

In collaboration with
Accenture



Industrial Electrification: Strategies and Policies for Europe

BRIEFING PAPER

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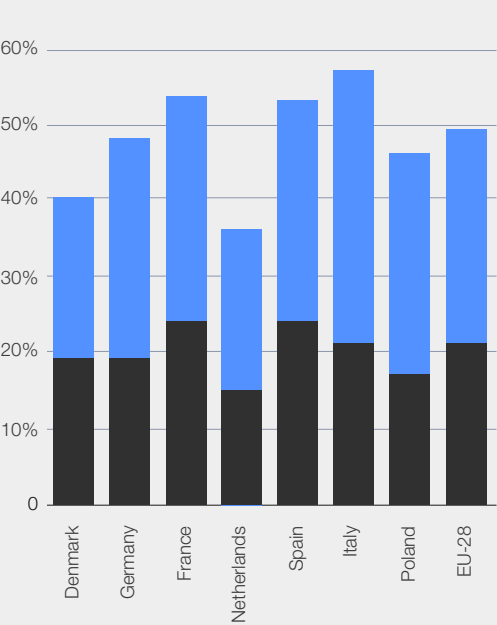
Introduction

Electricity’s share in final energy consumption is projected to rise from 20% today to over 50% by 2050 based on a net zero scenario.¹ Electrification offers a major opportunity to cut emissions and improve efficiency in industrial processes, especially low- to medium-heat processes (up to 500°C), which account for about half of all industrial carbon emissions.

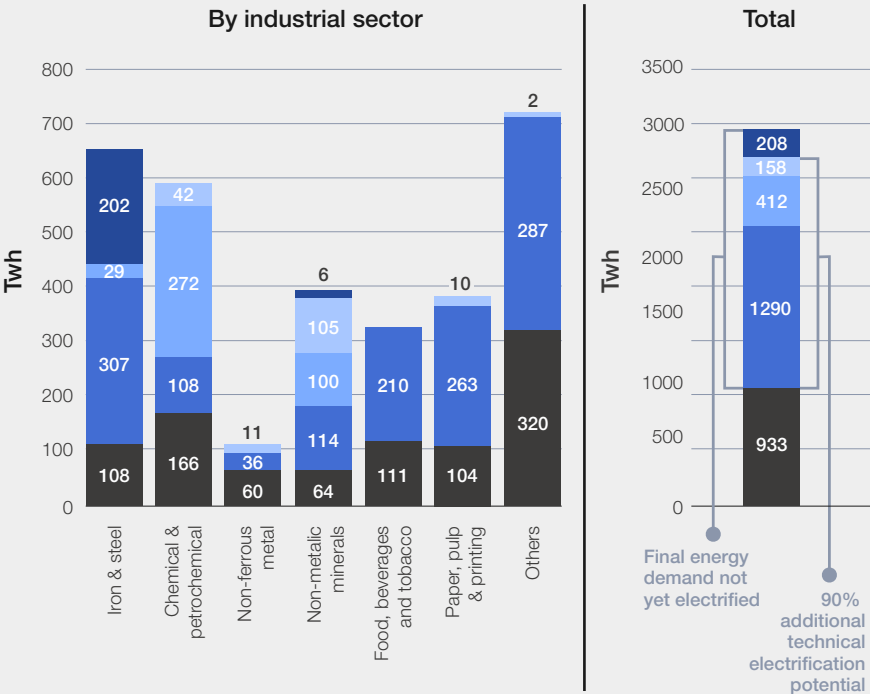
However, much of Europe’s industrial electrification potential remains untapped. Developing a clear and compelling business case will elevate the investment opportunity for business leaders, realizing the potential of electrification in different sectors (see Figure 1).

FIGURE 1 Comparison of realized electrification potential across various industries

Electrification penetration potential, by region (% of final energy demand)



Technical potentials for direct electrification in the EU-27 based on 2019 energy demand



● Already

● Electrification potential

● Electrification demand in 2019

● Electrification potential from 2025

● Remaining fuel demand

● Electrification potential from 2030

● Electrification potential from 2035

Source: Schneider Electric Sustainability Research Institute

Source: 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.

Through a series of multistakeholder dialogues facilitated by the World Economic Forum, several

key challenges were identified that risk impeding industrial electrification progress:



Clean power availability and price: Delays in accessing a reliable grid or system with sufficient capacity remain challenging. In addition, the uncertainty about electricity prices compared to other feedstock alternatives (e.g. natural gas, biogas, etc.) is highlighted as a key concern in decision-making for industrial electrification projects.



Limited financing support: High interest rates and lack of risk-sharing mechanisms make it difficult for businesses to secure funding for electrification projects against other alternatives with more immediate returns.



Risk aversion for new technologies: Industrial companies are reluctant to invest in newer, less proven technologies, as they are perceived as riskier due to limited case studies to validate their effectiveness or sufficient financial returns. With current assets having long lifecycles, upgrading before these assets near the end of their use is both challenging and costly, even if it promises improved efficiencies.

The Forum's dialogues focused on public-private collaboration, business and market enablers, and regulatory frameworks, resulting in nine actions and strategies to strengthen the business case for

industrial electrification. While these strategies are adapted for Europe, many could apply to other global markets (see Figure 2).

FIGURE 2

Strategies for improving the business and economic case for industrial electrification

Industrial Electrification Strategies and Policies for Europe



Public-private collaboration

1 Collaborate on shared regional vision and action plans across the value chain

2 Create integrated public funding and risk sharing models

3 Develop regional certified financial models for electrification investment



Business and market enablers

4 Support the development of a mature vendor and supplier ecosystem

5 Streamline access to private finance and investment support

6 Capture and expand markets for green products



Policy and regulatory

7 Consider advancing proposed revisions to the Energy Taxation Directive

8 Expand the Industrial Emissions Directive

9 Ensure EU Action Plan for Grids targets industrial electrification

1

Public-private collaboration strategies

Enhance collaboration on shared regional vision and action plans across the value chain

A shared regional vision among industrial electrification stakeholders could help accelerate the development of joint action plans and optimize demand, especially in the case of industrial clusters. For example, the public and the private could work together to set ambitious, yet achievable, electrification targets to meet climate goals.

Challenges addressed²



Clean power availability and price



Limited financing support



Risk aversion for new technologies

REPowerEU:³ The European Commission's REPowerEU plan calls for a significant increase in electrification, supported by the recent Wind Power Action Plan, which sets clear targets to enhance the investment landscape. The plan outlines 15 actions for EU Member States and industry. Following its release 21 EU countries and industry leaders committed to wind energy deployment targets for 2024-2026.⁴

Net Zero Basque Super Cluster (NZBSC):⁵ The Basque Business Development Agency is a signatory of the Forum's Transitioning Industrial Clusters initiative, which includes 23 clusters promoting cooperation between companies and governments. This collaboration enables scaling, resource-sharing and demand aggregation. Through a neutral forum, stakeholders co-develop strategies, optimize emissions solutions and build an integrated energy system that supports economic growth and the energy transition. To date, NZBSC has developed decarbonization roadmaps for industries such as oil refining, steel, cement, and pulp and paper, focusing on energy efficiency and green technologies driven by public-private collaboration.

FIGURE 3

Industry roadmaps created for Net Zero Basque Super Cluster

Roadmaps

In the initial phase the initiative will focus in the most relevant industries by GHG Emissions



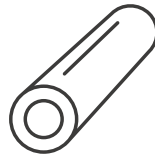
Oil refining

↓ Roadmap



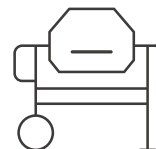
Foundry

↓ Roadmap



Steel

↓ Roadmap



Cement

↓ Roadmap



Pulp & paper

↓ Roadmap

Improve integrated public funding and risk-sharing models

Governments and the private sector could work together to scale funding mechanisms such as targeted grants, co-investment opportunities and low-cost financing options. These financial tools, while broadly applicable to various technologies, can mitigate investment risks and enable the adoption of electrified solutions with narrow project margins. In some cases, export credit agencies or multilateral development banks could play a role by providing additional financial support and risk mitigation.

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Examples

- **Public funding of green steel development:**⁶ Svenskt Stål AB, Luossavaara-Kiirunavaara Aktiebolag and Vattenfall created a joint venture to develop fossil-free steelmaking using hydrogen (HYBRIT). The project has received over €250 million in funding from the Swedish Energy Agency and the EU Innovation Fund. It is a model that could be replicated in other locations and for other technologies.
- **Energy savings insurance and standardized investment models:**⁷ The Basel Agency for Sustainable Energy (BASE) co-developed a new financial model with the Inter-American Development Bank (IDB) for electrification and efficiency. This includes rolling out an energy savings insurance programme, which enables companies to guarantee minimum project rates of return. This has been tested in Italy, Portugal and Spain with expansion to Croatia, Greece and Slovakia ongoing.

Advance the development of regional certified financial models for electrification investment

Standardized financial models and contracting templates tailored to electrification projects enable consistent assessment of return on investment by financiers, governments and developers, thereby accelerating time to final investment decisions. These tools include reference assumptions (e.g. energy prices, carbon costs, available grid capacity, supply chain risk) certified by governments and financial institutions.

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Examples

- **Scotland's Low-Carbon Infrastructure Transition Programme (LCITP):**⁸ Scotland's LCITP offers financial support for projects that contribute to low-carbon transition. The program includes templates for developing an investment-grade proposal, including calculation recommendations and baseline assumptions for estimating carbon impact.
- **European Hydrogen Observatory – Levelized Cost of Hydrogen Calculator:**⁹ The calculator offers a tool for assessing the cost of hydrogen production across 27 EU countries, Norway and the UK. By using default or user-specified values for various electricity sources (wholesale, PV, onshore wind, offshore wind), the tool provides insights into the economic feasibility of hydrogen projects by considering regional energy prices and technologies.

Business and market enablers

Support the development of a mature vendor and supplier ecosystem¹⁰

Developing a collaborative supplier ecosystem can benefit both industrial companies and equipment suppliers (including manufacturers and installation/maintenance services providers). Industrial companies can gain insight into advanced electrification technologies and trusted suppliers, enabling more informed investment and procurement decisions. At the same time, suppliers can gain market clarity for low-to-medium processes where bespoke installations are required, while better tailoring their offering by understanding demand volume, location and timing to ensure timely availability of equipment and services. Such a collaboration can foster new partnerships, expand and strengthen supply chains, establish design and installation standards, and reduce costs through economies of scale.

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Examples

- **L&G and Octopus Energy Investment in Kensa Group:**¹¹ Legal & General Capital and Octopus Energy invested in the Kensa Group, a manufacturer of ground-source heat pumps. This investment supports production expansion and aims to increase the installation of ground-source heat pumps to 50,000 units per year by 2030.
- **Iberdrola investing in heat storage technology from Kyoto Group:** Iberdrola joins the Kyoto Group as a strategic investor and business partner in an alliance to accelerate the decarbonization of heat in industrial processes with Heatcube, Kyoto's thermal energy storage solution.

Streamline access to private finance and investment support

To address high upfront capital costs associated with electrification projects, strategies such as blended finance, off-balance sheet instruments and heat/energy-as-a-service (HaaS/EaaS) models could be used. These financial tools can also attract additional infrastructure investors and public sources, facilitating access to previously unattainable commercial debt. By adopting these approaches, projects can optimize their financial structures and reduce investment risks.

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Examples

- **Catalyse blended financing – Pentagreen Capital:**¹² A joint venture between HSBC and Temasek, Pentagreen Capital is a debt financing platform dedicated to accelerating the development of sustainable infrastructure in South-East Asia. The venture aims to finance projects that might not have access to traditional financing and provides risk mitigation for both project developers and financiers.
- **Enel X's offering portfolio is focused on power supply throughout innovative solutions as enablers to consumption electrification:**¹³ EaaS solutions allow businesses to outsource energy management and infrastructure investment, sustain electrification path of clients and help companies manage high upfront costs by providing energy services through a subscription-based model.

Capture and expand markets for green products

Businesses adopting decarbonization solutions, including clean electrification, can position their products as green and potentially capture a “green premium” to offset the deployment costs of low-emitting technologies and projects. Achieving this requires supply chain transparency and traceability, as well as the cultivation of the right customer base. Governments and industry bodies can accelerate this further through the endorsement of green standards and procurement of cleaner products.

Challenges addressed



Clean power
availability and price



Limited financing
support



Risk aversion for
new technologies

Examples

- **EU Green Public Procurement:**¹⁴ The European Union’s Green Public Procurement (GPP) criteria set standards for purchasing green products and services, including energy-efficient technologies. By aligning procurement practices with environmental goals, the GPP provides a significant market for companies offering sustainable solutions, driving innovation and adoption.
- **SteelZero¹⁵ and ConcreteZero¹⁶ initiatives:** The Climate Group’s SteelZero (launched in 2020 with ResponsibleSteel) and ConcreteZero (started in 2022 with WBCSD and World GBC) involve partnerships with 25 and 22 companies, respectively. These initiatives focus on advancing the use of net-zero steel and net-zero emission concrete in construction.



Regulatory ideas for Europe

Recent political guidelines published by European Commission President Ursula von der Leyen include multiple references and provisions that could advance electrification efforts, including an Industrial Decarbonization Accelerator. The following incremental measures would further strengthen the business case for electrification:

Consider advancing proposed revisions to the Energy Taxation Directive

Initially proposed by the European Commission in 2021, revisions to the EU Energy Taxation Directive are currently under consideration. The proposed changes would impose taxes on fuel based on their energy efficiency and environmental impact rather than their volume. The taxation could prioritize minimizing taxes on electricity compared to other fuels and energy carriers. While these proposals have yet to be adopted, this approach could enhance the competitiveness of electrification over carbon-intensive alternatives. It could also eliminate the currently existing double taxation on stored electricity¹⁷ and incentivize electrification as a means to avoid higher taxes on carbon-intensive fuel.

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Expand the Industrial Emissions Directive

The current Industrial Emissions Directive,¹⁸ which mandates the adoption of Best Available Technologies (BAT) to meet regulatory limits on industrial pollution, could be extended to include a broader range of electrification technologies. This expansion could go beyond the current focus on

heat pumps for heat recovery (currently mentioned only for waste incineration¹⁹ and food, drink and milk industries²⁰).

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Ensure EU Action Plan for Grids targets industrial electrification

Current approaches to energy system development will be increasingly challenged to accommodate the rising load from electrification. The EU's Grid Action Plan, launched in 2023, could be leveraged to help facilitate industrial electrification alongside the necessary grid expansion and optimization. In implementing this plan, the European Commission should collaborate closely with industry stakeholders to ensure it meets their electrification needs, particularly in long-term grid planning (Action 2), smart and efficient grid innovation (Action 7) and grid tariffs that incentivize electrification (Action 8).

Challenges addressed



Clean power availability and price



Limited financing support



Risk aversion for new technologies

Conclusion

Implementing the actions outlined in this paper will strengthen the business case for industrial electrification, addressing key challenges and

driving rapid decarbonization while unlocking significant investment opportunities.

TABLE 1 Industry electrification strategies to address core challenges in Europe

	Action/strategy	Clean power availability and price	Limited financing support	Risk aversion for new technologies
Public-private partnerships 	1 Collaborate on shared regional vision and action plans across the value chain	✓	✓	✓
	2 Create integrated public funding and risk-sharing models		✓	
	3 Develop regional certified financial models for electrification investment	✓		
Business and market enablers 	4 Support the development of a mature vendor and supplier ecosystem			✓
	5 Streamline access to private finance and investment support		✓	
	6 Capture and expand markets for green products		✓	
Regulatory ideas for Europe 	7 Consider advancing proposed revisions to the Energy Taxation Directive	✓		
	8 Amend the Industrial Emissions Directive			✓
	9 Ensure EU Action Plan for Grids targets industrial electrification	✓		

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