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NOTE

From: General Secretariat of the Council
To: Permanent Representatives Committee/Council
Subject: Electrification as a driver of a competitive and clean transition
- Exchange of views

In view of the TTE (Energy) Council on 20 October 2025, delegations will find in the Annex the Presidency background note on electrification as driver of a competitive and clean transition.

Context

The industrial sector is one of the largest energy consumers, accounting for 25 percent of total energy consumption in the EU. This sector remains heavily reliant on fossil fuels, which constituted over half of its energy use in 2023¹. The recent energy crisis and unprecedented price volatility have revealed our dependence on fossil fuel imports, rendering energy-intensive industries vulnerable. As global competition intensifies, the future competitiveness and resilience of European industry are closely linked to its ability to decarbonise by phasing out fossil fuels and replacing them with more efficient, European clean energy. This follows from both the Draghi report and the Commission's Clean Industrial Deal.

Electrification has the potential to be a key driver of a more resilient, competitive and climate-neutral industry. Enhancing the industry's capacity to respond to price signals and manage energy consumption flexibly not only strengthens its competitiveness, but also contributes to the overall robustness and efficiency of the energy system.

The Commission Action Plan for Affordable Energy² stresses the need for a substantial scale-up of clean energy and electrification, with energy efficiency at its center. Following this, the Commission is expected to present an electrification action plan in the first quarter of 2026, outlining the necessary next steps to advance electrification.

¹ [Eurostat \(2023\): Final energy consumption in industry - detailed statistics.](#)

² COM(2025) 79 final

This creates a timely opportunity to exchange perspectives on the electrification agenda and to provide input to the Commission before the action plan is presented. Electrification is also a key driver of decarbonisation in the transport and heating sectors. Since electrification of the various sectors entails differing opportunities and challenges and, hence, differing policy solutions, a granular analytical approach is necessary. This discussion will therefore focus on industrial electrification, as industrial competitiveness is a particularly pressing challenge.

The debate on the post-2030 framework is also about ensuring an appropriate mix of approaches that can drive progress cost-effectively while leaving space for innovation and national specificities. This requires balancing target-setting with regulatory flexibility. Given the urgent need to accelerate the transition from fossil fuels to clean energy, our discussion aims to identify an appropriate framework to advance cost-effective electrification in the industries with the highest potential and address potential barriers.

Potential for industrial electrification

Analyses show that the technical potential for direct electrification in Europe could be between 60 and 90 percent of total industrial energy demand by 2035³. This transition involves substituting fossil fuel-based processes with electric alternatives. More than 60 percent of this demand can already be met with existing technologies, such as electric boilers, heat pumps and electric arc furnaces. However, in order to realise this potential, the right enabling conditions must be in place. These include investments, effective incentives and the efficient use and expansion of the electricity grid.

³ [Giuli, M. \(2024\): Direct electrification of industrial process heat: An assessment of technologies, potentials and future prospects for the EU, Agora Industry, 11. December.](#)

In parallel, additional efforts should be put into accelerating innovation for electrified solutions in high-temperature processes, while establishing the right conditions for the remaining hard-to-electrify processes to make cost-effective use of other decarbonisation pathways. Moreover, electricity needs to be an affordable supply source for industry and other demand to consider electrifying. This requires increasing efforts in enhanced measures to improve the competitiveness of electricity, such as accelerating the deployment of low-marginal-cost homegrown sources such as renewables and nuclear, and strengthening the grid and expanding storage capacity to reduce overall system costs.

Framework conditions to drive electrification uptake

Investments in electrification and flexibility often involve substantial upfront capital expenditures (CAPEX). These typically include upgrading or replacing existing equipment and infrastructure with electric-powered alternatives. Thus, electrification requires both private and public financing to bridge the investment gap and incentivise industrial transformation at scale.

The recently adopted Clean Industrial Deal State Aid Framework (CISAF) has provided part of the way in de-risking private investments in clean technologies and industrial decarbonisation. It enables the use of public tools like guarantees, loans and equity to attract private capital into projects that accelerate the transition to a climate-neutral economy while maintaining the global competitiveness of European industry and lowering electricity prices.

The forthcoming Industrial Decarbonisation Bank is expected to play a central role in facilitating the transition of European industry towards electrified alternatives. Through the provision of low-cost loans, grants, and guarantees, the Bank is expected to de-risk investments. As the framework evolves, it remains necessary to assess whether additional financial instruments or support mechanisms are required to accelerate uptake.

In addition, industrial electrification decisions hinge on lower operating expenses (OPEX) while running processes on electricity instead of fossil fuels. This depends to a large extent on the gap between electricity and gas prices, but also on other factors, such as flexibility.

Whilst many industries have limited flexibility potential, enhancing the industry's capacity to respond to dynamic price signals and participate in flexibility markets by managing energy consumption with operational flexibility can help reduce operational costs and create new revenue streams, while contributing to enhance the stability and reliability of the electricity system. Even industries that face challenges in adapting production can make investments to overcome them, such as data platforms, on-site batteries or heat storage. These additional assets can contribute to reduce the payback time of electrification investments.

The EU's 2024 Electricity Market Design reform has made important progress in promoting flexibility. It ensures market access for industry and aggregators, mandates national flexibility needs assessments, and opens capacity mechanisms to non-fossil flexible resources. It also strengthens the role of aggregators and promotes local flexibility markets to address grid constraints.

By 30 June 2026, the Commission is expected to review the Regulation. This provides an opportunity to assess whether additional measures are needed to further strengthen incentives for cost-effective industrial electrification and flexibility.

Key questions for the discussion

1. How can we best ensure the right framework for the electrification of industry so that we support the right incentives to invest and convert production, while simultaneously allowing them to respond to price signals and consume flexibly?
 2. Which sectors or industries present the greatest potential for rapid electrification and what specific measures should the Commission's future electrification strategy adopt to support industrial electrification?
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