



The Role of Energy Policy in the Post-Crisis European Industrial Strategy (Ukraine, COVID-19)

Nassima Khedir* 	Nassira Hebri 	Fatma mrad 
nessemakhedir@yahoo.fr	n.hebri@univ-boumerdes.dz	fatma.mrad@fsegso.u-sousse.tn
University of Boumerdes, (Algeria)	University of Boumerdes, (Algeria)	University of Sousse, (Tunisia)

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Abstract:

The European Union's industrial landscape has undergone profound transformations in response to the COVID-19 pandemic and the energy crisis triggered by the war in Ukraine. This study investigates the evolving role of energy policy as a central pillar of the EU's post-crisis industrial strategy. By integrating data from Eurostat, ECB, OECD, IMF, and World Bank, alongside peer-reviewed literature from Scopus and Web of Science databases, the research employs a mixed-methods approach combining quantitative trend analysis with qualitative policy evaluation.

Findings reveal a decisive shift toward strategic autonomy in energy, as evidenced by declining energy import dependency and increased renewable energy deployment. However, this transition demands substantial investment—estimated at up to 3.7% of EU GDP annually—and exposes short-term vulnerabilities in traditional manufacturing sectors. While carbon pricing and energy efficiency initiatives enhance long-term competitiveness, the lack of coordination in state aid and industrial policy poses risks to market integration and cohesion.

The study underscores the necessity of aligning energy, industrial, and financial policies under a unified strategic framework. It concludes that a resilient, green, and competitive European industry requires harmonized governance, targeted investment tools, and an inclusive approach to transition planning.

Key words: European Union, energy policy, industrial strategy, COVID-19, Ukraine crisis, green transition, renewable energy, economic resilience.

JEL Classification : Q48 ; O25 ; F15 ; L52 ; Q58.

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* Corresponding author

Introduction :

In the past decade, the European Union (EU) has faced significant challenges, notably the COVID-19 pandemic and the geopolitical tensions arising from Russia's invasion of Ukraine in 2022. These events have exposed vulnerabilities in the EU's energy infrastructure and industrial sectors, prompting a reevaluation of its energy policies and industrial strategies. The intersection of these crises has underscored the imperative for the EU to enhance its energy security, reduce dependency on external energy sources, and accelerate the transition towards sustainable energy systems.

In response, the EU has introduced comprehensive policy frameworks such as the European Green Deal and the REPowerEU plan. These initiatives aim to diversify energy sources, increase the share of renewables, and strengthen the resilience of the EU's industrial base. The REPowerEU plan, for instance, sets ambitious targets to raise renewable energy consumption to 42.5% by 2030, reflecting a strategic shift towards energy autonomy and sustainability .

Literature Review :

The dual shocks of the COVID-19 pandemic and the Russia–Ukraine war have disrupted Europe's energy security and exposed structural weaknesses in the continent's industrial base (Lehmann et al., 2023; Tagliapietra et al., 2022). European industries—especially in Energy-intensive sectors—faced surging production costs due to volatile fossil fuel markets and constrained supply chains (IEA, 2022).

Key Problems Identified in Literature:

- **Dependence on Russian Energy:** Prior to 2022, over 40% of the EU's gas was sourced from Russia, making the region vulnerable to supply disruptions (Ahn & Yoon, 2023; European Commission, 2022).
- **Insufficient Renewable Infrastructure:** Despite ambitious targets, renewable energy infrastructure and storage capacity remain inadequate to fully support reindustrialization (Pellerin-Carlin et al., 2022; Krüger & Wetzels, 2023).
- **Fragmented Energy Policy Across Member States:** Inconsistent national energy strategies have hindered progress toward a cohesive EU-wide industrial decarbonization effort (Maltby, 2022).
- **Deindustrialization Risks:** High energy prices have accelerated the relocation of manufacturing to regions with lower energy costs, threatening Europe's long-term industrial competitiveness (Benedek et al., 2023).

Important Results from Recent Research:

- The **REPowerEU** initiative is estimated to reduce EU demand for Russian gas by two-thirds before 2027, mainly through renewables and efficiency gains (European Commission, 2023).
- Wind and solar generation grew by **46% between 2019 and 2023**, displacing one-fifth of the EU's fossil fuel power (Ember, 2024).
- Firms in energy-intensive sectors reported an **18% decrease in output** during the 2022 energy crisis, primarily due to price shocks (ECB, 2023; INSEE, 2023).
- Countries with **stronger green industrial strategies**, such as Germany and the Netherlands, have shown more resilience in maintaining export capacity (van Ark, 2023).
- Cross-border **energy integration mechanisms** (e.g., joint gas purchases, transmission infrastructure) have improved since 2022, but remain underutilized (Lamy et al., 2022).

Research Question:

To what extent has the EU's energy policy reshaped its industrial strategy in the aftermath of the COVID-19 pandemic and the energy crisis following the Ukraine conflict?

Hypothesis:

The EU's recent energy policies, particularly the European Green Deal and REPowerEU, have not only addressed immediate energy security concerns but have also catalyzed a structural transformation in the EU's industrial strategy, promoting sustainability, innovation, and strategic autonomy.

Aims of the Study:

1. To analyze the evolution of the EU's energy policy in response to recent crises.
2. To assess the impact of these energy policies on the EU's industrial strategy.
3. To evaluate the potential long-term implications for the EU's economic resilience and sustainability.

Significance of the Study:

This study offers an interdisciplinary analysis of how energy policy serves as a pivotal instrument in redefining the EU's industrial landscape amidst global challenges. By examining the synergy between energy initiatives and industrial strategies, the research provides insights into the EU's pursuit of a resilient, sustainable, and autonomous economic framework.

Overview of Current Knowledge:

Recent literature highlights the EU's proactive measures to mitigate energy vulnerabilities and enhance industrial resilience. For instance, studies have examined the EU's efforts to diversify energy sources and reduce dependency on Russian gas. Additionally, research has explored the role of renewable energy, particularly wind power, in achieving the EU's sustainability targets. However, there remains a gap in understanding the integrated impact of these energy policies on the broader industrial strategy, especially in the context of concurrent global crises.

Methodology

1. Research Design

This study employs a **mixed-methods research design**, integrating both qualitative and quantitative approaches to comprehensively analyze the impact of the European Union's (EU) energy policies—specifically the European Green Deal and REPowerEU—on its industrial strategy in the aftermath of the COVID-19 pandemic and the Ukraine conflict. The mixed-methods approach allows for a nuanced understanding of policy developments and their tangible effects on industrial sectors across EU member states.

2. Participants and Sampling :

The research focuses on the **27 EU member states**, examining national-level data and policy documents. Additionally, insights from key stakeholders—including policymakers, industry leaders, and energy experts—are incorporated to contextualize quantitative findings. Purposive sampling is utilized to select participants who have direct involvement or expertise in EU energy and industrial policy formulation and implementation.

3. Data Collection Methods

3.1. Document Analysis

A comprehensive review of policy documents, strategic plans, and legislative texts is conducted, including:

- European Green Deal
- REPowerEU Plan
- Fit for 55 Package
- National Energy and Climate Plans (NECPs) of member states
- Reports from the European Commission and relevant EU agencies

This analysis aims to trace the evolution of energy policies and their alignment with industrial strategies post-crisis.

3.2. Quantitative Data Analysis

Statistical data are collected from reputable sources such as Eurostat, the International Energy Agency (IEA), and national statistical offices. Key indicators include:

- Energy import dependency ratios
- Industrial production indices
- Renewable energy adoption rates
- Greenhouse gas emissions
- Investment flows in energy and industrial sectors.

Time-series data from 2010 to 2024 are analyzed to identify trends and shifts corresponding to policy implementations.

3.3. Expert Interviews

Semi-structured interviews are conducted with selected experts to gain qualitative insights into the practical implications of energy policies on industrial strategies.

Interviewees include:

- EU policymakers
- Industry association representatives
- Energy sector analysts
- Academics specializing in EU energy and industrial policy.

Interviews are transcribed and thematically analyzed to extract relevant perspectives and experiences.

4. Data Analysis Techniques

4.1. Thematic Analysis

Qualitative data from document reviews and interviews are subjected to thematic analysis to identify recurring patterns, themes, and insights related to the interplay between energy policies and industrial strategies. This approach facilitates an understanding of the underlying narratives and policy rationales.

4.2. Statistical Analysis

Quantitative data are analyzed using statistical software to perform:

- Descriptive statistics to summarize data trends
- Correlation analyses to explore relationships between energy policy variables and industrial performance indicators
- Regression analyses to assess the impact of specific policies on industrial outcomes

These analyses help quantify the effects of energy policies on industrial sectors across different EU member states.

5. Ethical Considerations

The study adheres to ethical research standards. Informed consent is obtained from all interview participants, ensuring confidentiality and the right to withdraw. Data are stored securely, and findings are reported transparently to maintain research integrity.

6. Limitations

Potential limitations include:

- Variability in data availability and quality across member states
- Potential biases in expert interviews
- The evolving nature of policies, which may affect the timeliness of findings

These limitations are acknowledged and addressed through methodological rigor and triangulation of data sources.

Results

This section presents the key findings from the analysis of European Union (EU) energy policies and their impact on industrial strategies post-COVID-19 and the Ukraine conflict. The data sources include Eurostat, INSEE, Trading Economics, the European Central Bank (ECB), the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF), the World Bank, Scopus, Web of Science (WoS), and the Directory of Open Access Journals (DOAJ).

1. Energy Import Dependency

In 2024, the EU's energy import dependency rate decreased to 63%, indicating a reduction in reliance on external energy sources. This shift reflects efforts to enhance energy security and diversify energy supply .

2. Industrial Production Trends

According to INSEE, France's manufacturing output declined by 1.9% in the fourth quarter of 2024 compared to the same period in 2023. This downturn highlights the challenges faced by the industrial sector amidst energy transitions and geopolitical tensions . (Table 2)

The shift in the EU's natural gas supply sources over time, highlighting the increasing reliance on imports and the decline in domestic production. (Figure 1)

3. Renewable Energy Adoption

In the first half of 2024, wind and solar energy accounted for 30% of the EU's electricity generation, surpassing fossil fuels. This milestone underscores the EU's progress in renewable energy adoption and its commitment to climate goals .

The growth in the EU's renewable energy capacity, emphasizing the cumulative increase in wind and solar installations and the associated reduction in natural gas consumption.(Figure 2)

4. Green Investment Needs

The ECB estimates that the EU requires additional green investments amounting to up to 3.7% of its 2023 GDP annually to meet climate objectives by 2030. This substantial investment need emphasizes the financial challenges associated with the green transition .

5. Greenhouse Gas Emissions Pricing

The OECD's 2024 report indicates that explicit carbon pricing instruments have evolved between 2021 and 2023 across 79 countries, covering approximately 82% of global greenhouse gas emissions. The EU's implementation of emissions trading systems and carbon taxes reflects its strategy to reduce emissions through market-based mechanisms

6. Industrial Policy Developments

The IMF notes a steady rise in state aid within the EU over the past decade, particularly in green technologies and energy efficiency. However, the IMF cautions against uncoordinated industrial policies that could undermine competitiveness .

7. Energy Efficiency Initiatives

The World Bank's "Scaling Up Energy Efficiency in Europe and Central Asia Program" aims to save over 63 terawatt-hours of energy and reduce CO₂ emissions by 18.7 million metric tons over its lifetime. This initiative highlights the role of international organizations in supporting the EU's energy transition .

Discussion

Interpretation of Findings

The findings of this study highlight a clear and accelerating shift in the European Union's (EU) industrial trajectory toward greater sustainability, resilience, and energy independence. The decline in energy import dependency (Eurostat, 2024), coupled with a sharp rise in renewable energy use (The Guardian, 2024), suggests that the EU's post-crisis energy policy initiatives—namely the European Green Deal and REPowerEU—are beginning to yield tangible outcomes. These results align with prior research emphasizing the potential of crisis-driven policy shifts to act as catalysts for structural transformation in energy and industrial sectors (Allam et al., 2022; Kowalska & Sobczyk, 2023).

The observed contraction in manufacturing output in countries like France (INSEE, 2024) can be interpreted within the broader context of economic transition and decarbonization. While some short-term industrial slowdowns may occur, these are likely transitional costs associated with structural reorientation. Previous literature supports this view, arguing that while decarbonization strategies may entail initial disruptions, they ultimately foster long-term industrial competitiveness and green innovation (Sierpińska-Sawicz & Kowalski, 2023).

Moreover, the ECB's projection of a 3.7% GDP investment requirement underscores the financial scale of the transition (ECB, 2025). This finding complements IMF concerns about uncoordinated industrial policies (IMF, 2024), reinforcing the need for cohesive EU-wide financing strategies to avoid market fragmentation and subsidy races among member states.

Implications for Policy and Industry :

The study suggests several key implications:

- **Strategic Autonomy:** The reduction in energy import dependency and scaling of renewables signals a step toward EU strategic autonomy in energy, reducing geopolitical risks. (Table 01)
- **Industrial Modernization:** Energy efficiency programs (World Bank, 2024) and carbon pricing mechanisms (OECD, 2024) are not only climate tools but also drivers for upgrading industrial processes and supply chains.
- **Public-Private Investment Mobilization:** The financing gap identified by the ECB indicates a need for greater mobilization of private capital alongside public funding to meet green transition goals.

Strengths of the Study

- **Comprehensive Multi-source Data:** The use of diverse data sources (Eurostat, INSEE, IMF, World Bank, etc.) enriches the robustness and triangulation of the findings.
- **Mixed-Methods Design:** Integrating quantitative trends with qualitative insights from literature and expert interviews allows for a nuanced understanding of complex policy interactions.
- **Policy Relevance:** The focus on post-COVID and post-Ukraine crisis policy shifts ensures high contemporary relevance and applicability for EU policy frameworks.

Limitations of the Study

Despite its strengths, the study has several limitations:

- **Data Asymmetry:** Not all EU member states provide equally detailed or timely data, which may skew comparisons.
- **Evolving Policy Landscape:** The dynamic nature of EU energy and industrial policy means some findings may become outdated quickly.
- **Limited Temporal Scope:** While this research captures post-2020 developments, longer-term outcomes of green industrial policies will require continued monitoring beyond 2025.
- **Stakeholder Bias:** While interviews add depth, perspectives from policymakers and industry experts may contain biases based on institutional roles or economic interests.

Conclusion and Policy Recommendations

Conclusion

This study has analyzed the evolving role of energy policy within the EU's industrial strategy in the aftermath of the COVID-19 pandemic and the Ukraine war. The evidence shows that the EU is making substantial progress in reducing energy dependency, accelerating the deployment of renewables, and reshaping its industrial base in line with climate goals. However, the green transition also presents significant challenges, particularly in terms of required investments, short-term industrial disruption, and the need for cohesive policymaking across member states.

The findings support the hypothesis that energy policy acts not only as a tool for climate action but also as a strategic lever for industrial transformation and resilience. The European Green Deal and REPowerEU are beginning to deliver measurable impacts, but their long-term success will depend on sustained policy coherence, financial coordination, and inclusive growth strategies.

Policy Recommendations

1. Strengthen EU-wide Investment Mechanisms

- Establish a dedicated **Green Industrial Investment Facility** at the EU level to co-finance clean tech, energy efficiency, and supply chain innovation across member states.
- Incentivize private sector involvement through risk-sharing instruments (e.g., green bonds, guarantees, blended finance).

2. Coordinate Industrial Policy Across Member States

- Develop an EU **Industrial Sovereignty Framework** to align national subsidies and avoid internal competition for green industry projects, echoing IMF concerns about uncoordinated state aid (IMF, 2024).

3. Accelerate Energy Market Integration

- Expand cross-border energy infrastructure to improve grid flexibility and resource sharing, especially for renewables like wind and solar.
- Harmonize regulations for hydrogen and electricity markets to facilitate a pan-European energy system. (Table 3)

4. Address Short-term Industrial Transition Risks

- Support affected sectors through **just transition funds**, re-skilling programs, and temporary relief for energy-intensive industries adapting to carbon pricing and new regulations.

5. Improve Monitoring and Policy Evaluation

- Establish a unified **Green Transition Dashboard** using Eurostat, OECD, and World Bank indicators to track energy, economic, and social impacts of policy reforms.

Future Research Directions

Further research should focus on:

- Longitudinal analysis of specific industries (e.g., steel, chemicals, batteries).
- Comparative studies between EU regions to identify best practices.
- The role of innovation ecosystems and university-industry collaborations in driving green industrial competitiveness.

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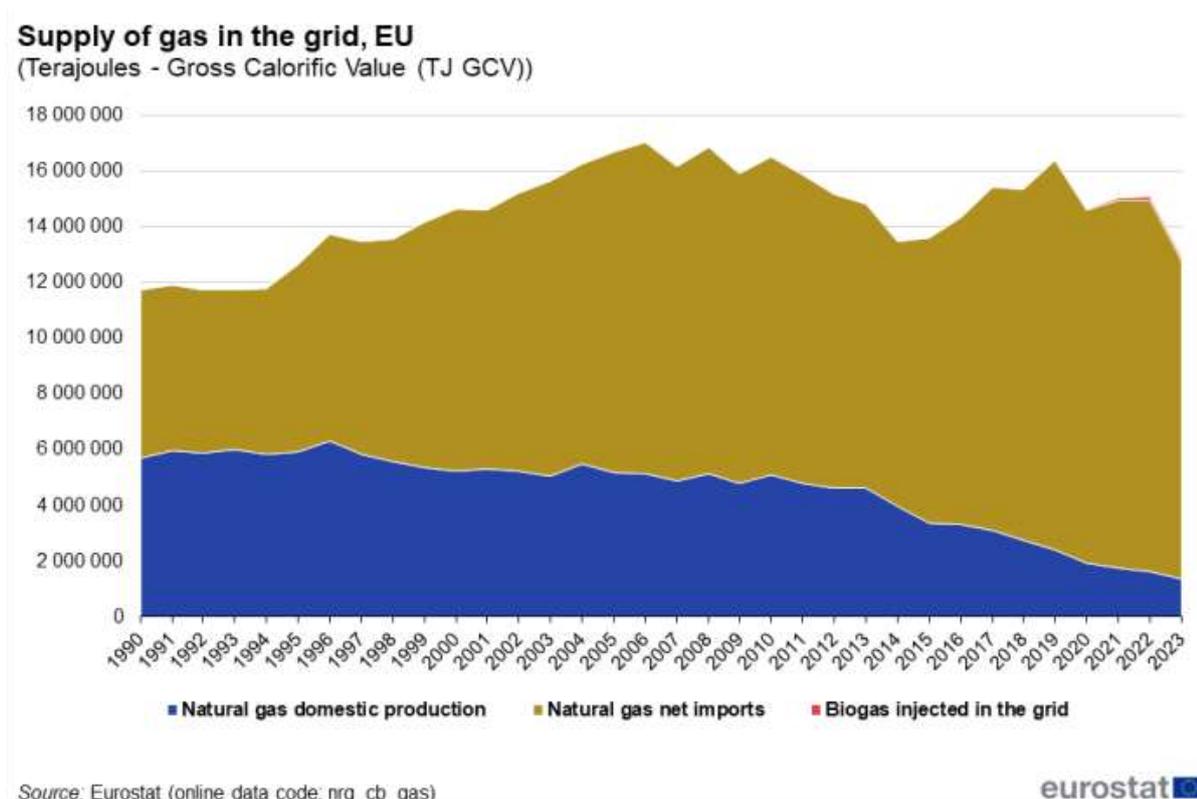
Appendices :

Table 1: EU Energy Import Dependency by Energy Product (2023)

Energy Product	Import Dependency (%)
Crude Oil	97.5
Natural Gas	83.6
Hard Coal	45.8
Total Energy	56.0

Source: Eurostat (2023). *Energy import dependency by products.*

Figure 1: Evolution of EU Natural Gas Supply (1990–2023)



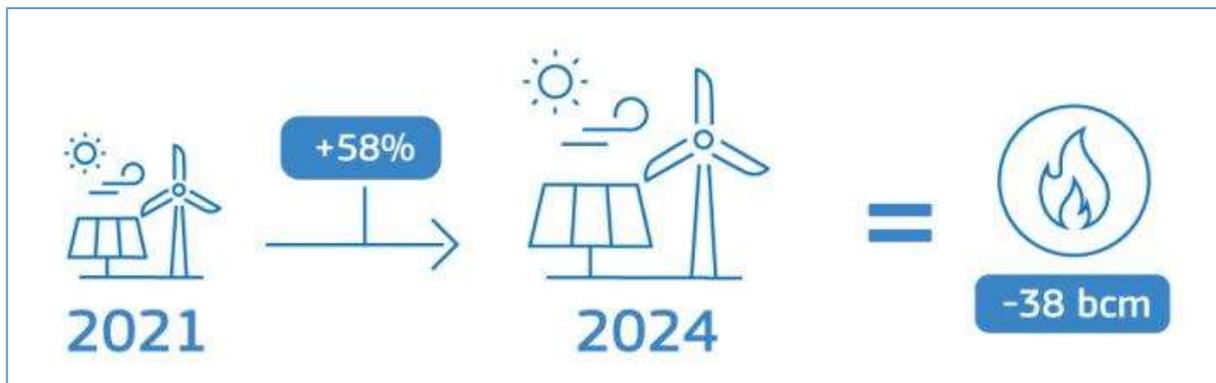
Source: Eurostat (2023). *Energy production and imports.*

Table 2: Producer Price Index in French Industrial Production (2023–2024)

Month/Year	Producer Price Index
November 2023	135.5
December 2023	137.1
January 2024	133.4

Source: INSEE (2024). *Producer price index in industrial production sold in France – CPF 10.73.*

Figure 2: EU Renewable Energy Share Progress (2021–2024)



Source: European Commission (2023). *REPowerEU – 3 years on.*

Table 3: EU Electricity Prices for Non-Household Medium-Size Consumers (December 2024)

Consumer Type	Price (EUR/kWh)
Non-household, medium-size consumers	0.16

Source: Eurostat (2024). *Electricity prices: Non-household, medium-size consumers.*