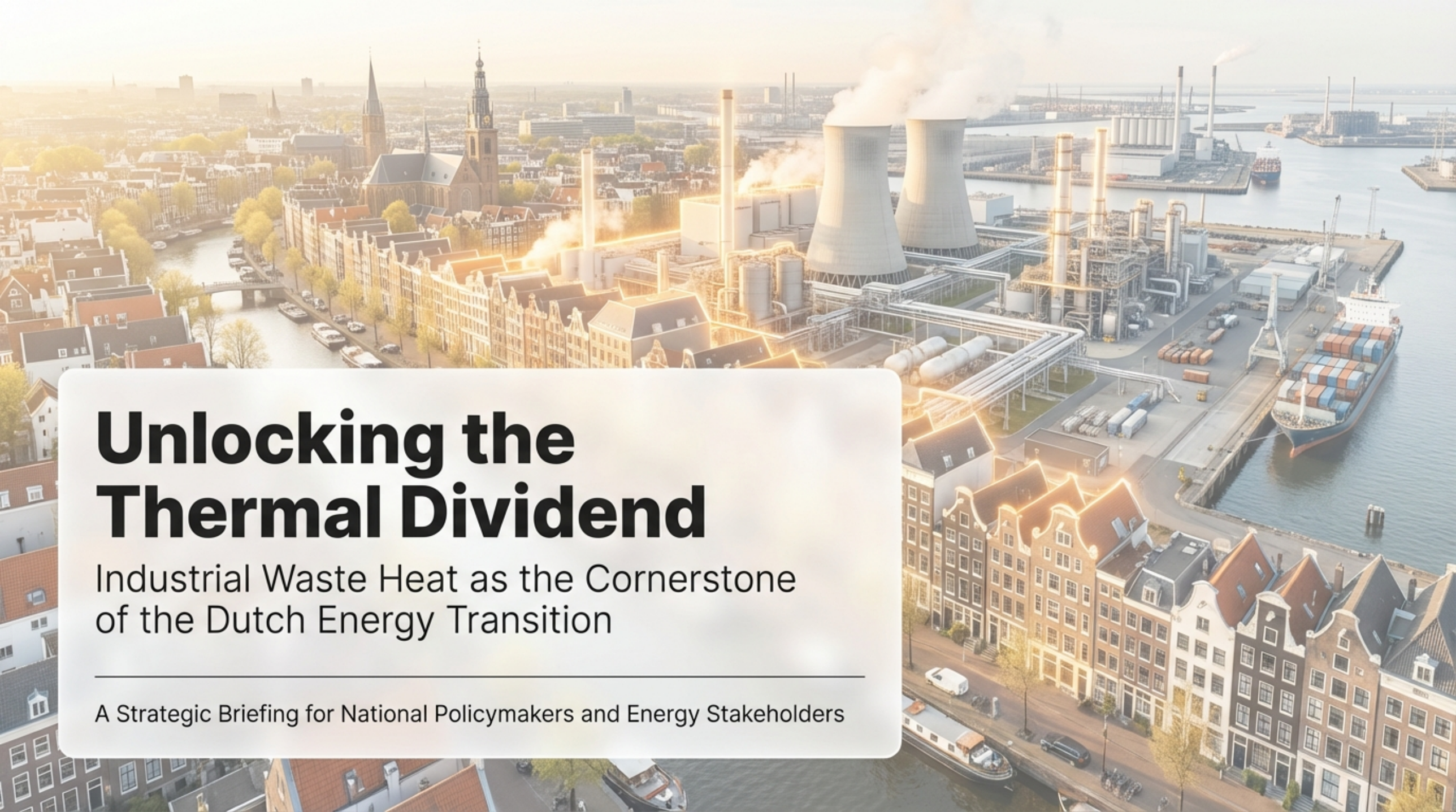

Unlocking the Thermal Dividend

Industrial Waste Heat as the Cornerstone of the Dutch Energy Transition

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A Strategic Briefing for National Policymakers and Energy Stakeholders

93%

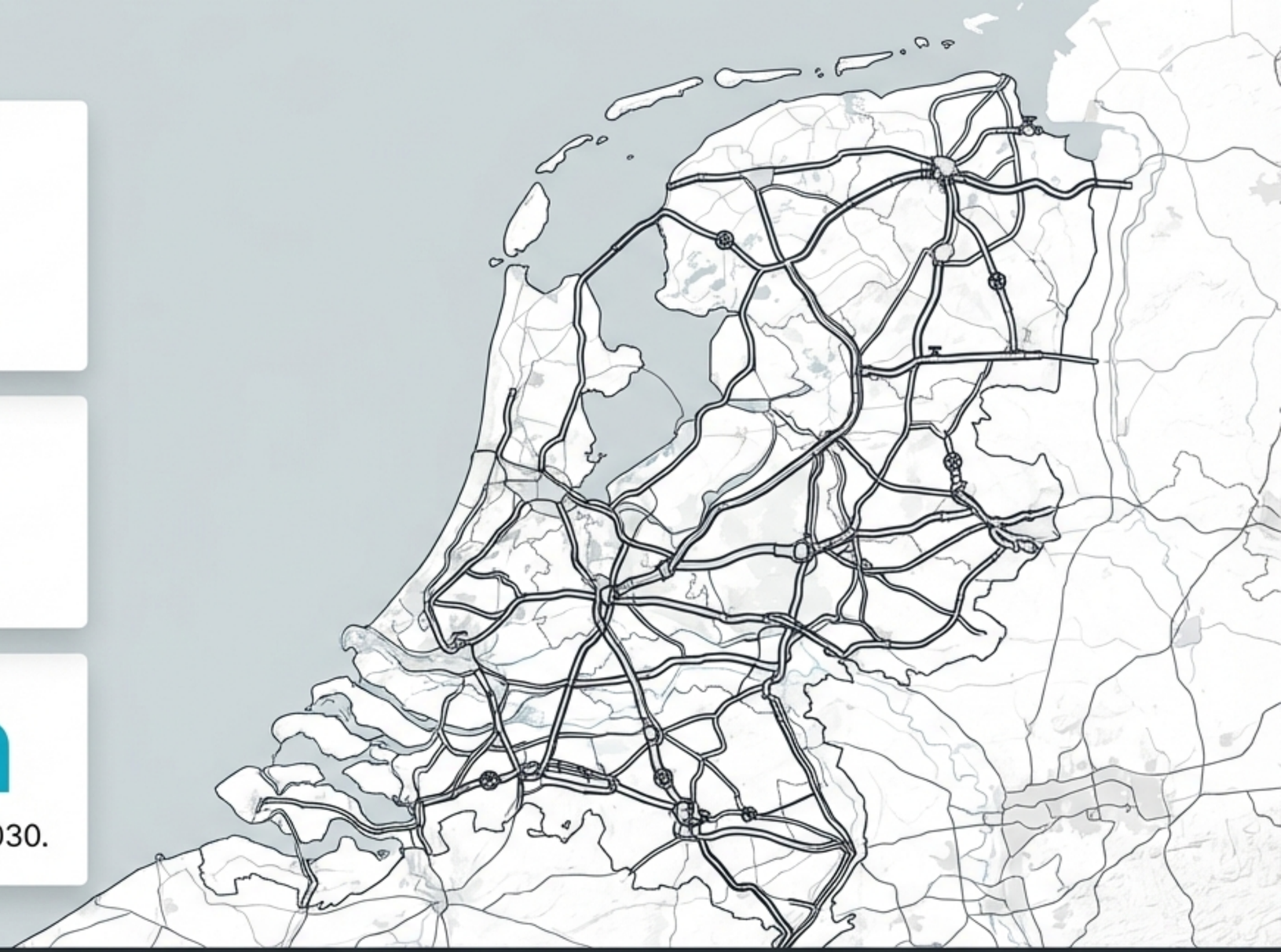
Residential heat demand supplied by natural gas in 2013.

4%

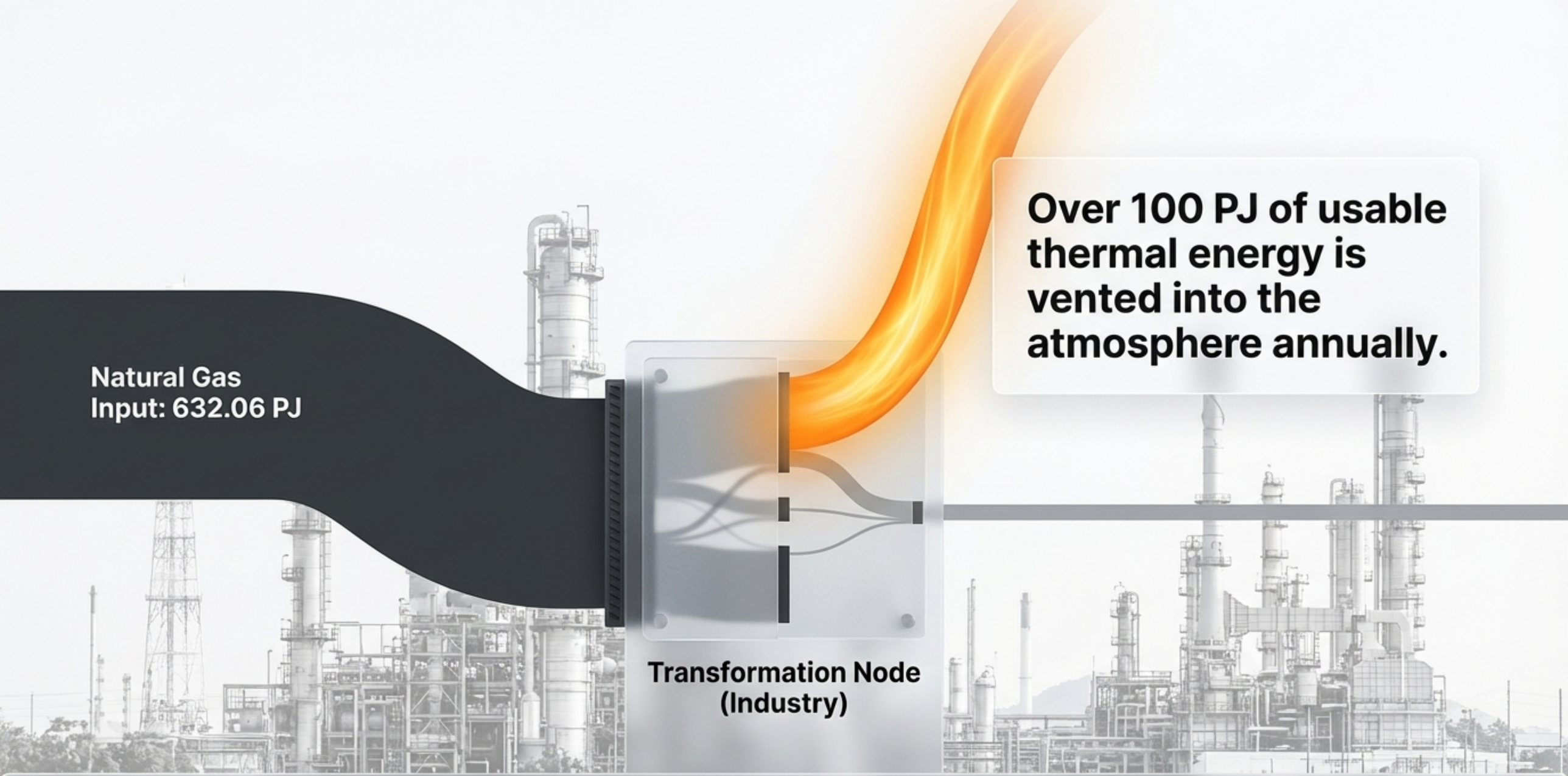
Market share of collective district heating.

1.5 Million

Homes mandated to transition off gas by 2030.



The legacy of Groningen has created unparalleled infrastructural path dependency. Phasing out natural gas requires dismantling a century-old socio-technical lock-in.



Our current linear energy model imports volatile fossil fuels merely to exhaust their byproducts as waste.

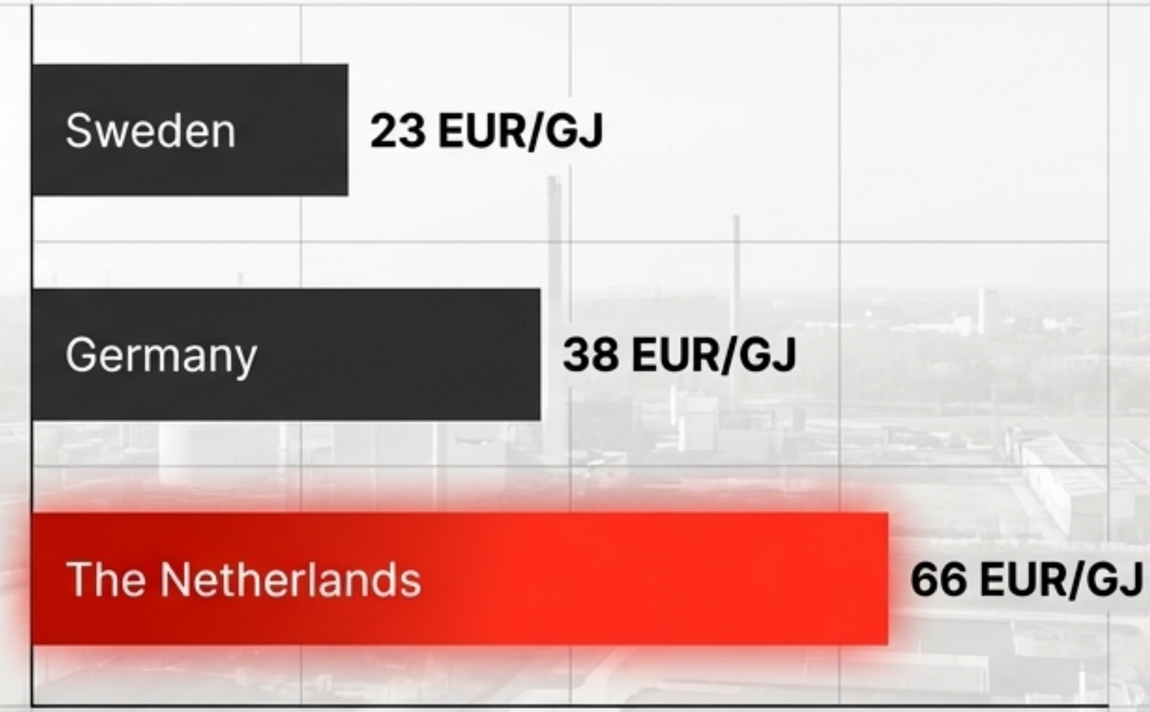
The Legislative Leader

Transitievisie Warmte: Mandatory municipal heat programmes.

WGIW Law (2024): Legal authority to force neighbourhood gas decommissioning.

EED Readiness: 1 of only 3 EU states fully ready for transposition.

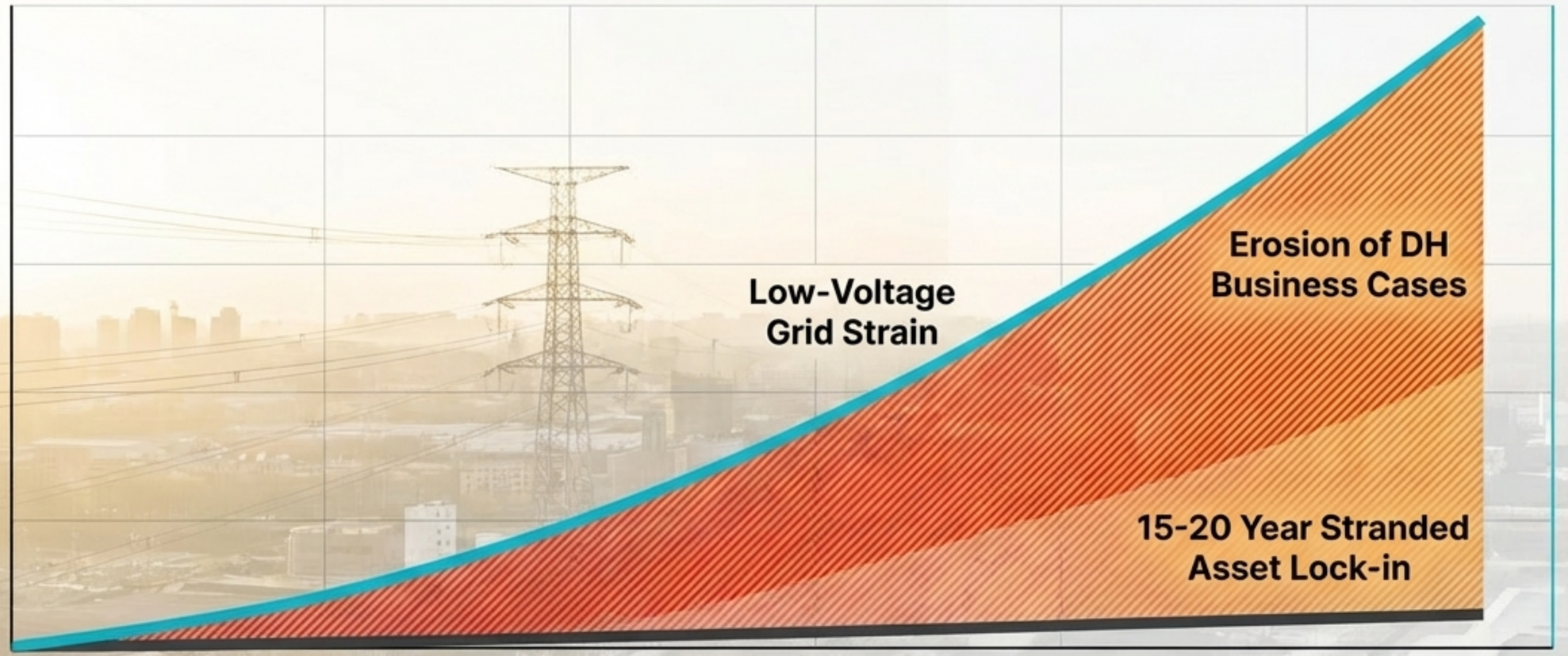
The Implementation Laggard



Average integral heating tariffs (2023)

Advanced planning architectures are failing to translate into physical infrastructure due to crippling market distortions and exorbitant capital costs.

The Collision Course



Individual Electric Heat Pumps
(752k units by 2024)

District Heating
Market Share (~4%)

Uncoordinated market forces are systematically eroding the viability of collective decarbonisation pathways in dense urban cores.

Row Titles	Individual Electric Heat Pumps	Collective District Heating
Capital Intensity	Consumer-borne	High Upfront Institutional
Grid Impact (Electricity)	Severe strain in dense areas	Minimal / Grid-balancing capable
Spatial Suitability	Suburban / Rural	High-Density Urban / Industrial proximity
Adoption Pace	Rapid / Market-driven	Slow / Coordination-heavy

Individual heat pumps win on speed, but fail on grid impact in dense areas. Central intervention is required to deploy collective solutions where systemically necessary.

100+ Petajoules

Total Potential: 127.4 PJ/year

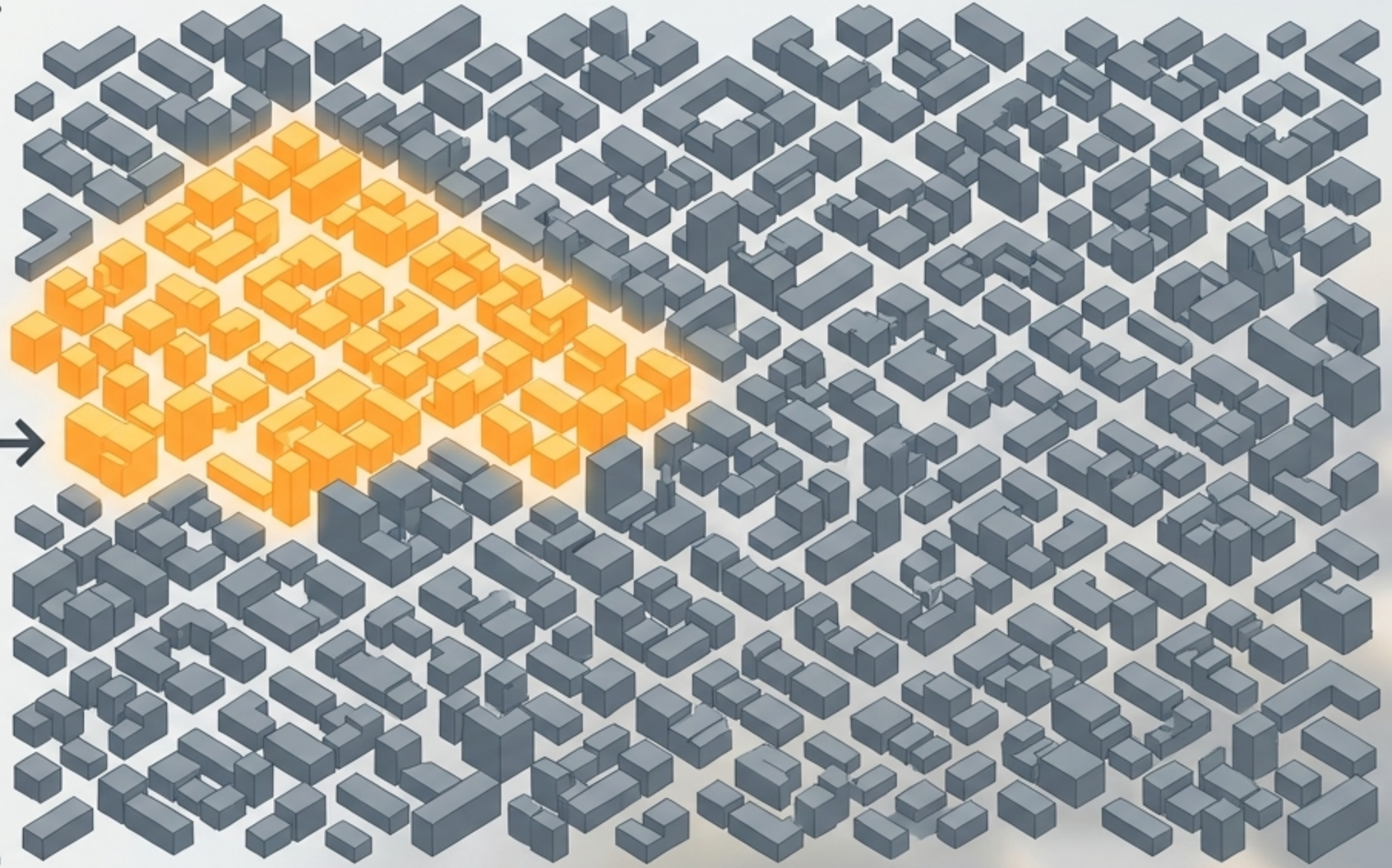
Technically Usable Supply: 57 to 70 PJ/year

Distance: 98% of major industrial sites are within 10 km of urban heat demand

Industrial waste heat is a stranded domestic asset capable of shielding the Dutch economy from global energy volatility.

Total Built Environment Demand: 525 PJ

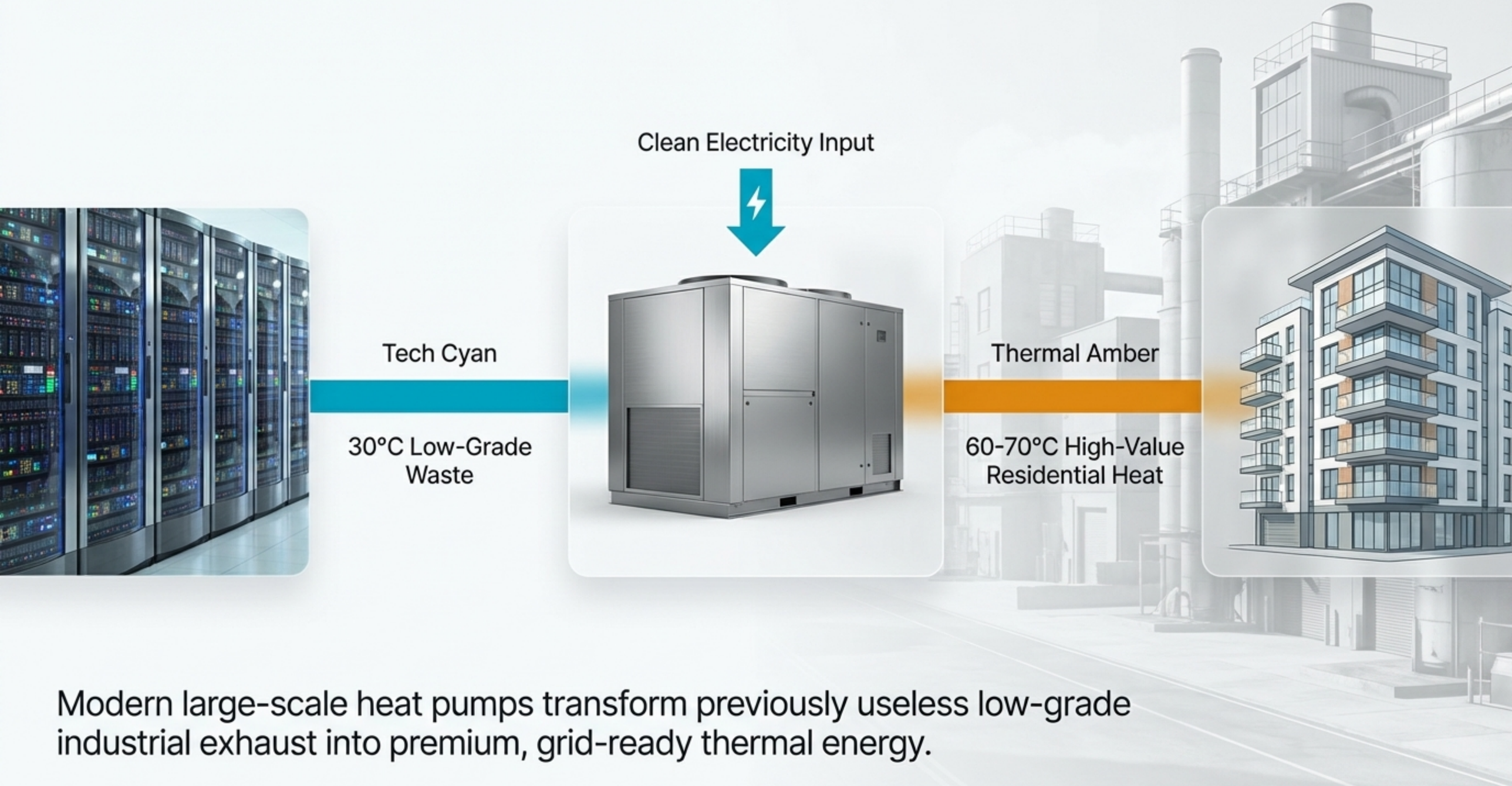
Usable Supply: 57-70 PJ



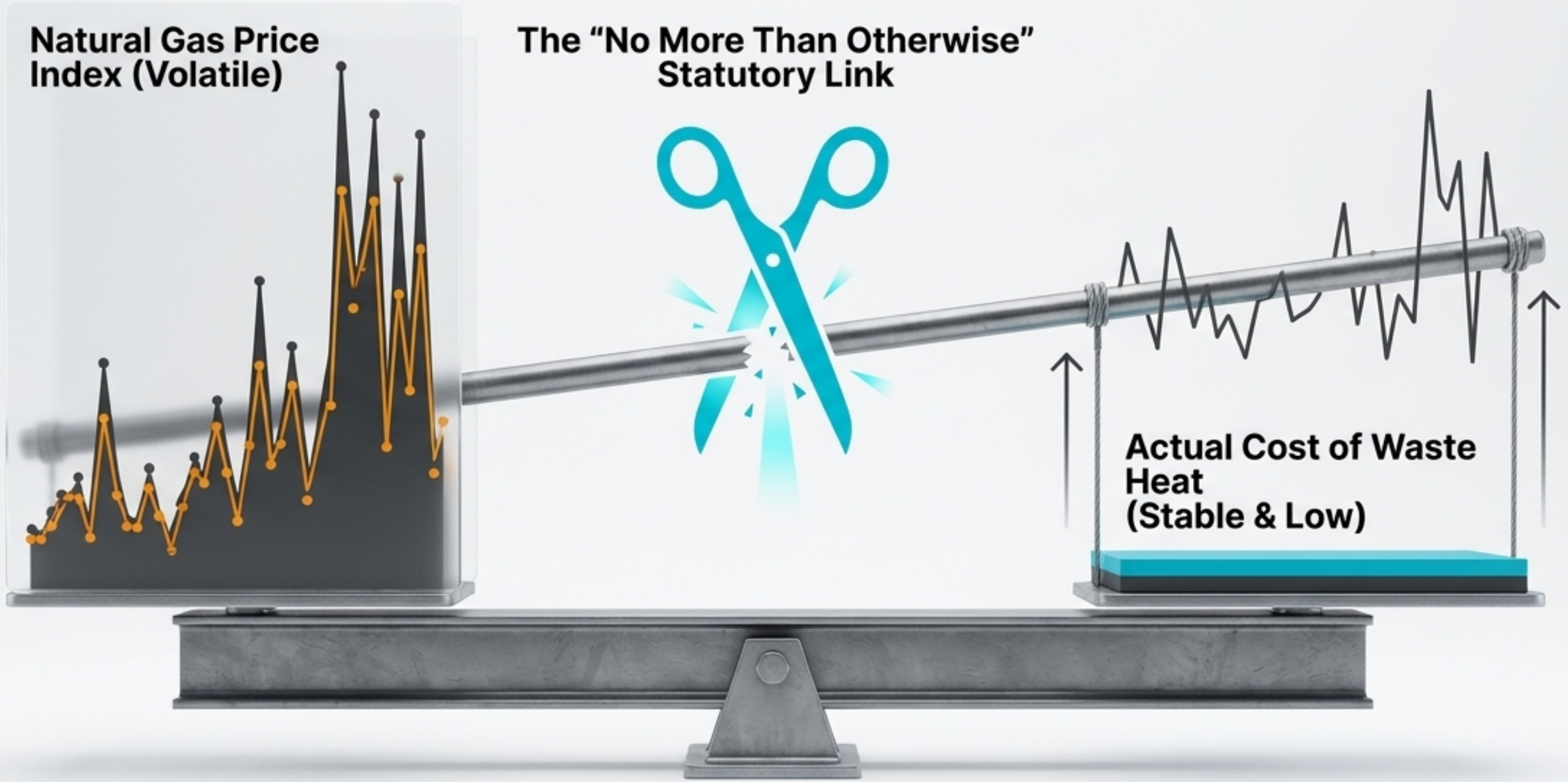
The thermal dividend possesses the technical potential to satisfy 13% of the entire Dutch built environment’s heat demand—equivalent to permanently decarbonising 1.2 million households.

Industrial Sector	Low-Grade Heat (<100°C)	Medium-Grade Heat (100-400°C)	High-Grade Heat (>400°C)	Total Potential
Oil Refineries	10.0	12.6	6.0	28.6
Chemicals	12.0	10.0	5.0	27.0
Iron & Steel	2.0	5.0	8.0	15.0
Waste Incineration	3.0	11.9	0.0	14.9
Data Centres	9.9	0.0	0.0	9.9
Hydrogen Production	10.0	10.0	5.0	25.0
Total	**51.9 PJ**	**51.5 PJ**	**24.0 PJ**	**127.4 PJ**

Over 80% of the available thermal dividend exists in the low-to-medium temperature grades—perfectly aligning with modern district heating requirements.



Modern large-scale heat pumps transform previously useless low-grade industrial exhaust into premium, grid-ready thermal energy.



Decoupling district heating tariffs from volatile fossil fuel markets is the single most critical market reform required to unlock consumer adoption.

A coordinated triad of financial de-risking, market reform, and spatial governance is required to bridge the implementation gap.

Pillar 1: Infrastructure De-risking

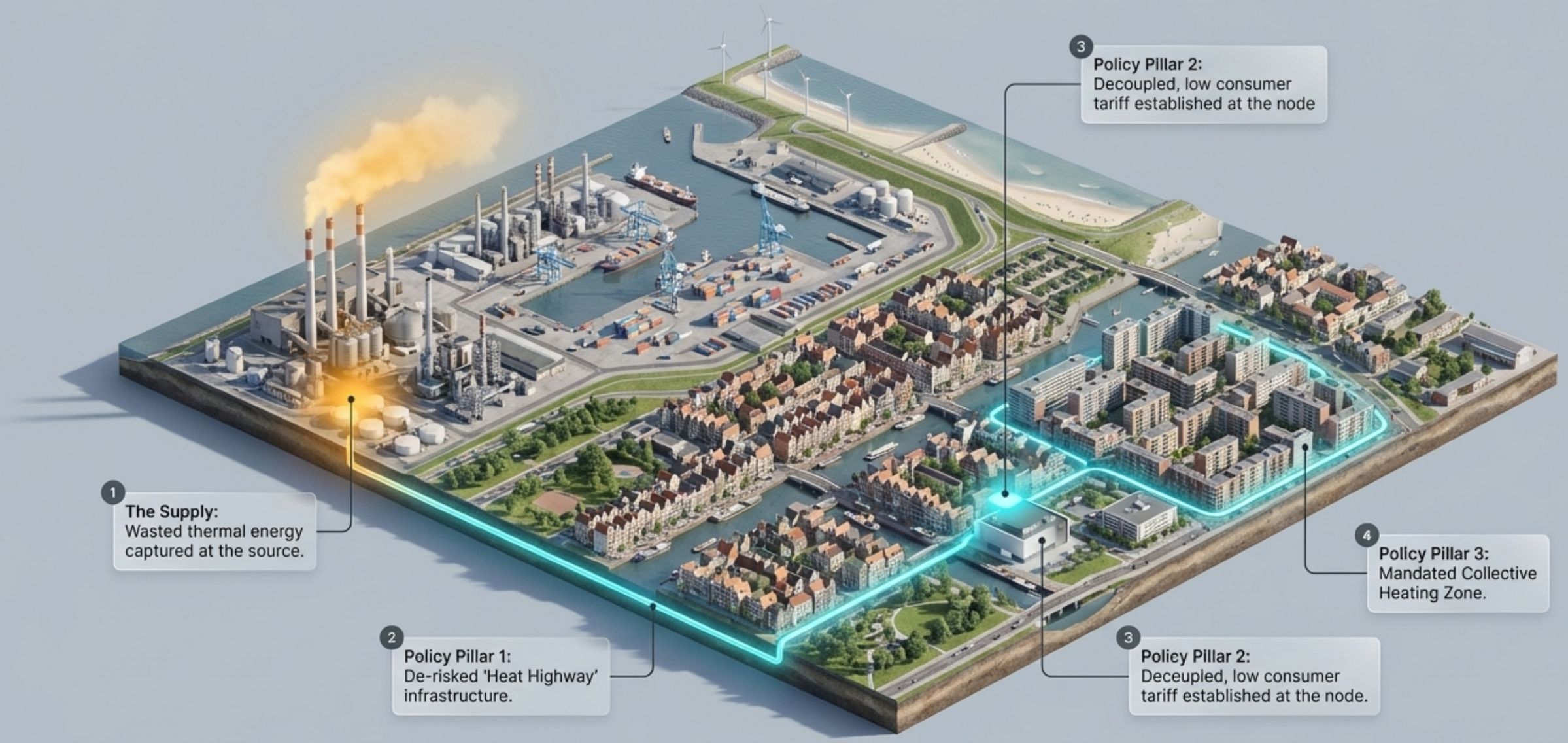
Implement Regulated Asset Base (RAB) models and national loan guarantees to lower the cost of capital for DHC networks.

Pillar 2: Market & Regulatory Reform

Sever the gas-price link and legally mandate major industrial emitters to offer viable waste heat to network operators.

Pillar 3: Strategic Spatial Zoning

Mandate municipal Heat Programmes to designate exclusive, high-density zones zones for collective heating, phasing out individual pump subsidies in these areas.



Isolated interventions will fail. True industrial-urban symbiosis requires synchronising physical infrastructure with spatial legislation and market economics.

A phased spatial rollout prioritises immediate high-yield anchor projects before scaling to an interconnected national thermal grid.

Anchor Projects

Focus on immediate high-yield clusters: Port of Rotterdam, Tata Steel, Chemelot. Establish foundational local networks.

Inter-regional Heat Highways

Construct transmission pipelines connecting major industrial sources to non-industrial cities, creating a national thermal market.

Low-Temp Integration

Network densification. Connect diffuse 4G/5G sources (data centres, wastewater) to the primary backbone.

The Netherlands must transition from a century of linear fossil extraction to a future of circular thermal circulation.

By treating industrial waste heat as a cornerstone asset rather than an environmental byproduct, we can insulate our economy, decarbonise our built environment, and pioneer a definitive model for urban-industrial **symbiosis**.