Industrial Heat

Tech for Net Zero Knowledge Poster #1

TECH FOR NET ZERO

Industrial Heat is the Hidden Engine We Use Daily

Industrial heat refers to the **thermal energy** either **required for** or **generated by essential production processes** across various sectors:

- chemical manufacturing
- cement production
- metal processing
- food processing

Industrial heat spans a wide range:

- **Low-grade heat** (<100°C) for food drying and water heating
- **Medium-grade heat** (100–1000°C) for chemical and textile processes
- **High-grade heat** (>1000°C) for steelmaking and cement kilns

Why Industrial Heat Matters

51% Industrial heat accounts for a substantial 51% of the **global heat consumption** (IEA, 2022).

25% Alarmingly heat generation is responsible for around 25% of **global CO_2 emissions**.

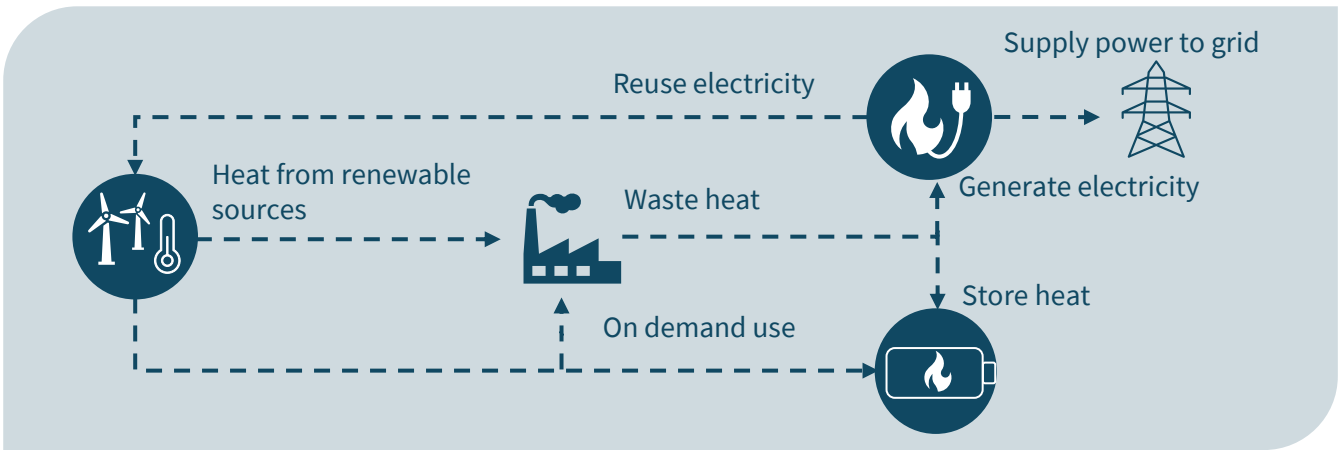
Ongoing cost reductions of renewable heating continues to make it more competitive with fossil fuels.

Most of the heat still comes from **burning fossil fuels** like coal and natural gas.

Clean solutions already exist for low- and medium-grade heat but **remain underused**.

The Technology That Makes Industrial Heat Renewable

Renewable energy generates heat, which is **used in industrial processes** and can also be **stored for later use**. Waste heat from industry can be reused or turned into electricity and sent back to the grid — making the whole system more **efficient** and **flexible**.



Further Sources by Future Cleantech Architects

- Technical Report on Decarbonizing High-Temperature Heat in Industry
- The Basics & The Gaps - Thermal Energy Storage

Policy Recommendations …to mobilize investments and accelerate deployment of industrial heat technology:

Predictable Returns & De-Risking

- Create **tailored financing programs** through low-interest loans or blended finance options.
- Provide **government-backed guarantees** for investments in capital-intensive heat assets.
- Introduce **market-based support mechanisms** to guarantee a fixed, predictable return per MWh.

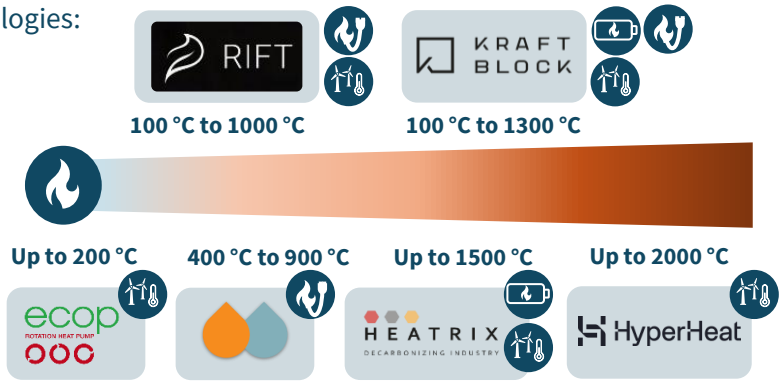
Early Adoption & Demand Stimulation

- Implement **one-stop-shop** permitting, with fixed approval timelines.
- Provide **targeted CAPEX support** for early adopters, especially in hard-to-abate sectors and first-of-a-kind projects.
- Introduce **accelerated depreciation for replacing fossil fuel-based heat systems** to improve investment payback.

Industrial Heat Experts in the Tech for Net Zero Network

There are **3 key sectors** for industrial heat technologies:

- Producing electricity from **waste heat**
- Producing heat from **renewable sources**
- Storing heat for **on demand use**



ecop Technologies GmbH is an Austrian based cleantech company that has developed a high-efficient, high flexible and environmentally friendly heat pump for industrial applications for heat production up to 200 °C with typical ROIs between 3-5 years. The company arises from 15+ years of R&D activities on its innovative Rotation Heat Pump.

etavalve is a Swiss startup developing a compact heat-to-power system. It is based on the well-established gas turbine process, which is implemented in a piston engine. Their initial focus is on market segments with at least 400 kW of waste heat at 400 °C or higher, including steel plants, pyrolysis facilities, weak gas flares, and crematories.

Heatrix is a startup based in Bremen, with the mission to replace fossil fuels in energy-intensive industries, like cement, steel and chemicals. Their modular Heatrix system combines an electric air heater with a thermal energy storage to convert renewable electricity into carbon-free high-temperature of up to 1500 °C process heat.

HyperHeat is a German startup dedicated to revolutionizing industrial heating processes with cutting-edge electric heater technology capable of achieving temperatures up to 2000 °C using only renewable electricity. HyperHeat targets a potential to reduce over 1Gt CO_2 annually by retrofitting existing industrial infrastructure.

Kraftblock is an energy storage system that can decarbonize industries like steel, glass or ceramics, food, chemicals or paper by utilizing renewable energy or waste heat and storing it to provide flexibility. The system can deliver heat between 100 °C and 1300 °C to processes.

Rift is a Dutch startup developing Iron Fuel Technology, which burns iron powder to generate high-temperature heat for industrial processes, without direct CO_2 emissions and low NOx emissions. The cycle converts rust back into iron fuel using hydrogen, offering a grid-independent, scalable, and cost-effective alternative to fossil fuels.