

ERCST Reflection Note

Boosting Electrification to Help Decarbonize European Industry

Authors

*Alexandra Maratou
Andrei Marcu*

Introduction

Alongside the EU ETS review proposal in mid-July 2026, the European Commission will be issuing an Electrification Action Plan encompassing several legislative and non-legislative actions aimed at accelerating the electrification of the EU's energy consumption.

This is in recognition that electrification represents one of the key – albeit not the sole – decarbonization pathways.

There are several things that are needed for successful electrification: good infrastructure, competitive pricing, availability of low carbon electricity and clean energy technology (appropriate and deployable for a specific application). Right now, however, the first two are still uncertain and to happen require further action. While we are assured that the third one can be delivered, the sheer scale of the transition presents unprecedented challenges given the vast electricity use requirements in industry processes, AI data centers, transportation, and residential heating and cooling.

The impending Electrification Action Plan is an attempt to address a persistent problem: the EU's electrification rate has stagnated for over a decade at around 23% of final energy consumption across all sectors (industry, transport, residential & non-residential buildings). In that light, the EU's non-binding 2030 electrification target seems increasingly unattainable under current conditions¹.

Two of the plan's legislative measures that the Commission is expected to propose by end 2026 include:

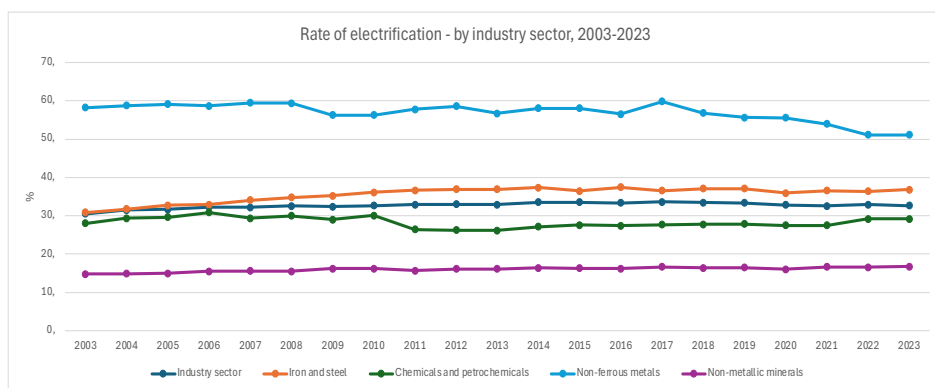
1. Introducing a 2040 (potentially legally binding) electrification target and
2. Requiring EU Member States to lower taxes on electricity with a view to improving national electricity-to-gas price ratios.

At the same time, the European Grids Package, which aims to unlock much-needed grid investments will soon enter trilogue negotiations and is expected to be adopted by early 2027.

Electrification in the industrial sector

In the industrial sector as a whole, the electrification rate, as shown in Figure 1 below, has on average stalled at roughly 32%. Addressing this is critical, as industrial decarbonization relies on electrification, alongside other critical solutions².

Figure 1 Rate of electrification in industry in the EU; overall and in specific industries, 2003 -2023³



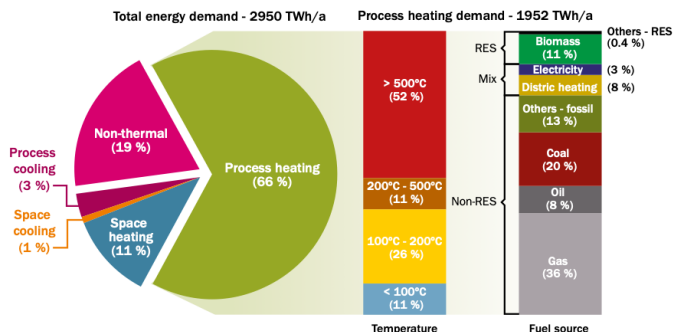
¹ The Clean Industrial Deal and the Affordable Energy Action Plan have set a non-binding target to raise electricity's share of final energy use to 32% by 2030.

² Key pathways include energy efficiency, direct electrification, the use of low carbon molecules e.g. hydrogen and derivatives (indirect electrification), and carbon capture, utilisation, and storage (CCUS).

³ Source: ERCST based on Eurostat dataset 'Rate of electrification' [nrg_ind_re__custom_20810690]

An even greater electrification gap exists in process heating that accounts for the lion share (about two thirds) of EU industrial energy demand: electricity supplies a mere 3% of this heat, while fossil fuels supply about 78% (Figure 2).

Figure 2 Breakdown of the final energy demand in European industry by broad application (left) and process heating demand by temperature level (centre) and energy source (right)⁴



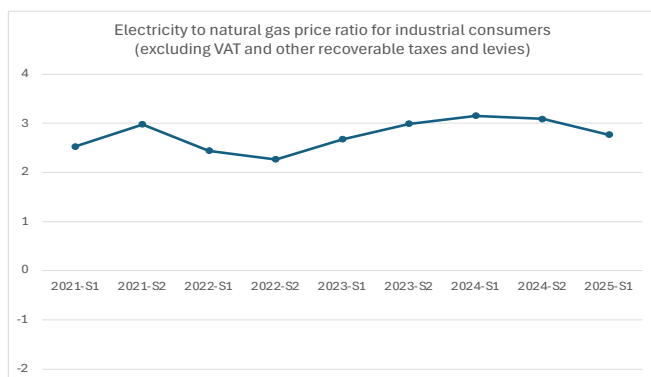
Structurally high electricity prices impeding industrial electrification

This is not due to a lack of technical feasibility: Around 60% of industrial process heat needs can be directly electrified today using mature technologies like electric arc furnaces, boilers, and industrial heat pumps⁵. These proven technologies are suitable for electrifying several low and medium temperature applications requiring hot water or steam. By 2035, emerging solutions typically suitable for higher temperature processes —such as resistance heating, induction heating, and electric steam crackers— could push this technical potential to 90%⁶.

However, despite this technical feasibility, switching remains financially risky and requires a supportive economic environment with attractive long-term investment conditions.

The primary barrier is the high electricity-to-gas price ratio for industrial consumers. Electricity still costs more than double the price of gas on average in the EU, with the ratio sitting in recent years at well above 2.5 - the threshold where industrial heat pumps begin to break even with gas boilers on running costs (Figure 3).

Figure 3 Electricity-to-gas price ratio for industrial consumers in the EU⁷



⁴ Source: figure 1, de Boer, R., Marina, A., Zühlsdorf, B., Arpagaus, C., Bantle, M., Wilk, V., Elmegaard, B., Corberán, J., & Benson, J. (2020). *Strengthening Industrial Heat Pump Innovation: Decarbonizing Industrial Heat*. https://backend.orbit.dtu.dk/ws/portalfiles/portal/216587293/2020_07_10_whitepaper_IHP_A4.pdf

⁵ Fraunhofer ISI (2024): Direct electrification of industrial process heat. An assessment of technologies, potentials and future prospects for the EU. Study on behalf of Agora Industry. https://www.agora-industry.org/fileadmin/Projects/2023/2023-20_IND_Electrification_Industrial_Heat/A-IND_329_04_Electrification_Industrial_Heat_WEB.pdf

⁶ idem

⁷ Source: ERCST, based on Eurostat datasets: 'Electricity prices for industrial consumers - bi-annual data' (online data code: nrg_pc_205); 'Gas prices for industrial consumers - bi-annual data' (online data code: nrg_pc_203)

Notably, European energy-intensive industrial consumers currently pay double the electricity rates of the US and 50% more than China⁸. This severe cost disparity undermines the global competitiveness of vital sectors like steel, chemicals, and aluminum.

Overall, high retail power prices (including wholesale component, tariffs, and taxes/levies) are stalling Europe's green transition, as they invalidate the business case for adopting low-carbon technologies, whether through direct electrification or low-carbon hydrogen and derivatives, notwithstanding other benefits from electrification in terms of energy efficiency and energy security.

Measures to incentivise industrial electrification

To accelerate the transition from fossil fuels, policy measures must be introduced to drive down the electricity-to-gas price ratio and incentivize industrial electrification. These could inter alia include:

- **Reforming energy taxation frameworks in EU Member States that favour gas over power.** Overhauling these rules via the EU Energy Taxation Directive (ETD) remains highly contentious, having stalled in past attempted reviews. In mid-July, the European Commission is expected to propose lowering electricity taxes by amending the Electricity Market Design Regulation. Unlike the ETD, this path avoids the need for unanimous Member State agreement. However, negotiations may still be difficult because tax policy is traditionally viewed as a national competence. Separately, through the upcoming Q4 2026 Energy Union package the Commission might introduce a mandatory EU electrification target⁹, which could encourage Member States to shift their tax and grid fee structures in favour of clean power. Although current renewable energy and energy efficiency targets should theoretically drive the transition towards electrification, this additional target could provide the necessary political leverage at national level. An electrification target provides a technology-neutral framework for steering the transition away from fossil fuels.
- **Policy frameworks must expand beyond capital expenditure (CAPEX) support to offer robust operational expenditure (OPEX) support when needed.** CAPEX subsidies alone are no longer sufficient to drive low-carbon industrial transformation due to structurally high electricity prices. Energy costs have evolved into a defining operational risk, often overshadowing the choice of technology itself when determining commercial viability. Today, exposure to volatile power prices is a critical vulnerability across the industrial sector. In response, market leaders are actively mitigating this risk by locking in long-term power agreements, optimizing demand management, and investing in operational flexibility to protect their bottom lines. Crucial intervention mechanisms should inter alia include:
 - **Implementing 'reverse' Contracts for Difference (CfDs) for industry** to bridge the cost gap between fossil fuels and clean electricity and stabilize investment conditions. Just as traditional CfDs de-risk power producers, 'reverse' CfDs are required to safeguard the consumer side. Reverse CfDs can mitigate the operational risks of fuel-switching by guaranteeing a predictable price trajectory for clean energy inputs. If fluctuating wholesale power prices rise above a certain threshold, the public counterparty compensates the industrial consumer for the difference. These contracts stabilize operating costs and shield industrial consumers from electricity market volatility.
 - **De-risking and promoting long-term Power Purchase Agreements (PPAs)**, including cross-border, to bridge the gap between clean developers and heavy industry in accessing competitive low-carbon electricity.
 - **Facilitating demand and supply aggregation** to ensure smaller industrial consumers can collectively access competitive power pricing.
- **Accelerate the deployment of low-carbon electricity generation capacity** through a technology-neutral approach to optimize overall European energy system costs (post-2030 legislative framework), thereby supporting industrial electrification and strengthening energy security. While significant price disparities exist between EU Member States, markets with the cleanest energy mixes (Nordic, France,

⁸ Source: IEA (2026), Electricity 2026, IEA, Paris <https://www.iea.org/reports/electricity-2026/prices>, Licence: CC BY 4.0

⁹ The current EU economy-wide electrification rate targets are not legally mandatory, though the legislative push to make future targets binding is actively underway. According to a leaked draft of the Electrification Action Plan the Commission is expected to “propose an electrification target of [X]% of final energy consumption by 2040, enshrined in EU legislation as part of the Energy Union package for the decade ahead (Q4 2026)”. It is still uncertain whether the 2040 electrification target will be a legally binding one.

and Iberian) enjoy the most competitive wholesale electricity prices, reinforcing the case for continued effort in decarbonizing the electricity system.

- **Accelerating grid infrastructure investments:** Crucially, such support measures must run parallel to accelerated grid infrastructure investments. Grid access is currently the primary bottleneck for (industrial) electrification; consumers will only realize the economic benefits of the energy transition if network expansion is able to match the rapid pace of investment in low-carbon generation. Adopting a robust European Grids Package in the next months and translating this into action remains vital to unlock faster grid investments through fast-tracking permitting and proactive, anticipatory planning.

There are clear interlinkages between the upcoming EU ETS review and measures that support industry electrification and thus decarbonisation:

- Consideration should be given to earmarking part of EU ETS revenues to both CAPEX and OPEX support and de-risking tools such as ‘reverse’ CfDs to mitigate the risk of volatile power prices for industrial consumers.
- The ETS Investment Booster and other ETS-funded support instruments should support industrial electrification, focusing on projects in ready-to-electrify processes with readily available technologies.
- Indirect cost compensation remains important in ensuring electricity to gas price parity for industrial consumers and therefore in ensuring that the EU ETS is creating a clear price signal for electrification.
- The swift adoption and subsequent implementation of the European Grids Package is a necessary (yet not sufficient) condition for the decarbonisation of EU industry: unless grid permitting is expedited immediately, installations might lose their free allowances before the grid is physically capable of delivering clean power to their new electrified processes. Designing a resilient electricity system capable of delivering electricity when and where it is needed is critical for industrial consumers covered by the EU ETS as the majority have limited demand-side flexibility potential.
- Introducing a mandatory EU electrification target could create the political leverage needed for Member States to restructure their tax and grid fee frameworks, ultimately improving cost parity between electricity and natural gas. This mechanism can prompt Member States to reform their national energy taxation while by-passing the stalled EU Energy Taxation Directive revision, and future proposed changes to the Electricity Market Design Regulation that could also prove contentious. If effective, it could provide a clear, long-term investment signal for industrial installations under the EU ETS to accelerate their electrification plans.

About ERCST

The European Roundtable on Climate Change and Sustainable Transition (ERCST) is a Brussels-based think-tank incorporated as non-profit organisation under Belgian law. ERCST provides rigorous intellectual analysis of EU and international climate change developments and policies, drawing on the experience and research of its staff as well input from stakeholders who participate in its activities. ERCST provides original ideas and research into European and international debates on climate change policy. It represents its own views and strives to strictly ensure its independence and integrity.