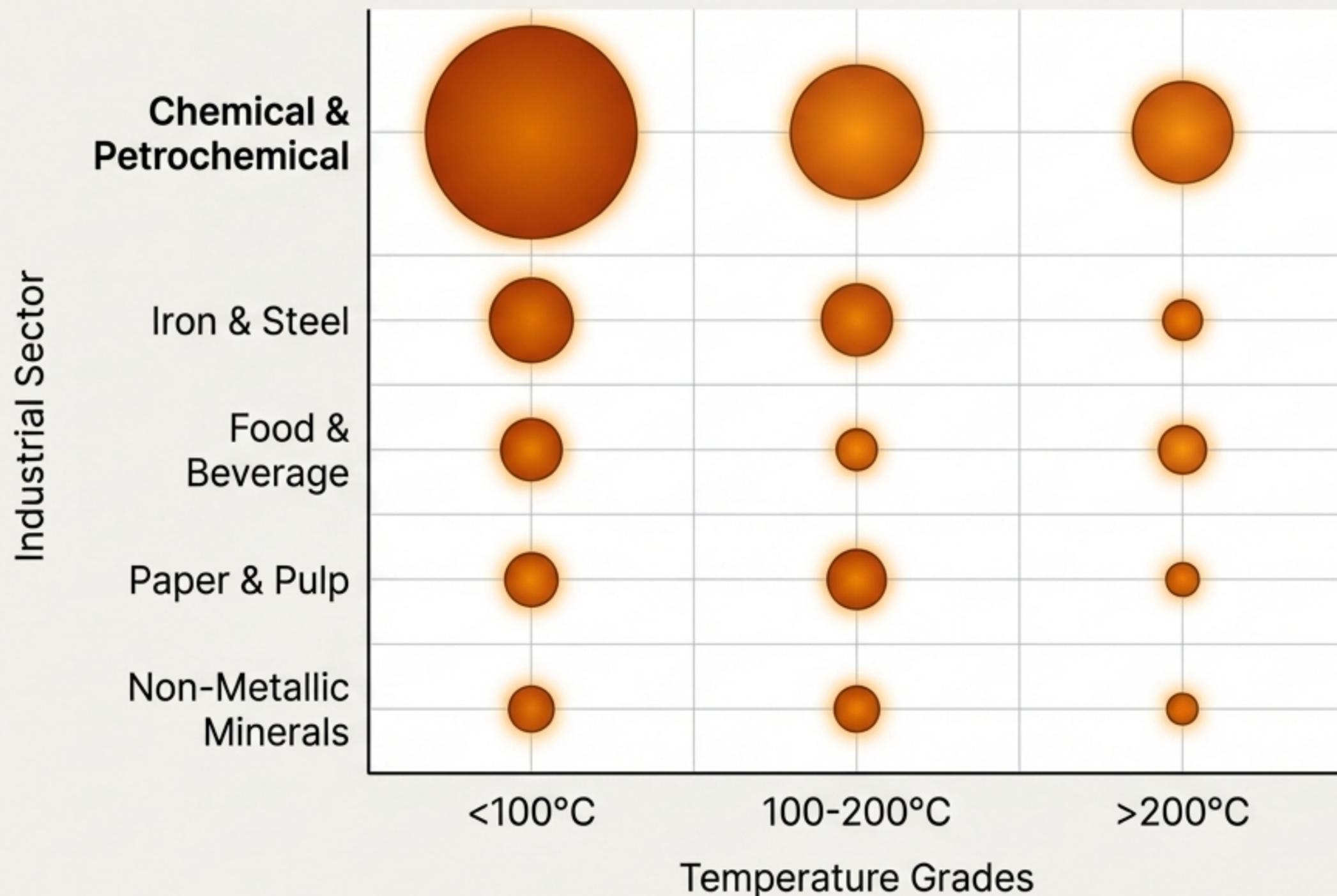
Nearly equal to the total heat demand of a major European city.

This is not a theoretical energy source. It is an existing, indigenous, and constant by-product of the Belgian industrial base that is currently being vented into the atmosphere and waterways.

# Mapping the Thermal Topography



# The Temperature Profile of the Resource



## The Low-Grade Paradox

Over 75% of the total potential (10.2–13.1 TWh) sits below 200°C. It is too cool for direct industrial reuse, yet too massive to ignore. Unlocking it requires active thermal upgrading.

# The 20% Displacement Guarantee



**Baseline:**  
49.8 TWh Gas + 26.2 TWh Oil.

**Displacement Overlay:**  
10.0–15.0 TWh Waste Heat.

**The Resulting Metric:**  
13%–20% Total Fossil Displacement.

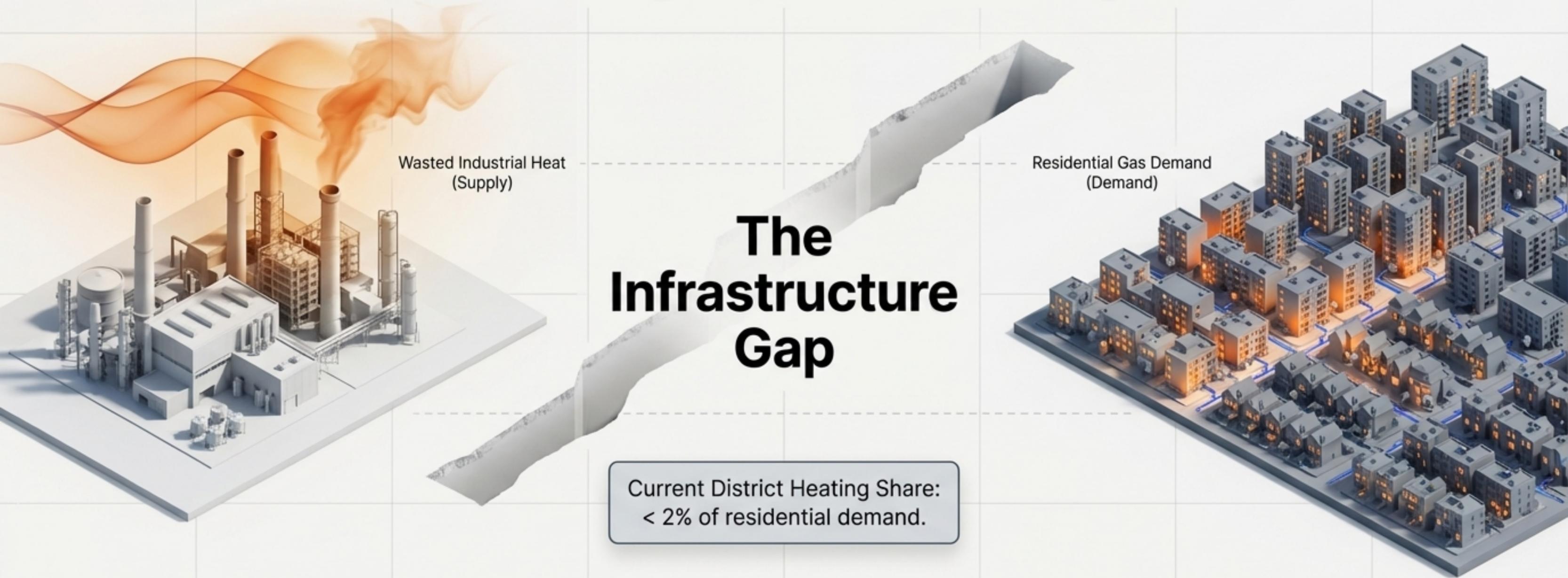
By capturing available waste heat, Belgium can directly neutralise up to one-fifth of the entire fossil fuel requirement for building heat, fundamentally altering its energy import dependency.

# The Incumbent vs. The Future: A Structural Imbalance

		The Incumbent (Gas Boilers)	The Future (Heat Pumps)
1	Installed Stock	~2.8 Million units (75% share)	209,000 units (~12% share)
2	Lifespan Inertia	15–20 year lock-in	Rapid recent growth (118% surge in 2022)
3	The Economic Barrier	<b>Spark Spread Ratio</b> The electricity-to-gas price ratio sits at an unsustainable 4.15:1 for non-residential and 3.8:1 for residential.	

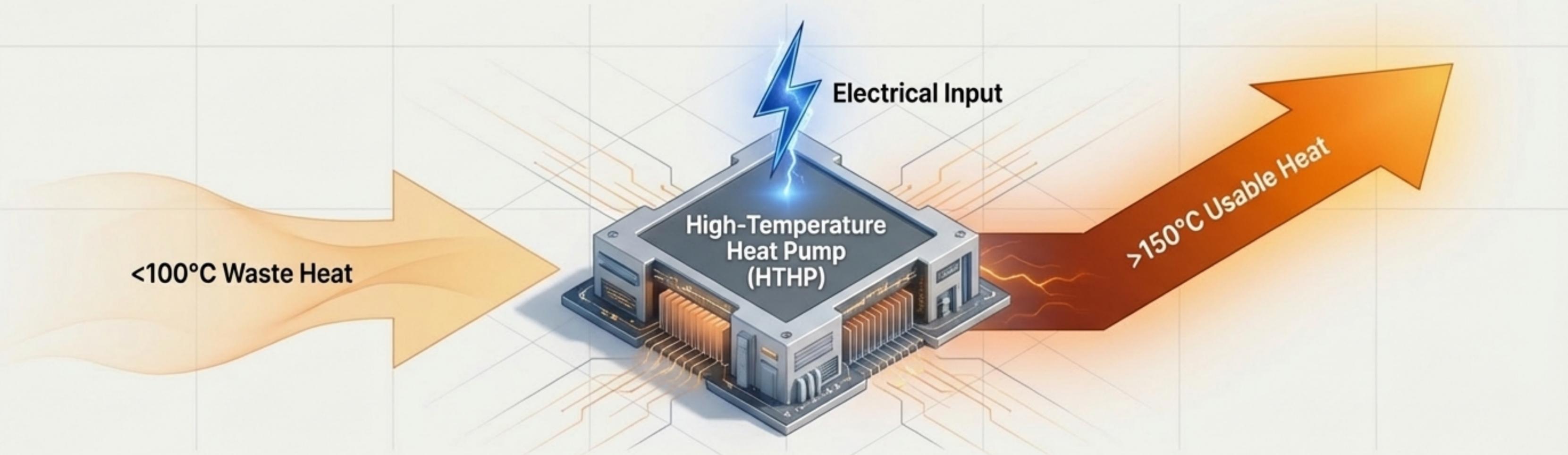
Despite superior efficiency (COP of 3 to 4), a heat pump is fundamentally penalised by the market. When electricity costs four times as much as gas, the operational economics fail. The transition is currently fighting gravity.

# The Missing Thermal Highway



District Heating and Cooling (DHC) networks are the mandatory circulatory system for waste heat. Without these “thermal highways” to connect isolated industrial supply to dense urban demand, the 15 TWh resource remains a permanently stranded asset.

# The Heat Transformer: Upgrading the Asset



**1 Capture**  
Abundant, low-grade thermal runoff is captured at 40-80°C.

**2 Inject**  
A minimal input of electrical energy drives the thermodynamic cycle.

**3 Lift**  
The temperature is exponentially upgraded to 150-200°C, achieving the critical threshold required for industrial process reuse or long-distance DHC injection.

**Takeaway:** HTHPs act as thermal multipliers, ensuring that no grade of waste heat is too low to be economically salvaged.

# The Legislative Catalyst: EED Article 25.6

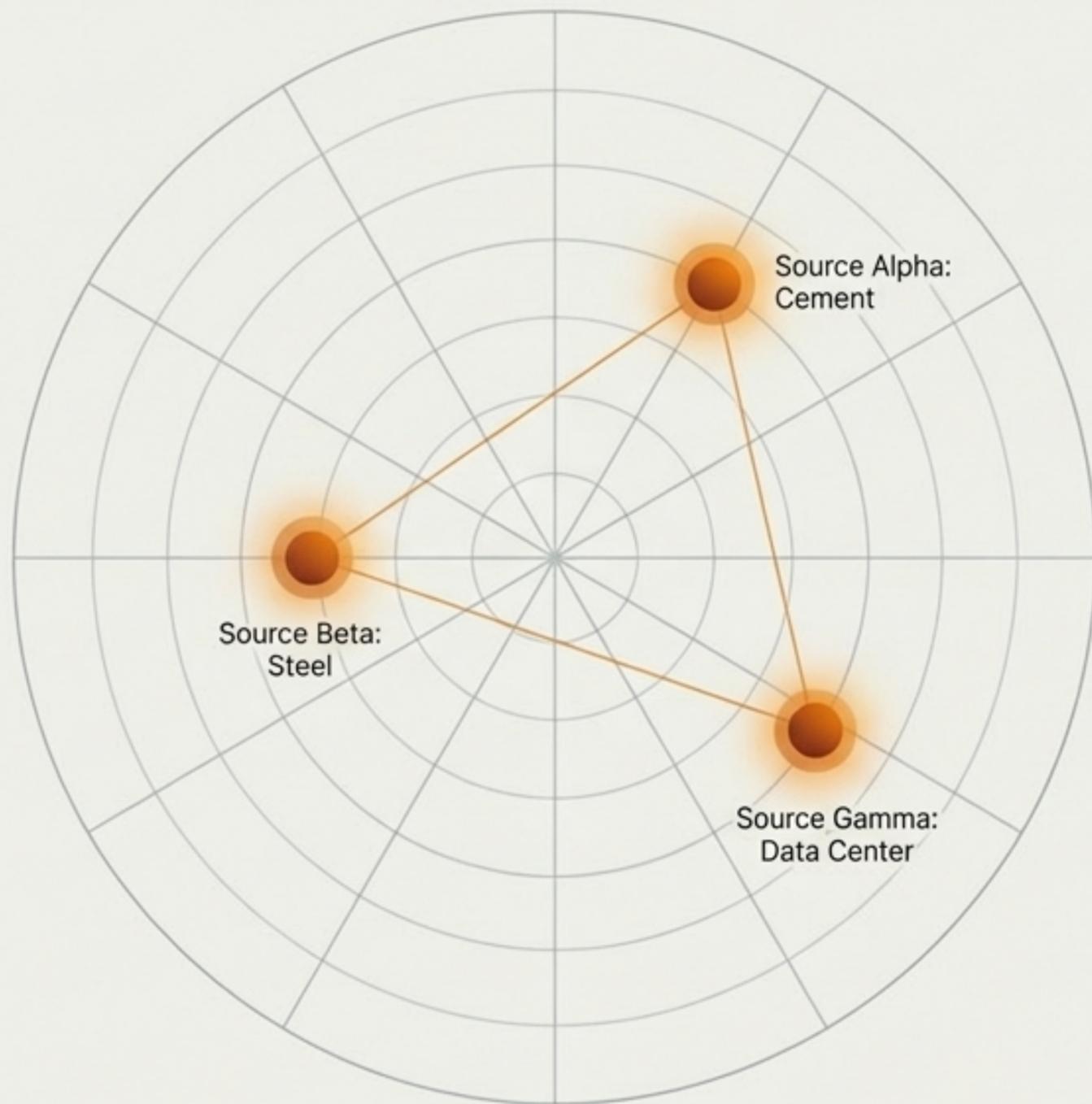
September 2025

By September 2025, the EU Recast Energy Efficiency Directive requires all municipalities with populations over 45,000 to finalise comprehensive local heating and cooling plans.

This directive forces a paradigm shift. Thermal planning is moving from abstract national targets to **mandatory, granular, street-by-street** municipal blueprints.

Local authorities are now legally required to map and valorise local waste heat. The window for project development is opening immediately.

# Pillar I: Discovery & National Strategy



## 1 Elevate to Strategic Status

Formally integrate waste heat recovery targets into Belgium's National Energy and Climate Plan (NECP) to meet RED III renewable targets.

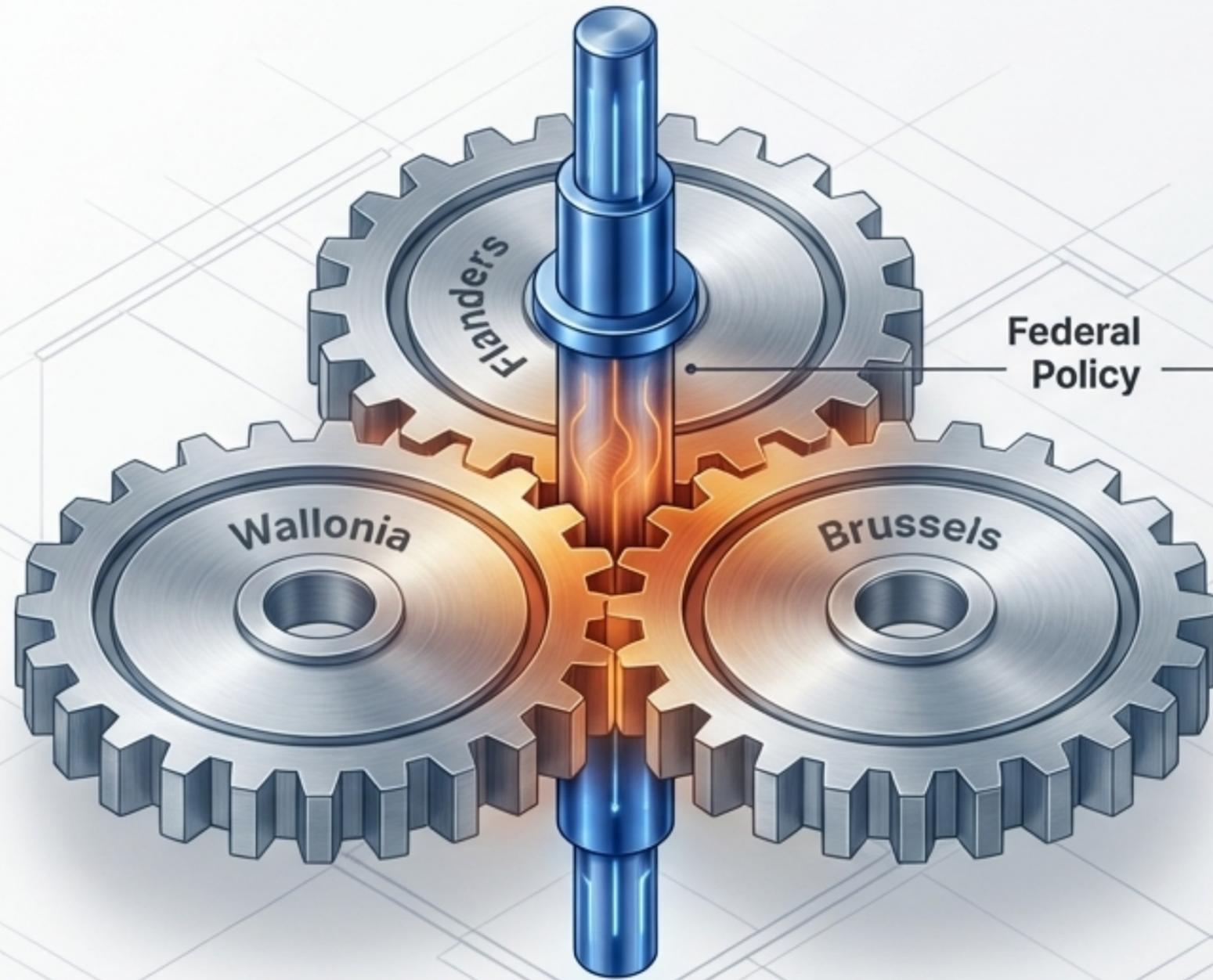
## 2 Mandatory ETS Audits

Require periodic, rigorous thermal audits for all large industrial facilities under the EU Emissions Trading System.

## 3 The Unified National Registry

Consolidate isolated regional data (like Flanders' Warmtekaart) into a single, publicly accessible federal database to trigger market development.

# Pillar II: Inter-Federal Symbiosis



## 1. Establish an Inter-Federal Task Force



A dedicated body to harmonise the deeply fragmented industrial, environmental, and fiscal policies across regions.

## 2. One-Stop Permitting



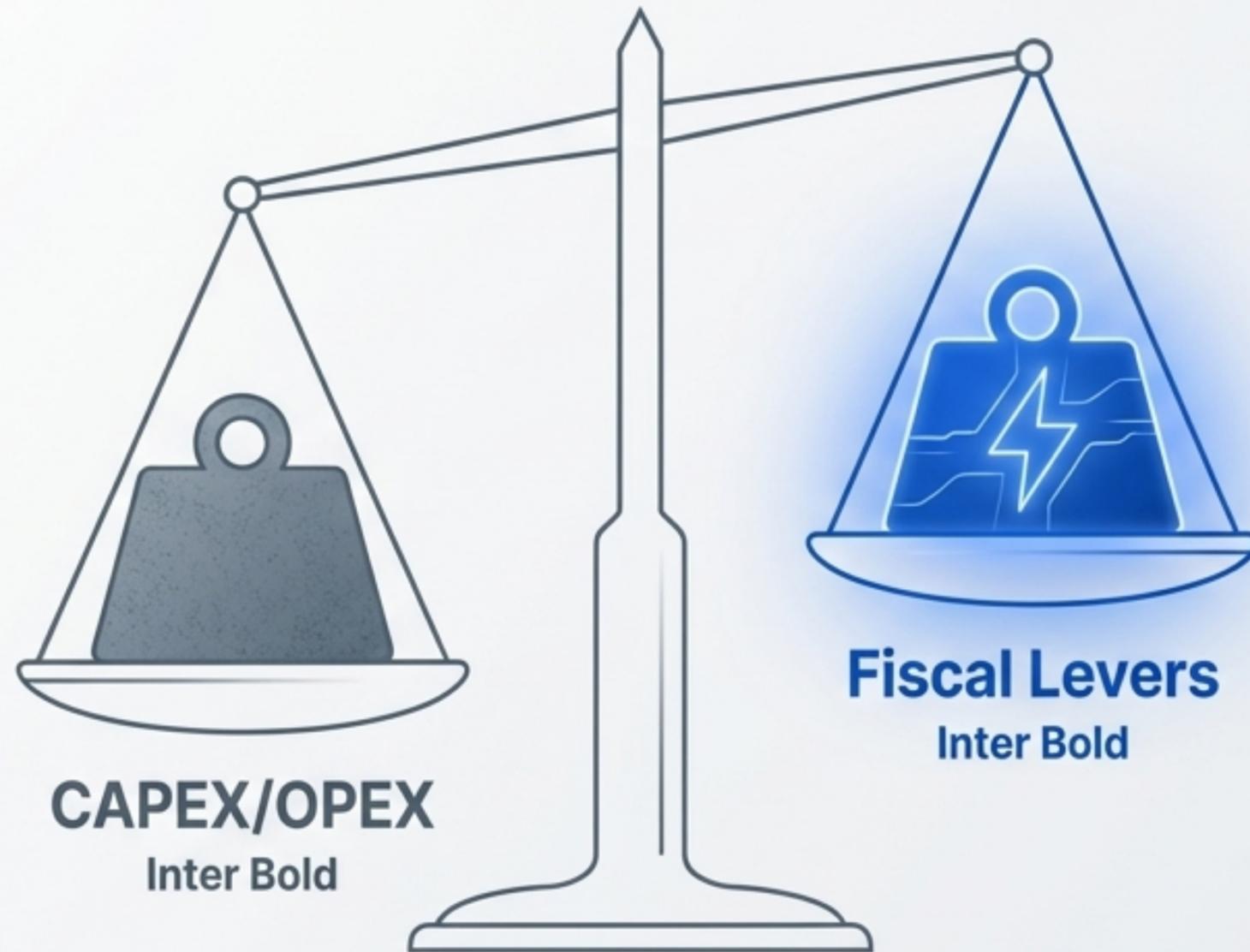
Streamline the bureaucratic labyrinth for inter-regional DHC networks, providing a single point of clearance for critical infrastructure.

## 3. Zoning Integration



Mandate the integration of specific DHC zones into the regional plans (VEKP, PACE, Air/Climate Plan) to create a pipeline of bankable, shovel-ready projects.

# Pillar III: Economics & Infrastructure De-Risking



## 1. Correct the Spark Spread

Execute a structural tax shift from electricity to fossil fuels, ensuring carbon intensities are accurately priced and heat pump operation becomes inherently profitable.



## 2. The Thermal Grid Fund

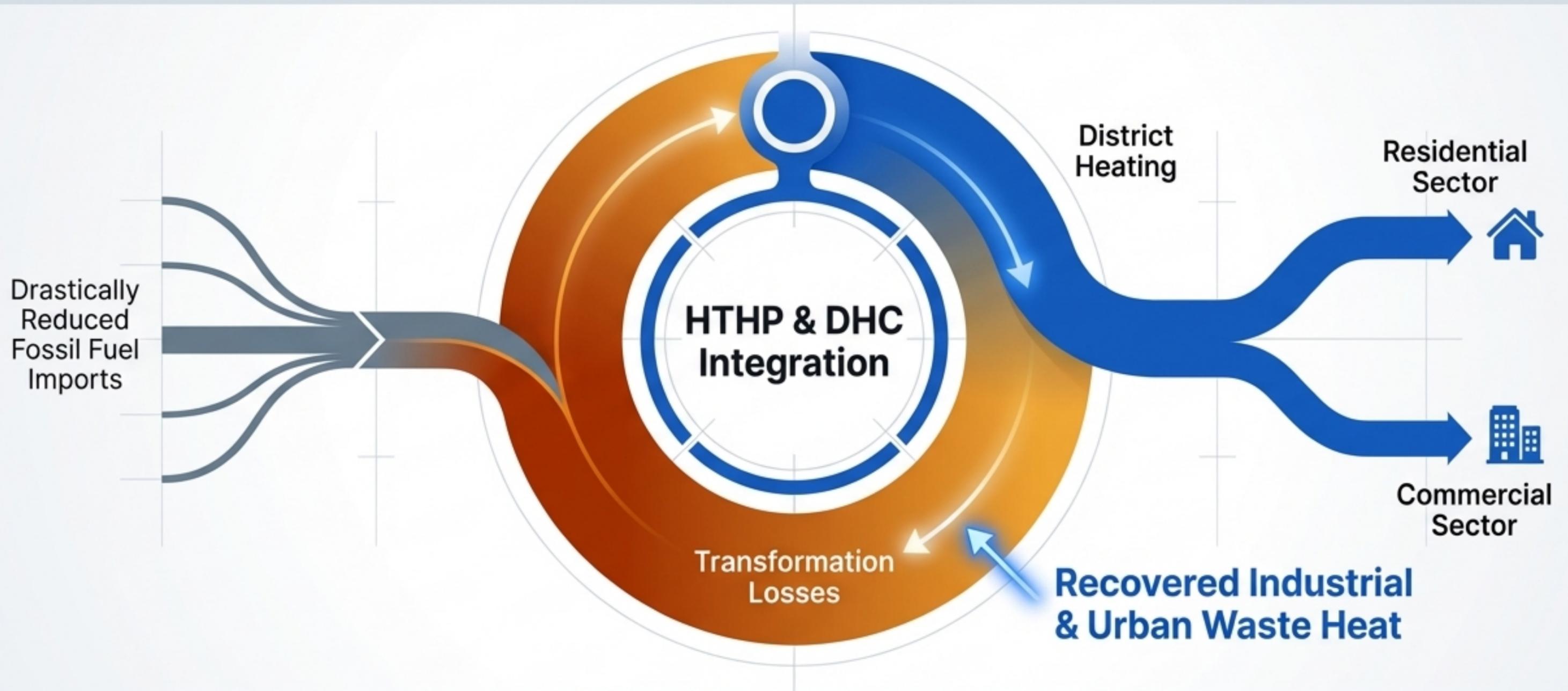
Create a federal-regional infrastructure bank utilising green bonds and public guarantees to provide low-cost, long-term financing for capital-intensive DHC networks.



## 3. Targeted CAPEX Support

Deploy accelerated investment tax credits specifically for Industrial High-Temperature Heat Pumps to stimulate initial supply chain scale.

# The 2040 Thermal Blueprint



By deploying the thermal blueprint, Belgium transforms an environmental liability into a cornerstone of energy sovereignty—building a highly resilient, circular economy where nothing is wasted.