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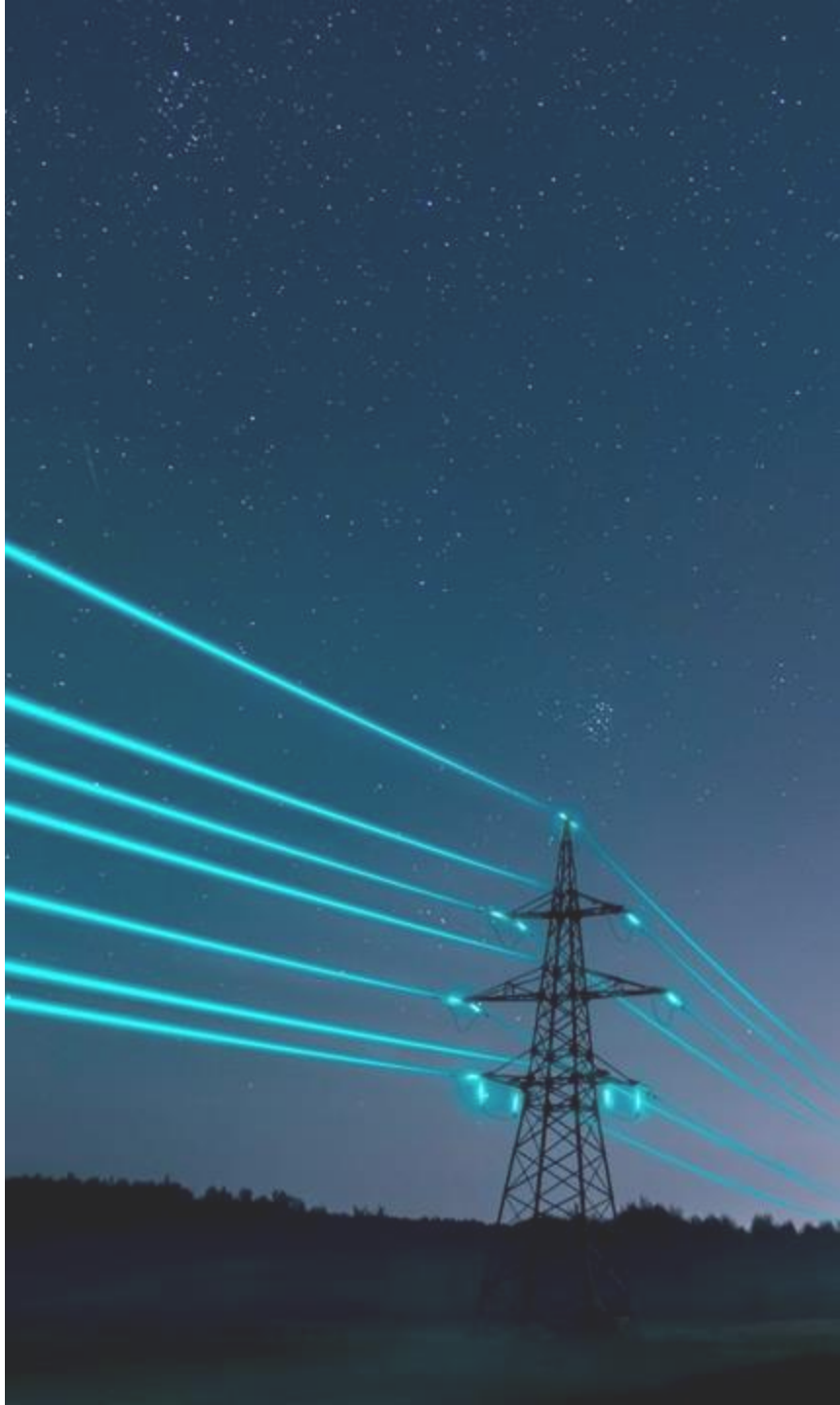
# Industrial Electrification

## The Path to Higher Efficiency, Lower Energy Costs and Reduced Emissions

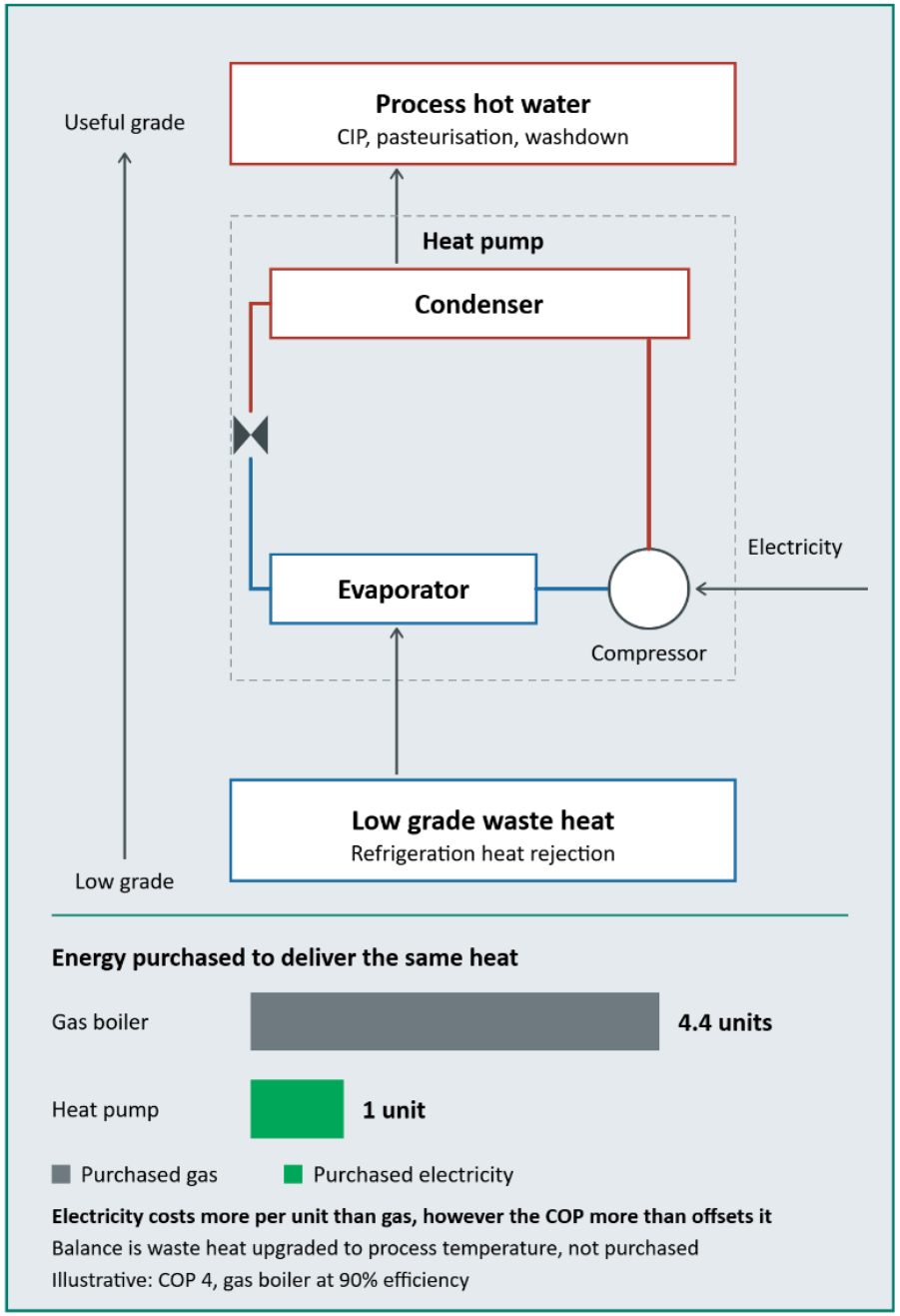
4th November 2026, Dominic Schone & Keith Whiriskey

# Why industrial heat electrification?

- **Efficiency:** Electric technologies can offer significant efficiency gains over fossil-fuel alternatives.
- **Exposure:** Continued reliance on fossil fuels increases exposure to energy price volatility and rising carbon costs. Timely investment can reduce costs, strengthen energy resilience and support long-term competitiveness.
- **Expectations:** International customers and parent companies value suppliers and subsidiaries demonstrating progress on emissions, energy costs and resource efficiency.



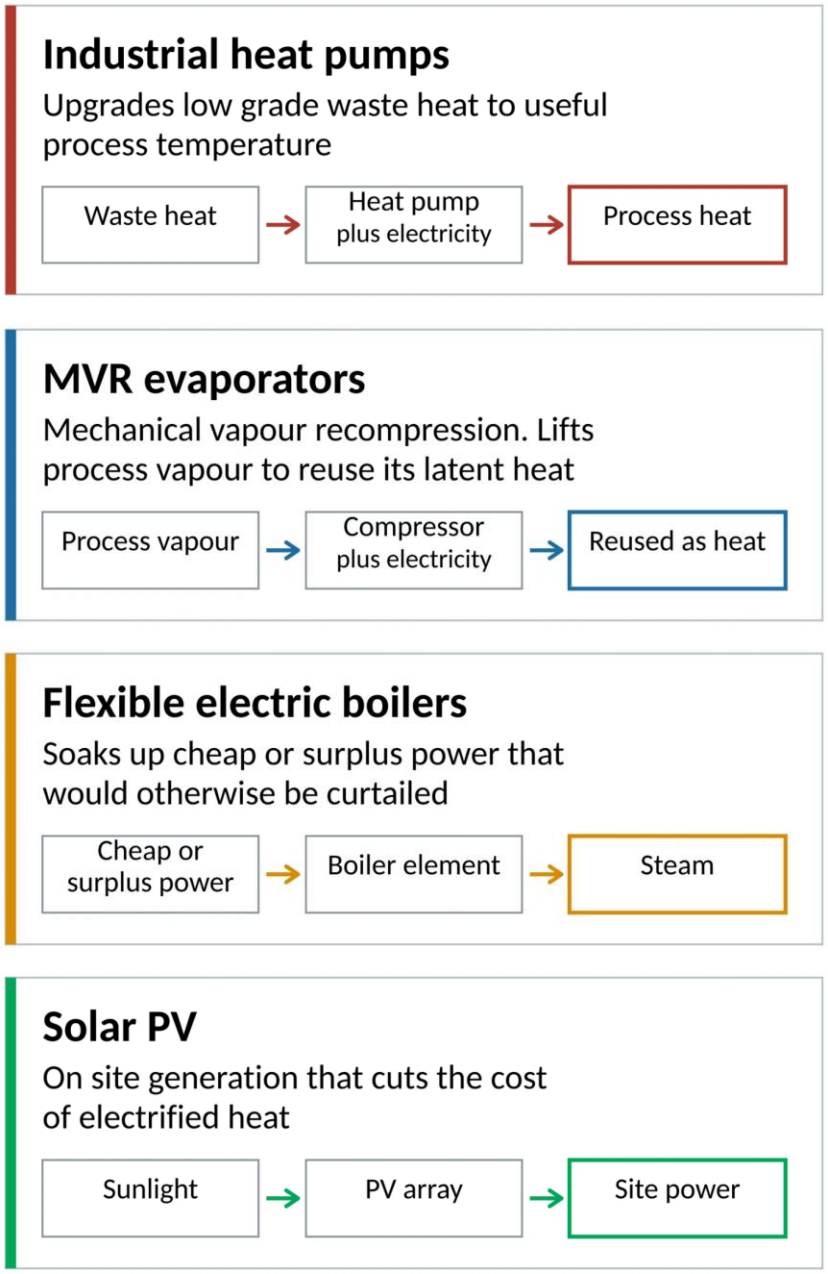
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# Heat Pumps & the Spark Gap

Electricity costs more per unit than gas, but the higher efficiency of heat pumps can more than offset this in many cases, especially those with a very high COP.

- **Lower-temperature, high-efficiency heat pump projects are already commercially attractive in many cases**
- Higher-temperature applications can remain more challenging under current energy prices
- However, flexible use of electricity and emerging technologies, may present opportunities for higher temperature applications




# Electrification grant support

**Enterprise Ireland has allocated €37m in 'Energy & Environmental Aid' capital grant support to electrification projects:**

- 13x industrial heat pump installations in manufacturing.
- 3x MVR (mechanical vapour recompression) evaporators
- 2x electric boiler installations.
- Solar PV installations that enable electrification

# Case Examples

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NO PARKING
HP SEEGER
NO THROUGH TRAFFIC

# Illustrative Case Study: Heat Pump

**Ammonia heat pump system to recover heat from refrigeration systems, produce hot water, and partially displace fuel usage in boilers.**

- Total investment of ca. €2.6m, costs included heat pump, thermal storage water tank, mech & elec, civils.
- In this case, a grant of over €800k (~35% of eligible costs) leaving a net investment from the company of ca. €1.8m.
- Taking both energy savings and grant into account, the project should pay for itself in ca. 3 years.

| Company Payback | Without Grant Aid | With Grant Aid |
|---|---|---|
| Company Cost of Investment | ca. €2.6m | ca. €1.8m |
| Annual Net Energy Cost Change Associated with Investment | ca. -€580k | ca. -€580k |
| Estimated Payback | ca. 4.5 years | ca. 3.1 years |

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# Illustrative Case Study: Multi-tech, Multi-site

A large manufacturer is undertaking a programme of energy efficiency and decarbonisation investments across multiple manufacturing sites. The programme will recover waste heat currently lost from industrial processes and reuse it for hot water, cleaning, pasteurisation and other manufacturing requirements.

- Industrial heat pumps and heat recovery
- thermal storage and associated infrastructure
- more efficient refrigeration and steam systems
- on-site solar electricity generation
- process modifications to enable lower-temperature heating

| **Annual Cost Change Associated with Investment** | **Future Impact** |
|---|---|
| Net total annual energy cost change (+electricity, –gas) | ca. -€2,5m |
| ETS cost change | ca. -€1m |
| Annual Cost Change Associated with Investment | ca. **-€3.5m** |

| **Company Payback** | **Without Grant Aid** | **With Grant Aid** |
|---|---|---|
| Company Cost of Investment | ca. €17.6m | ca. €12.7m |
| Annual Net Energy Cost Change Associated with Investment | ca. -€3.5m | ca. -€3.5m |
| Estimated Payback | ca. 4.9 years | ca. 3.5 years |

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# Technical and Engineering Considerations

**Build the knowledge base**

- Keep searching for opportunities and building internal knowledge
- Engage with a range of consultants, technical experts and suppliers
- Learn from peer companies and from examples in other sectors
- Monitor emerging technologies and applications as they become technically and commercially viable

**Plan the grid connection early**

- Engage with ESB Networks at the earliest possible stage.

**A grid upgrade is not always essential**

- A project designed to operate within the site's existing Maximum Import Capacity can still deliver significant benefits.

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# Strategy and Finance Considerations

**Undertaking a broad analysis**

- Consider how gas, electricity and carbon costs could change, not just today's prices
- Assess the full business case, rather than focusing only on the calculable energy savings
- Make full use of available technical expertise and financial supports

**Make it a strategic decision**

- Build an internal coalition across engineering, sustainability, operations and finance
- Avoid a passive 'wait and see approach', as competitors may move ahead

**Treat significant electrification projects like a major capital investment**

Major electrification projects deserve the same strategic importance as production or expansion investments

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# Challenges & Future Trends

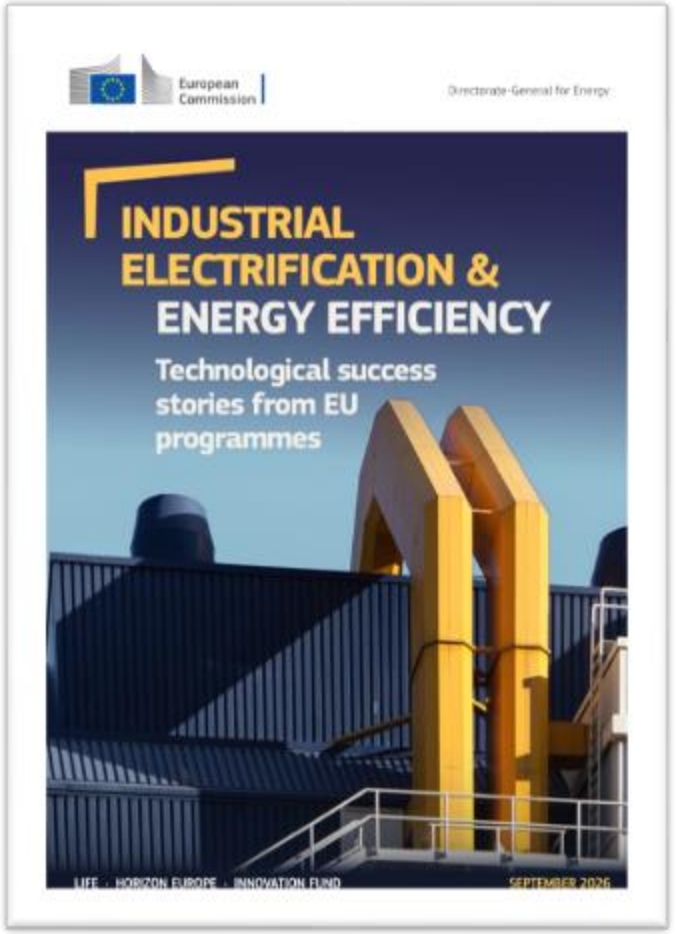
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# EU Electrification Action Plan

The Electrification Action Plan aims at **making Europe the first electro-powered continent**, with a stronger carbon market to support EU's industry in the clean transition and electrification.

Its indicative **electrification target of 46% by 2040** will be assessed as part of the post-2030 Energy Union package.

Reaching this goal could **cut the EU's fossil fuel import bill** by €260 billion per year by 2040.




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[Electrification - European Commission]

# Grid-Scale Battery Storage







# Onsite Solar & Battery Storage









# Challenges for Industrial Electrification in Ireland

**Electricity Cost**

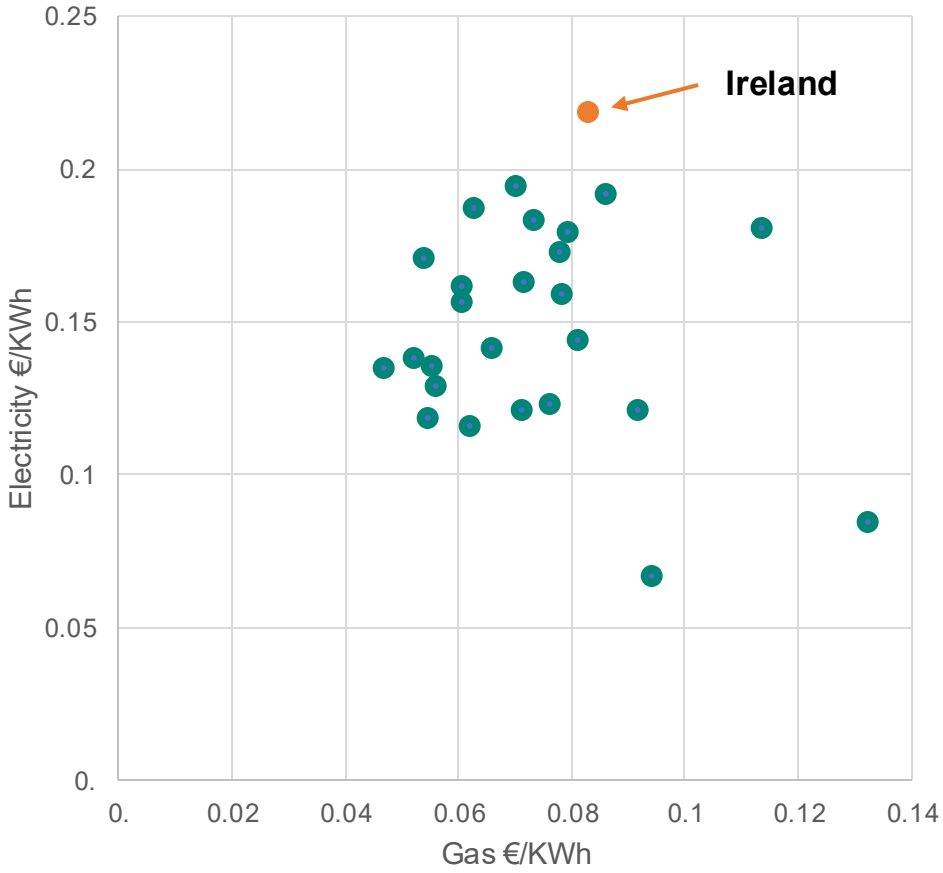
- Irish energy costs are high. Notably, electricity costs present a challenge for electrification of Irish industry.

> **Flexible Electrification:**
> Using electricity at times of high renewable generation and lower prices

**Grid Infrastructure**

- Clients have raised high costs and long delivery timelines as a concern in project planning and delivery.

> **Flexible / Non-Firm Grid Connections:**
> Maximising the utilisation of existing grid infrastructure

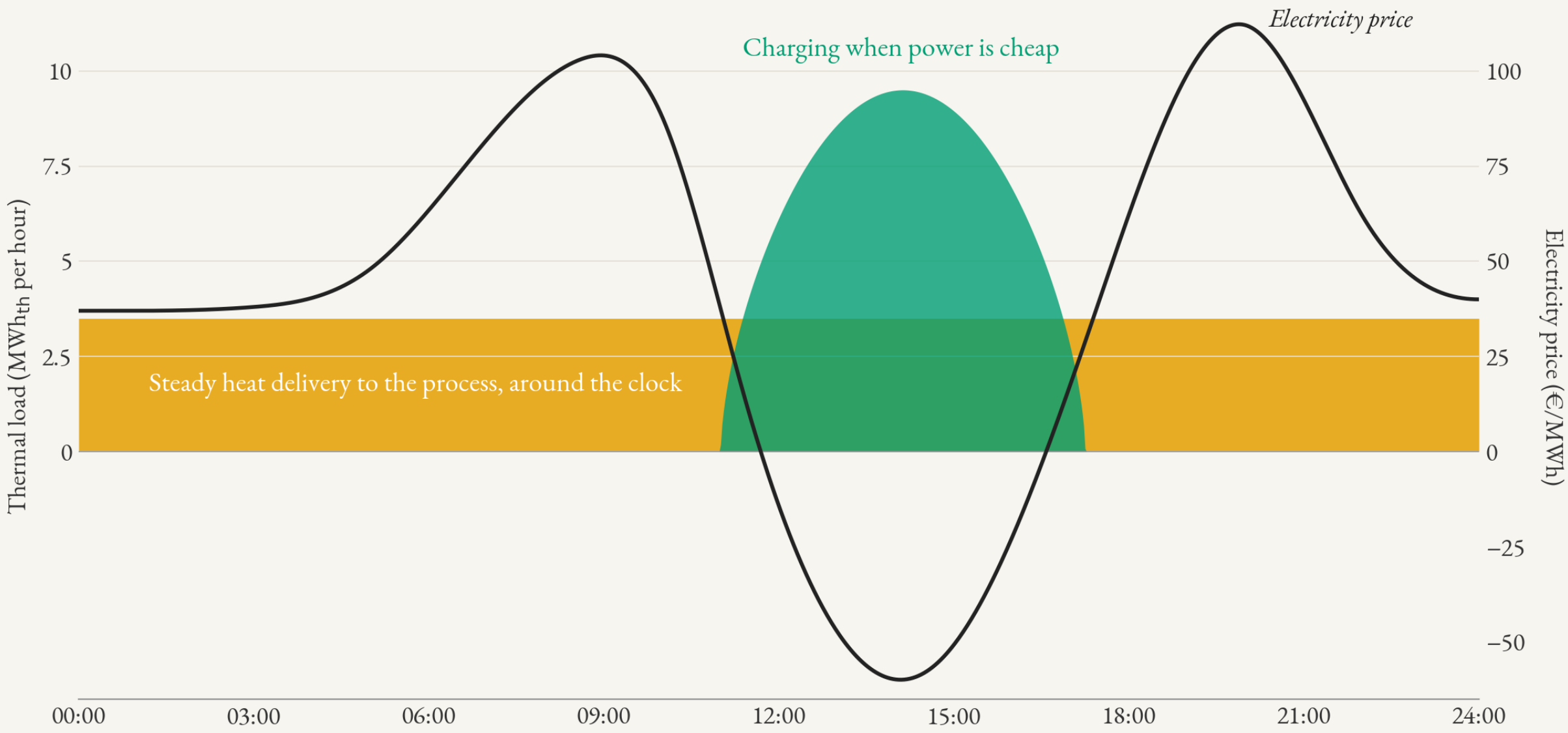



Eurostat 2025

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# How a heat battery turns volatile power into steady heat

Illustrative daily profile of an electric thermal energy storage system supplying industrial process heat




Note: stylised profile for illustration; prices and loads are indicative.

Jan Rosenow

# Flexible Electrification

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# Flexible Electrification

Ireland and Northern Ireland rank among the leading electricity systems globally for integrating variable renewable electricity, creating an opportunity to lead in flexible industrial electrification.

More demonstration projects are needed such as:

- Flexible electric boilers
- BESS combined with heat pumps
- Solid-state thermal storage

**These investments could generate revenue by providing grid services and could enable access to lower-cost renewable electricity, including electricity that might otherwise be curtailed**.
(€500 million lost in 2025, €450m in 2024).

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# Kepak

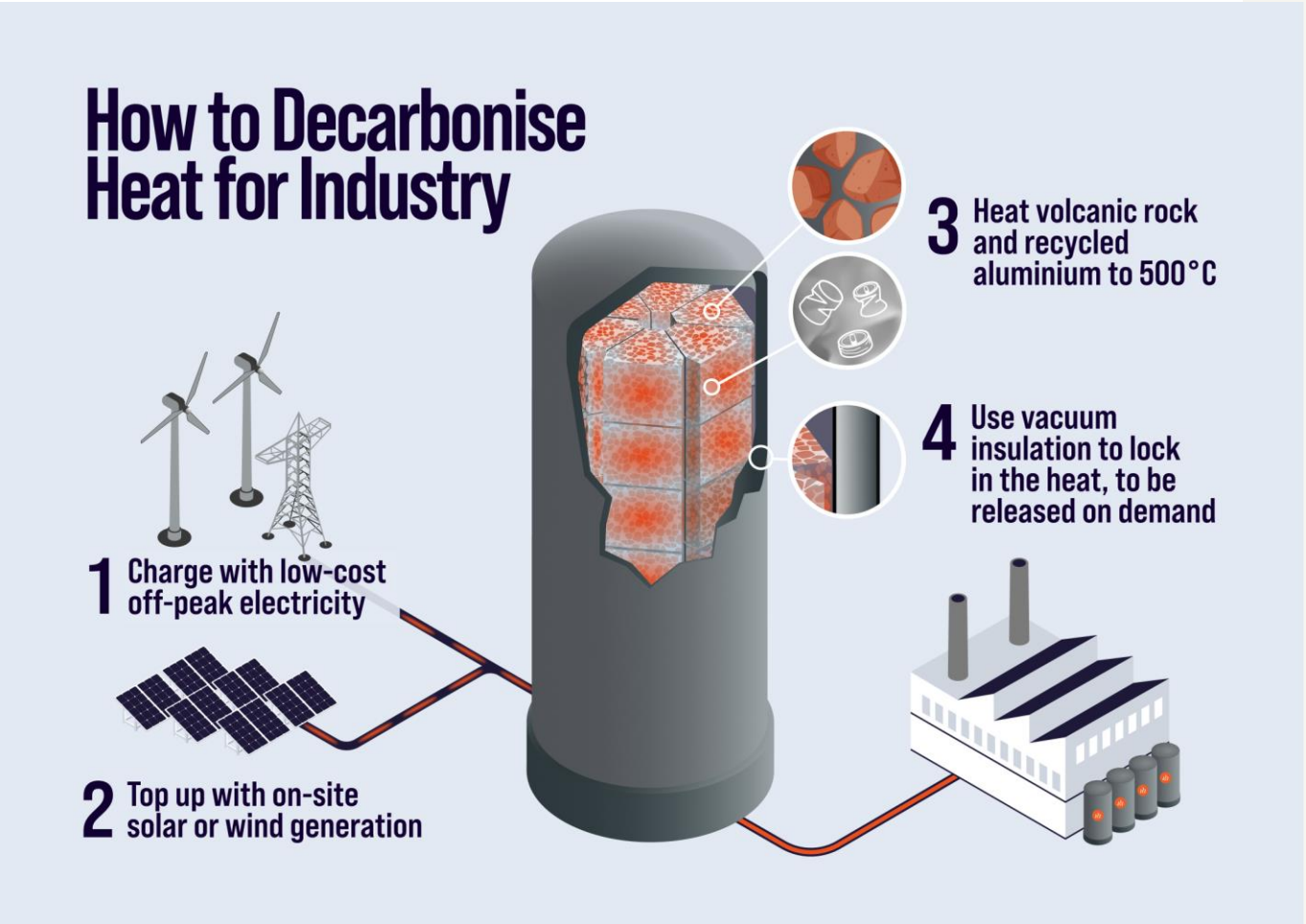
Kepak is an Irish-based food company serving international markets, restaurants and well-known food service brands.

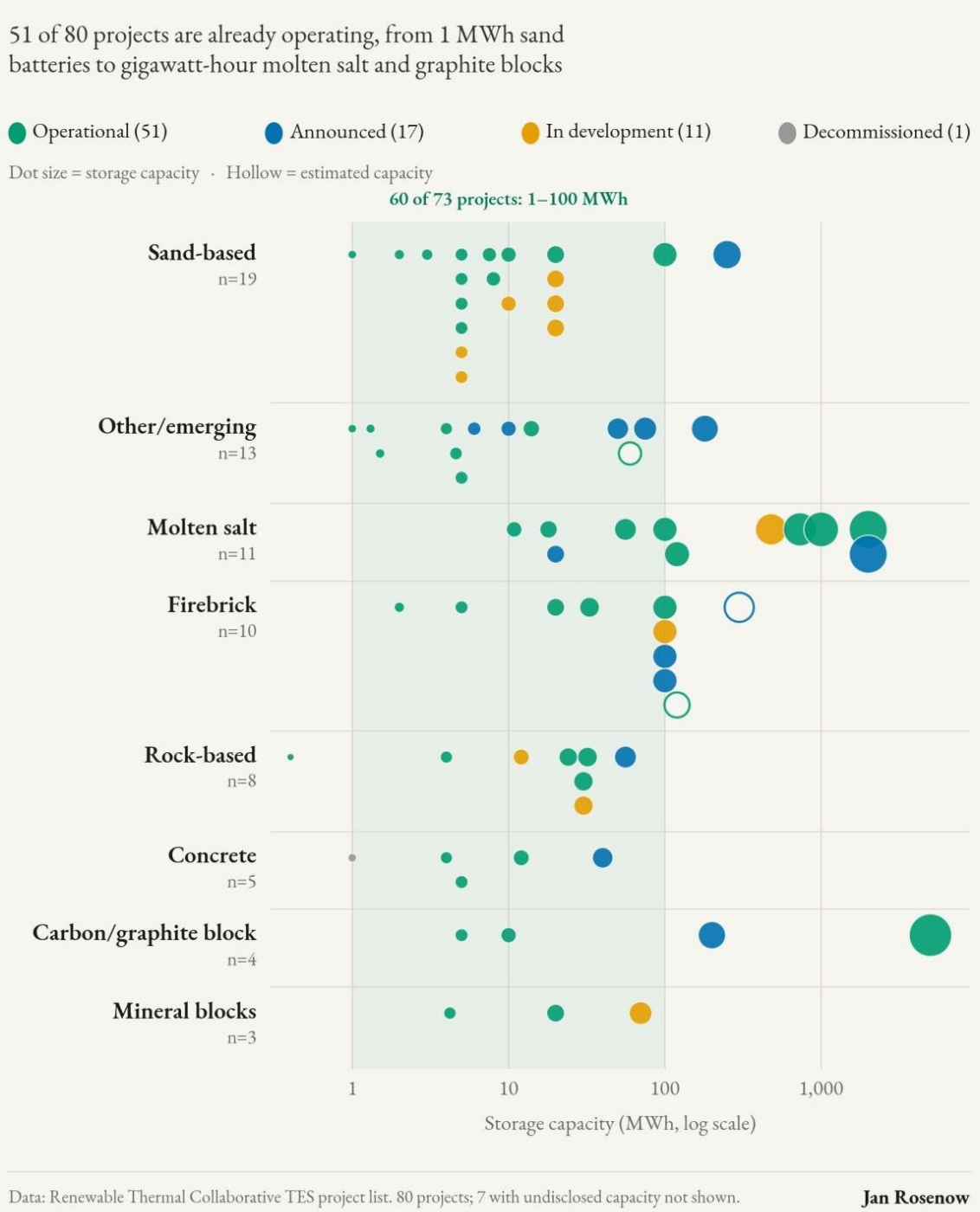
Kepak has made several large investments including the **installation of a wind turbine at Watergrasshill, and a thermal water tank which uses the excess electricity generated by the turbine.** Kepak developed Robotic Process Automation technology to manage the variables within this system.

*"For us, decarbonisation is about building a more competitive and resilient business over the long term. The key is integrating energy efficiency, operational discipline and data led decision making into everyday performance, rather than treating sustainability as a separate agenda. That approach allows us to reduce emissions while ensuring investment in low carbon technologies delivers real operational and commercial value."*
Brian Torney, CEO of Kepak's Meat Division



# Thermal Energy Storage




Polar
Night
Energy
LOVIISAN LÄMPÖ

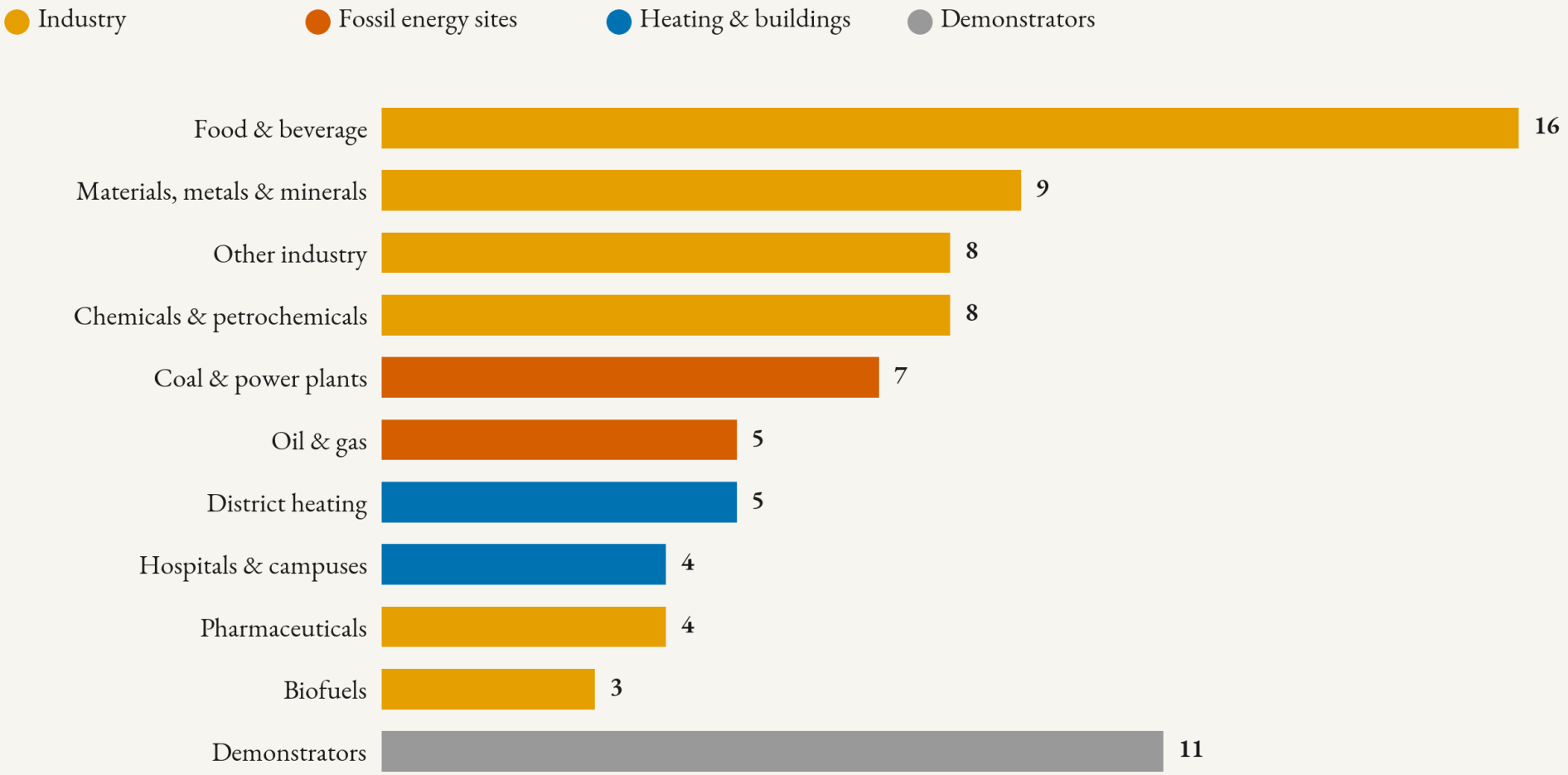

Caldera




EXERGY3

# Food and drink is the first big customer for thermal batteries

Projects by end user

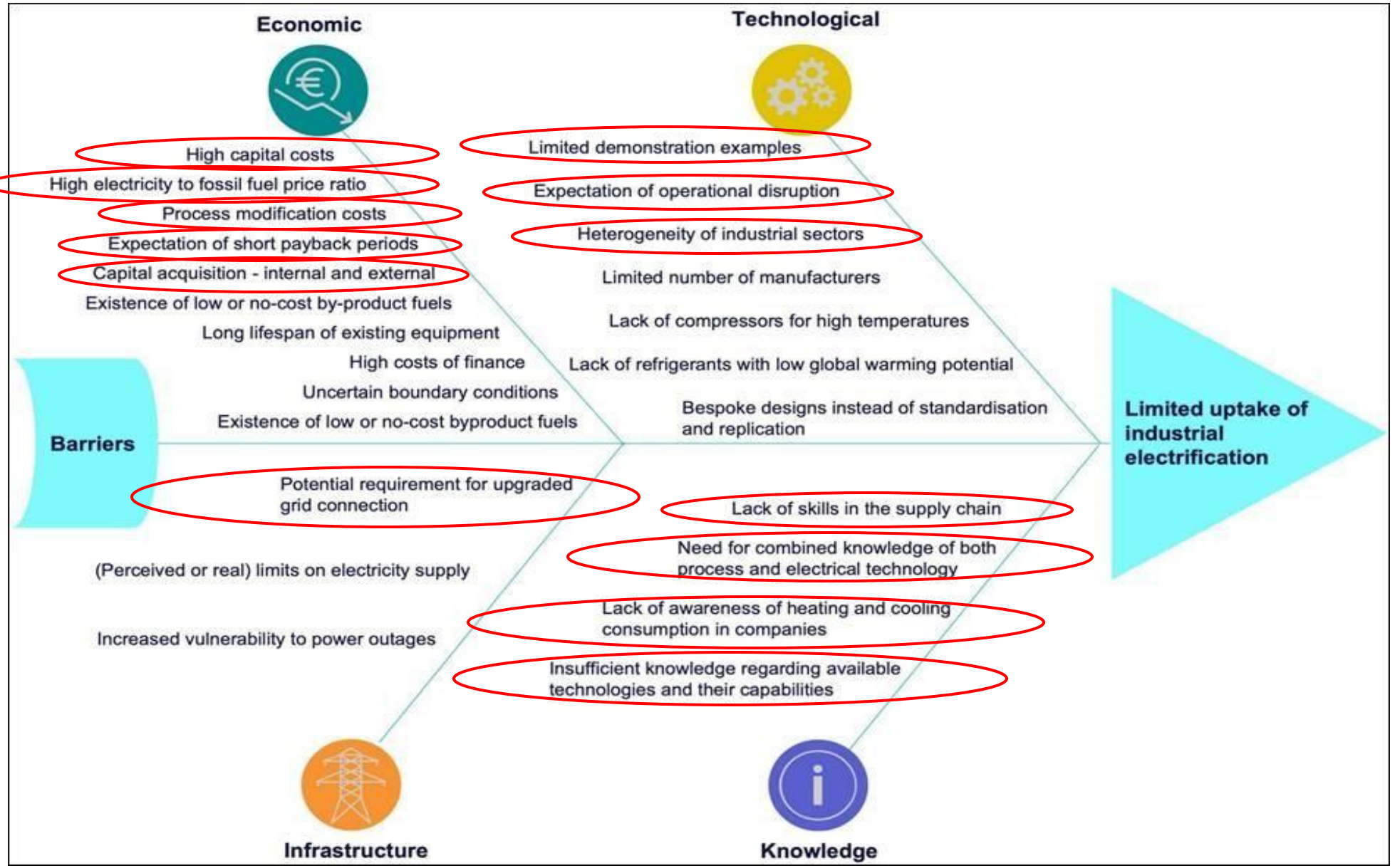



Other industry: paper, textiles, electronics, automotive, cleaning, industrial parks.

Data: Renewable Thermal Collaborative TES project list (80 projects).

**Jan Rosenow**

# Policy Solutions for Industrial Electrification



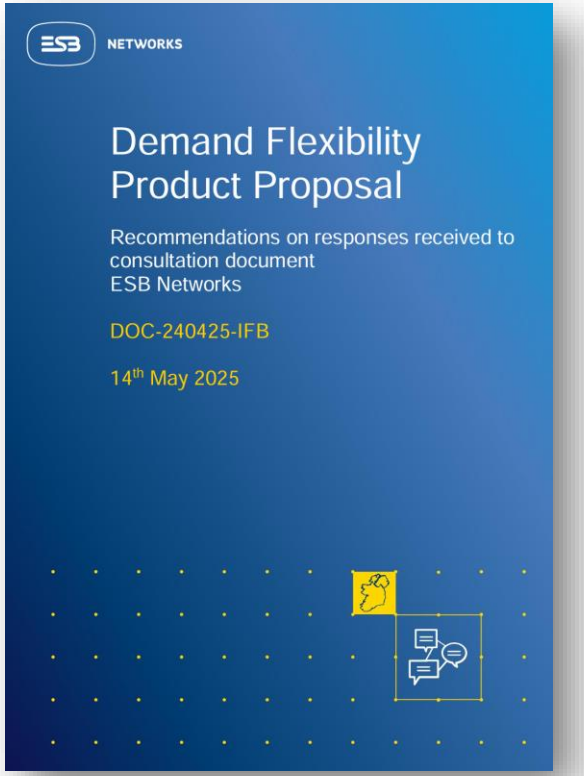

*Source: Rosenow, J., Arpagaus, C., Lechtenböhmer, S., & Pusceddu, E. (2025). The heat is on: Policy solutions for industrial electrification. Energy Research & Social Science, 127, 104227.*

# Next Steps for Irish Industrial Electrification

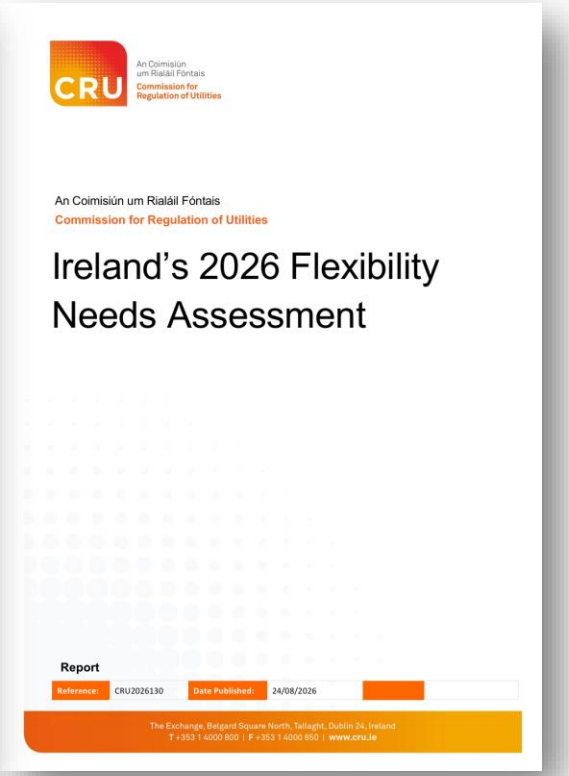
1. Industrial electrification is a major opportunity to strengthen competitiveness, resilience, and sustainability → *Search for your solutions*

2. Capital supports available. Strong local engineering competencies/ → *Leverage what we have*

3. Engagement and collaboration across the enterprise and energy systems is essential → *Real-world project proposals are needed to inform energy and grid policy*




Flexible Demand Connections Pilot




Flexibility Needs Assessment | CRU.ie

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# Thank you



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# Grant Support

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# Enterprise Ireland Sustainability Supports

| Understand | Begin | Plan | Do |
| --- | --- | --- | --- |
| Webinars | | | |
| Climate Toolkit for Business | | | |
| Sustainability Accelerator Workshop | GreenStart | Strategic Consultancy | Environmental Aid |
| Sustainability/Energy Leaders Programme | GreenPlus | Research, Development, and Innovation | Shared Island Demonstration |
| **Understand**<br>Low carbon skills & capacity building | **Begin**<br>Low carbon skills & capacity building | **Plan**<br>Strategic long term technical design & road mapping. | **Do**<br>Deploy low carbon production process and technology |

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# Decarbonisation & Energy Costs

In October, Minister Peter Burke and Minister Darragh O'Brien TD launched the 'Driving Cost Savings for Business Through Industrial Decarbonisation' report.

**Since January 2025, over €300m has been committed through the range of industrial decarbonisation funds** offered by Enterprise Ireland, IDA Ireland, and the Sustainable Energy Authority of Ireland (SEAI).

Read the full report here:
https://enterprise.gov.ie/en/publications/publication-files/driving-cost-savings-for-business-through-industrial-decarbonisation.pdf



*Peter Burke, Minister for Enterprise, Tourism and Employment and Ross O'Colmain, Head of Business Expansion and Sustainability Solutions, Enterprise Ireland*

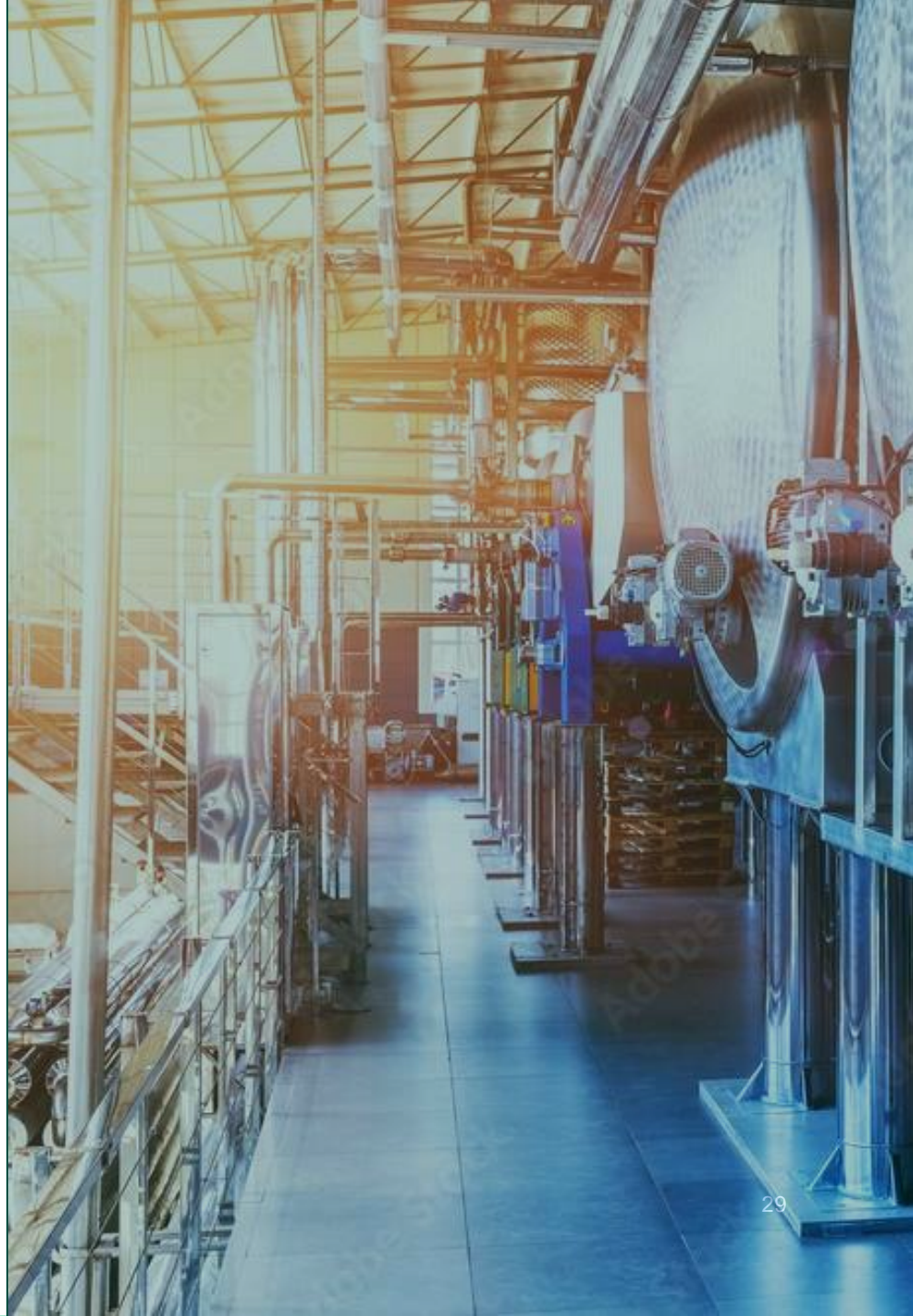
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# Energy & Environmental Aid

Energy & Environmental Aid is a capital grant to support companies implement large-scale projects that reduce reliance on fossil fuels.

For large integrated decarbonisation projects, e.g., Heat-pumps, e-boilers, heat recovery, biomass, anaerobic digestion, efficiency, and other enabling works e.g. solar, BESS, grid connection, flexibility etc.

**This type of funding has the scale and remit to incentivise multi-year decarbonisation projects that deliver vast emissions reductions, opex cost savings, and First-of-a-Kind projects.**



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# Shared Island

**The Shared Island Industrial Sustainability Challenge Fund provides capital grant support to help Enterprise Ireland clients deliver innovative sustainability projects.**

The fund supports first-of-a-kind projects that help industrial businesses reduce emissions, improve resource efficiency and strengthen competitiveness across Ireland and Northern Ireland.

Eligible areas include:

- **industrial electrification**
- hard-to-abate climate technologies
- water efficiency
- circularity, resource efficiency & bioeconomy

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Shared Island Initiative





# Strategic Consultancy

Grant support for accessing consultancy & engineering expertise is available for SMEs and large companies if linked to environmental investment.

50% grant rate & up to €70,000 total project cost.

**Eligible costs are consultancy services directly linked to investments. e.g. develop a site's decarbonisation roadmap.**

*Note: It is possible to list more than one consultant on each application if they are carrying out different work.*

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# Case Study: Aurivo

- **The wood pellet biomass burner will be the first of its scale in Ireland and will economically and technologically prove a viable high-heat decarbonisation pathway, particularly for the dairy processing industry.**
- Once operational, the new boiler system will expand the facility's use of renewable biomass and replace a large proportion of the fossil fuel currently consumed onsite.
- The investment is expected to reduce carbon emissions by approximately 7,500 tonnes of $CO_2$ annually.
- Fuelled by locally supplied, sustainably certified wood pellets, the new energy infrastructure will help anchor more economic value within the all-island supply chain while supporting indigenous industry.
- Moving away from imported fossil fuels towards a stable, renewable certified fuel source will enhance the long-term competitiveness of Aurivo's dairy operations.
- The project will also support local employment across the construction, engineering and supply chain while futureproofing critical food manufacturing infrastructure.




Enterprise Ireland

Shared Island Initiative

Aurivo