Auction for industrial heat electrification: A positive step, but mind the induced emissions!

Position Paper – May 2025

We welcome the European Commission's initiative to launch a new auction to promote the decarbonisation of industrial process heat through a €1 billion fixed-premium auction funded by the Innovation Fund. **Sandbag support this initiative**, while emphasising the need for careful design to prevent unintended increases in emissions due to electricity grid dynamics.

A welcome step

The proposed auction is a **timely and necessary measure to accelerate the decarbonisation of industrial heat**, where progress has lagged despite rising carbon prices. Fixed-premium support can play a critical role in de-risking initial investment, rewarding high-impact solutions, and sending a clear market signal in favour of electrification technologies.

We strongly support the proposed technological scope of the auction of electrified heat solutions. If well-designed, this initiative can build momentum toward large-scale transformation while supporting the EU's broader decarbonisation and competitiveness goals.

Beware 'induced' emissions

Electrification of industrial heat processes can reduce emissions, but **the net climate benefit depends on the way the electricity is produced**. For example, if electricity is produced from natural gas, with an efficiency of 50%, running a heat facility on such electricity will actually consume twice as much gas and emit twice as much CO2 than if it ran on natural gas directly.

Running heat facilities on renewable electricity could have the same negative climate impact if the renewable power used has to be replaced with gas-fired power to meet the grid's demand.

The main issue is, rather than the origin of the electricity used, the marginal generation mix of the power grid at the time of using it.

For industrial users, this poses a problem of time flexibility, which we raised in October 2024 in a report on the particular case of the aluminium industry. Consuming electricity during periods when the marginal generator is fossil-based leads to what we refer to as 'induced emissions'. Electrification of industrial heat could face similar problems; it is therefore essential to ensure that **indirect emissions remain lower than the direct emissions from the fossil-based technologies they replace**.

In particular, electrification should not lead to an increased reliance on fossil gas in the electricity mix, as this would result in higher emissions during periods of activity.

Efficiency-based baskets

To ensure the auction rewards technologies that genuinely reduce emissions, we propose dividing projects into two categories based on their energy efficiency relative to upstream electricity generation losses.

Two situations can arise:

1. Efficient equipment

In some cases, the electrified facility is so efficient that it compensates for the energy losses from converting gas into electricity (coefficient of performance (COP) exceeding 2.0 in our above example of 50% efficiency gas power generation) at any time of use. This could be the case for some advanced heat-pumps.

In those cases, even when electricity is being produced by gas marginal units, the emissions induced by the equipment remain lower than equivalent fossil-run equipment. In such cases, running the equipment even at times of strain on the electricity grid is always more efficient than burning fossil fuels, regardless of timing of use. The investment should be supported, and the fixed-premium paid, without time-of-use restrictions.

2. Less efficient equipment

In other cases, the electric technology is not efficient enough to compensate for energy losses at power plants, making its use at times of high electricity demand more emission-intensive

than the direct use of fossil fuels. In such instances, safeguards are needed to prevent an increase in emissions due to higher fossil gas usage in the grid. We then propose to **limit payments under the fixed premium** to the hours when the marginal carbon intensity of the grid is less than that of any fossil generation. This is notoriously the case **when spot electricity prices fall below 20€ per megawatt-hour**.

Given the very different situations described above, we recommend that **auction baskets are separated alongside an efficiency threshold that balances out the energy losses at power plants**. This leads us to propose different answers to question in section 5 and to question 3.3 of the Commission's survey, depending on the basket considered.

For basket 1 (efficiency above threshold):

- No additional requirements / safeguards needed to address the risk of indirect emissions outweighing direct emission abatement
- Fixed premium paid over 5 years

For basket 2 (efficiency below threshold):

- Safeguards needed:
    - Demand-side flexibility solutions
    - Limit the hours in which the project operates to avoid consumption in peak hours
    - No hard limit on the number of hours that bidders consume electricity from the grid, but the subsidy payments under the auction should be limited
- Fixed premium paid over 10 years: this is to compensate for the lack of activity during peak hours, which should make the investment longer to amortise

For the hour limitation recommended under basket 2, we believe there shouldn't be an obligation to turn off the equipment at peak times, but rather a suspension of the premium payment. However, although the survey is proposing three options of fixed limits on the number of hours (80%, 90% or 95%) we strongly recommend that payment be made based on power prices at the time of consumption, to **make sure electricity is not used at times of demand for fossil electricity**.