



Decarbonisation of industrial heat: a strategic challenge for factories

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During the last MIX.E / Produrable event, industry experts discussed the next frontier topics of the energy transition. Blunomy contributed to the content of various conferences, bringing 18 years of experience in the energy transition and decarbonisation fields.

One key challenge for many industrials that was discussed is how to decarbonise industrial heat to reach both environmental and business objectives?

Industrial heat represents a massive source of energy consumption, accounting for roughly one-third to one-half of all CO₂ emissions in the industrial sector. With the European Green Deal mandating carbon neutrality by 2050, the French industrial sector must decarbonise twice as fast by 2030 compared to its historical rate.

1. Takeaways from the discussion

Angélique Maillot, manager at Blunomy, took part in this discussion, alongside Thomas Delhon, Co-founder and CEO of Radiant (solution provider for decarbonising heat using solar concentration) and David Lolo, Economist at La Fabrique de l'Industrie (a think tank dedicated to economic studies on industrial challenges and the ecological transition).

Here are 4 key takeaways from this discussion:

1. A shift from environmental niche to core business strategy

Decarbonisation is no longer exclusively the domain of ESG, as today, discussions actively involve financial directors, procurement teams, and core business units. This shift is largely driven by recent energy crises and price volatility, which have transformed decarbonisation into a crucial lever for energy sovereignty and operational resilience. Companies increasingly recognise that relying on locally produced, decarbonised energy shields them from unpredictable international market shocks.

2. The absence of a "Silver Bullet"

A major consensus has emerged that companies must move past a binary "gas vs. electricity" mindset. Defaulting exclusively to electrification can be problematic, particularly for high-temperature industrial processes where electricity may lack competitiveness or require massive infrastructure overhauls. Instead, a hybrid, customised approach is required. A robust decarbonisation strategy relies on a "bouquet" of sequential actions: beginning with energy efficiency and waste heat recovery, followed by the strategic integration of electrification and renewable heat sources such as solar thermal, biomass, or geothermal energy.

3. Navigating financial and infrastructure barriers

The transition faces substantial systemic friction, as decarbonising French industry alone requires an estimated €10 billion per year by 2030. Securing a profitable return on investment (ROI) remains difficult,

particularly when domestic operators compete against extra-European companies that do not face equivalent carbon compliance costs.

Furthermore, the physical realities of industrial assets slow down adoption. Industrial furnaces have operational lifespans of 15 to 20 years; companies currently amortising these assets cannot feasibly replace them overnight. Widespread electrification also introduces significant grid challenges, including lengthy delays for grid connections and public acceptability hurdles regarding new power transmission lines.

4. Which pathways to action? Subsidies and innovative business models

Despite these hurdles, practical mechanisms exist to catalyse action today:

- **Targeted public subsidies:** public funding plays a definitive role. Attractive subsidy frameworks that cover capital expenditure (CapEx) and support operational costs (OpEx) frequently serve as the primary trigger for industrial sites to launch decarbonisation projects.
- **Carbon contracts for difference (CCfD):** emerging European mechanisms like CCfDs provide dynamic financial support by bridging the fluctuating gap between market carbon prices and the actual cost of decarbonisation.
- **"As-a-Service" models:** innovative frameworks like "Heat as a Service" drastically reduce financial friction. Instead of requiring a manufacturer to make a massive, risky capital investment in new machinery, third-party providers install the equipment and sell the decarbonised heat directly. This allows industrial players to maintain existing infrastructure as a backup, bypassing heavy upfront costs and technology risks.

Strategic Outlook: a definitive path forward for manufacturers is to conduct an objective diagnostic of current emissions, explore a diversified portfolio of technological solutions, and avoid the trap of delaying action while waiting for perfect market conditions.

2. Case study - 50% reduction in Scope 1 emissions for an industrial production site through electrification.

The Challenge:

A Luxembourg-based manufacturer, operating complex thermal processes (200-300°C), sought to decarbonize its site currently powered by two gas boilers. The challenge was to design an optimal electrification plan under CAPEX constraints, while ensuring the project's long-term economic viability, even after the phase-out of state subsidies.

The Solution:

Blunomy structured a three-step roadmap:

1. **Multi-criteria mapping and scoring** of all energy efficiency and decarbonization solutions.
2. **Prioritization** focused on optimization (destratification, free chilling), waste heat recovery, and technology substitution (electric boilers and high-temperature heat pumps).
3. **Dynamic financial modeling** based on Net Present Value (NPV) and carbon abatement costs to accurately balance efficiency investment (CAPEX) against future electricity costs (OPEX).

The Results:

The selected scenario enables a 50% reduction in the site's Scope 1 emissions. The technical and financial business case proved robust enough to be awarded state aid under Luxembourg's infrastructure support

schemes. This project demonstrates that a successful transition requires rethinking energy needs at the source before switching the energy carrier.

About Blunomy

Blunomy is a transition specialist consulting firm dedicated to accelerating the energy, climate, and environmental transition. For over 18 years, Blunomy has supported corporations, industrial players, energy providers, and financial institutions in accelerating their transition.

As an independent, pure-play transition advisory, Blunomy translates climate and environmental science into executable strategies, transforming the transition from a constraint into a performance driver through the right strategy, economics, and capital.

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