

The impact of crises on energy prices (2021-2023)

European Union Case

Agram Insaf , Rahal Fatma

¹ Mohamed khaidar University Biskra (Algeria), Lab.Fbm. insaf.agram@univ-biskra.dz

² Mohamed khaidar University Biskra (Algeria), Lab.Fbm. f.raham@univ-biskra.dz

Received: 23/10/2024

Accepted: 16/12/2024

Published: 22/12/2024

Abstract:

The 2021-2023 energy crises demonstrated how global events impact energy pricing. COVID-19 caused initial drops in energy demand, followed by a rapid price surge during economic recovery, worsening energy poverty in the EU. The Russia-Ukraine conflict further disrupted supply chains, highlighting Europe's dependence on Russian energy. The crisis drove inflation, hindered GDP growth, and strained public finances. Despite post-2022 price declines, long-term challenges remain for the EU's energy autonomy and economic competitiveness. The push toward renewables faces obstacles, such as reliance on critical minerals, mainly from China, complicating the balance between affordability, security, and sustainability.

Keywords: Energy crisis; Geopolitical tensions; Energy poverty; Inflation; Energy security.

JEL Classification Codes: Q41, Q43, Q48

1. INTRODUCTION

The energy crisis that began in 2022 exposed weaknesses in the European Union's (EU) energy system, triggering a mix of political and environmental concerns. The sudden rise in energy costs, driven by conflicts and dependence on fossil fuels, led to high inflation rates and larger public deficits, complicating fiscal policies among EU countries.

As nations grapple with the economic fallout of the crisis—affecting people's earnings and global economic progress—there has been a renewed push to embrace renewable energy as part of a broader shift. This transition is essential for ensuring long-term sustainability and requires adequate funding and well-thought-out policies to enhance energy reliability while reducing dependence on volatile fossil fuel markets.

In this context, it's crucial to understand the crisis's impacts on inflation rates, GDP growth, government finances, and the transition to alternative energy sources, as these factors will shape the EU's future energy landscape.

Problem of the Study

How have the COVID-19 pandemic and the Russia-Ukraine conflict impacted energy prices and market stability ?

Study Objectives

1. Analyze Historical Trends: Examine historical data on energy prices during the COVID-19 pandemic and the Russia-Ukraine conflict to identify patterns and impacts on global energy markets.
2. Evaluate Geopolitical Impacts: Investigate how geopolitical events have influenced energy supply chains, pricing dynamics, and market stability.
3. Assess Socio-Economic Effects: Explore the implications of rising energy prices on energy poverty, particularly in vulnerable populations within the EU.
4. Identify Policy Gaps: Assess the effectiveness of current energy policies in addressing price volatility and security concerns, and identify areas for improvement.
5. Promote Sustainable Transition: Investigate the role of renewable energy adoption in mitigating future crises and enhancing energy resilience.

6. Propose Recommendations: Develop actionable recommendations for policymakers to strengthen energy security and support a sustainable energy

2. Historical Context

Analyze the historical context of the energy crises from 2021 to 2023 to understand their impact on energy prices. During this period, wholesale gas and electricity prices reached sustained high levels that had not been seen since the establishment of European gas and electricity spot markets.

2.1 Covid 19 pandemic crisis

The COVID-19 pandemic sparked a global crisis, profoundly impacting economies and societies worldwide. By the end of 2020, the virus had infected over 84 million individuals, with a mortality rate of 2.2% (Hoang, 2021). The pandemic brought about considerable disruptions, including:

- Stock market declines of more than 25% in March 2020.
- Widespread business closures and a surge in unemployment.
- A sharp decline in travel and tourism, alongside interruptions to educational systems.
- Overburdened healthcare systems facing critical shortages of medical supplies.

Indirect Impacts of COVID-19

In addition to its direct health consequences, the pandemic has also caused considerable indirect effects (Jacques, 2023):

- **Mental Health Issues:** A notable increase in levels of anxiety, depression, and psychological distress has been observed globally.
- **Inequalities:** The pandemic has further exacerbated existing societal inequalities, disproportionately impacting vulnerable populations.

Global Economic Impact

The COVID-19 pandemic led to the most significant global recession in nearly a century (Vicente Javier Clemente-Suárez - ORCID, Eduardo Navarro-Jiménez - ORCID, Libertad Moreno-Luna, 2021):

- - A decline in GDP, along with a rise in inequality and poverty.
- -A global economic downturn of -3.5% in 2020, with advanced economies experiencing the most severe impact.

Energy Sector Impact

- **Disruptions:** The energy sector faced diminished demand due to travel and production restrictions, resulting in a decline in oil, gas, and coal consumption.
- **Renewable Energy Growth:** The crisis propelled the transition to renewable energy, with an impressive 300 GW of renewable capacity added worldwide in 2022.
- **Energy Poverty:** The pandemic intensified energy poverty, with millions of households in the EU struggling to afford adequate heating or cooling.

2.2 Russia-Ukraine War

The conflict between Russia and Ukraine significantly affected global energy markets:

- **Energy Supply:** Russia's long-standing supply of oil and gas to the EU was disrupted, raising concerns about energy security in Europe.
- **Hybrid Warfare:** Russia has employed both conventional military force and hybrid warfare tactics (Jerneck, 2007), combining military operations with cyberattacks and disinformation.

Impact on Energy Prices

- **Energy Price Surge:** The Russian invasion of Ukraine in 2022 led to a sharp increase in global energy prices, with crude oil and natural gas prices skyrocketing.
- **EU's Response:** The EU sought to reduce its dependence on Russian energy, with plans to cut Russian gas imports by two-thirds by the end of 2022.

Current Events: Energy Prices

The energy crisis, triggered by COVID-19 and exacerbated by the Russia-Ukraine war, has caused significant price volatility in global markets (Ellingsund, 2023):

- **Factors Driving Gas Prices:** Disruption of Russian gas exports, sanctions, and supply-demand imbalances contributed to the energy price surge.
- **Outlook:** While energy prices are expected to stabilize by 2024, political and market factors may continue influencing volatility. The long-term transition to renewable energy could further reshape energy pricing.

3. Current events: Energy prices

3.1 Energy Sector Disruptions

The energy sector has experienced significant disruptions in recent years, primarily due to the COVID-19 pandemic and the global energy crisis initiated by Russia's invasion of Ukraine. These events have resulted in considerable volatility in fuel and electricity prices, affecting both producers and consumers. In response, policymakers have implemented various measures to address immediate challenges and future vulnerabilities, while also highlighting the importance of transitioning to clean energy to combat climate change.

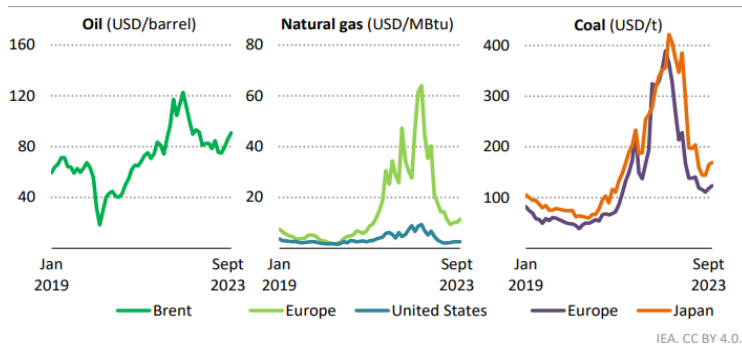
3.2 Gas Price Drivers

The ongoing crisis has particularly impacted European natural gas prices, driven by disruptions in Russian gas exports, sanctions against Russia, and a global supply-demand imbalance. The energy crisis of 2021-2022 was primarily caused by the decreased supply of fossil fuels, particularly natural gas, from Russia, rather than a transition to renewable energy sources.

Title : The impact of crises on energy prices (2021-2023) **European Union Case**

Additionally, climatic factors further... strained energy markets, further

Figure 1 prices for oil, natural gas and coal, January 2019 to September 2023
World Energy Outlook IEA



World Energy Outlook IEA

intensifying price increases. The ongoing global crisis, worsened by events such as Russia's invasion of Ukraine, has resulted in notable volatility and surges in energy prices, especially for natural gas in European markets.

Several factors influenced gas prices:

The disruption of Russian gas exports to Europe: The war in Ukraine disrupted the flow of Russian gas to Europe, raising concerns about the security of supply.

1. The imposition of sanctions on Russia: The sanctions imposed on Russia made it more difficult for European countries to import Russian gas.
2. The global supply-demand imbalance: The global supply of natural gas was already tight before the war, and the conflict exacerbated this imbalance.

The extreme volatility in natural gas prices during the summer of 2022 stemmed from supply-demand dynamics, political uncertainties, and market behaviors. While energy prices are anticipated to decrease slightly in 2024, they are likely to remain above pre-pandemic levels, affecting the euro area's economy and competitiveness. These rising energy prices could have negative effects on productivity in energy-intensive sectors, but they may also present opportunities for improved energy efficiency and a quicker transition to green energy.

Figure 2 household retail price for gas and electricity EU average

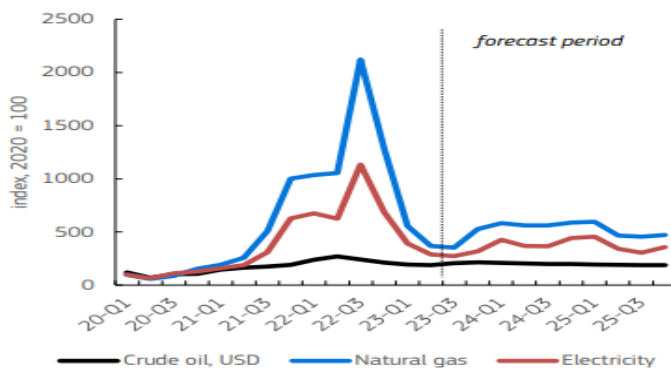


Source World Energy Outlook IEA

3.3 Euro Area Vulnerability

Ultimately, the euro area's heavy dependence on energy imports makes it susceptible to price fluctuations, contributing to a significant decline in its external balance in 2022 and marking a substantial shift in its current account dynamics.

Figure 3 Energy prices



Source World Energy Outlook IEA

The euro area's heavy reliance on energy imports makes it vulnerable to fluctuations in energy prices. This dependency was the main reason behind the sharp decline in the euro area's external balance in 2022. In 2020 and

2021, a drop in demand followed by a substantial rebound led to a brief decline in the euro area's current account, which was subsequently followed by a rapid recovery (see Figure 3). The tourism sector was particularly hard hit, negatively affecting exports from countries that depend on tourism until late 2022.

However, in 2022, the changes were much more pronounced, with the euro area's current account experiencing a significant drop and recording a deficit for the first time. Both energy and non-energy goods balances showed considerable declines, but it was the drastic reduction in energy balances—following a steep increase in energy prices—that primarily caused this outcome. This situation underscores the euro area's vulnerability as an energy importer, especially concerning gas imports.

4 Economic impacts:

Rising energy prices exert a profound influence on multiple economic facets, particularly inflation, GDP, and household income. A prime example of this is the UK's ongoing cost of living crisis, which has been largely ignited by surging energy prices. These escalating costs have severely strained household budgets, tightening the financial belts of families and leading to broader inflationary pressures throughout the economy. As energy expenses climb, businesses, compelled to maintain profit margins, frequently pass these costs onto consumers. This process drives up the overall prices of goods and services, creating a cycle that exacerbates inflation and reduces consumer purchasing power. The current energy crisis has laid bare the vulnerabilities within the European Union's (EU) energy system, underscoring a critical need for strategic energy autonomy across the sector. This crisis, however, is not just a tale of challenges; it has also proven the EU's resilience in weathering external shocks and managing their repercussions effectively (Mastantuono, 2023). The roots of this energy crisis can be traced back to an intricate mix of economic, political, and technical factors. Initial disruptions were sparked by the economic fallout from the COVID-19 pandemic, during which global energy demand surged as economies began their cautious reopenings. A closer examination of real GDP since 2019 vividly portrays the

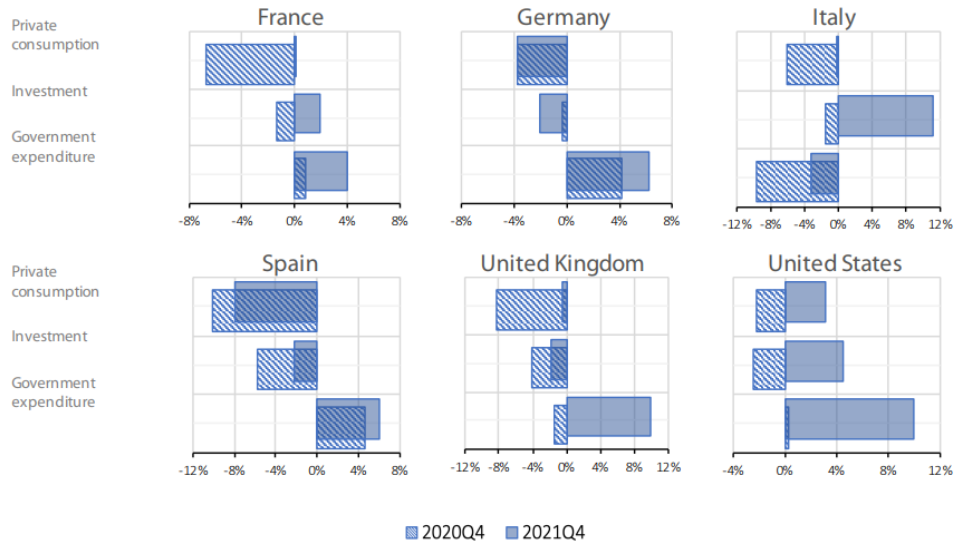
dramatic effects of the "COVID sudden stop" on global economic activity, along with the subsequent vigor of recovery efforts. The United States has emerged as a leader in this recovery, with its GDP surpassing pre-crisis levels by an impressive 4.8% in Q4 2021. Other nations, such as the Netherlands and Sweden, have similarly recovered ground. Among EU nations, France has notably returned to its pre-crisis GDP levels by Q4 2021. Germany's GDP trajectory initially tracked closely with that of the US and Canada but began to weaken after late 2020, concluding Q4 2021 at a disappointing -1.1% of pre-crisis levels. In stark contrast, Italy experienced a remarkable rebound, exceeding its pre-crisis GDP level by 7% at the start of 2022. However, the UK and Spain faced some of the steepest declines during the early months of the pandemic, with their GDPs plummeting by over 20%. By the end of 2021, GDP gaps compared to Q4 2019 stood at approximately 0.3% for the UK and 4.1% for Spain (François Miguet, Natacha Valla, 2022). To understand the economic ramifications of reduced activity, it's crucial to analyze the breakdown of real GDP by its various components. Across different countries, private consumption emerged as the primary contributor to the drop in economic activity. By Q4 2021, private consumption in Europe was still lagging behind pre-crisis levels, just inching closer in France while continuing to exert downward pressure on economic growth, even as health restrictions were gradually lifted. In stark contrast, the United States witnessed real private consumption soaring to 3.1% above its pre-crisis level. Investment levels in several countries had already surpassed pre-crisis benchmarks, acting as a catalyst for economic resurgence in the US, Canada, France, and Italy, showcasing a contrasting narrative of resilience amidst the broader challenges faced by the global economy. However, investment in Germany, Spain, and the UK remained subdued compared to pre-crisis levels,

Title : The impact of crises on energy prices (2021-2023)

European Union Case

indicating a varied recovery across different economies.

Figure 4 GDP growth by component, percentage change compared to 2019Q4



Source: Insee, ONE, BEA, DeStatis, IStat, INE.

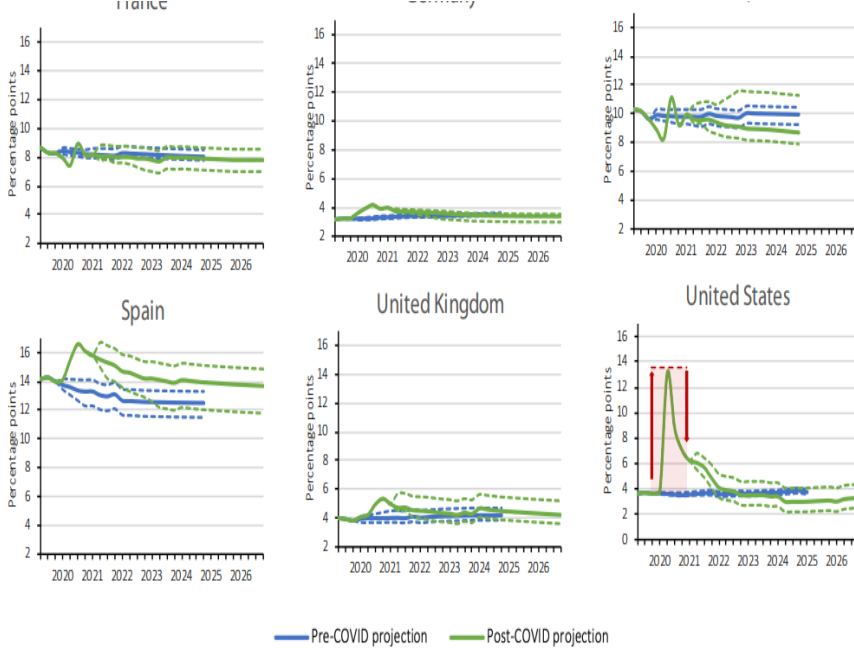
The search results fall short of delivering the detailed insights needed to thoroughly explore the various models of labor market adjustment on both sides of the Atlantic during the crisis. The findings only provide a broad overview, contrasting the responses in the United States and Canada with those in European countries. Unfortunately, they lack the specific information necessary to highlight the distinct approaches each region employed in addressing labor market challenges during this critical period. To adequately respond to this query, I would require more comprehensive information on:

1. The labor market support measures and adjustment mechanisms implemented in the United States, Canada, and various European countries during the crisis.
2. A detailed analysis of why the US and Canada experienced a decline in salaried employment and an increase in unemployment, while European countries preferred to reduce working hours.
3. The effectiveness and trade-offs of various approaches to reducing

unemployment and supporting workers can vary significantly.

Without specific details, I can only provide a high-level overview based on the limited information available. A more comprehensive answer would require additional and more detailed research on the topic..

Figure 5 Simulations of unemployment trajectories pre- and post-COVID



Source: Authors' calculations based on institutional forecasts (see Technical appendix for Figure 8: Simulations of unemployment trajectories pre- and post-COVID for details on calculations and data sources)

Interference from third countries and low gas storage levels in some European nations during the winter of 2021/2022, along with heightened demand, worsened the energy crisis. This situation escalated further after Russia's invasion of Ukraine in February 2022, highlighting the EU's dependence on fossil energy and impacting energy security. The crisis had severe repercussions on the EU economy in 2022, contributing to an inflation rate of 9.2%. Although inflation is expected to decrease to 6.7% in 2023 and 3.1% in 2024, it remains

high. Electricity prices surged to €150-300/MWh, and energy price inflation averaged 20% in 2022, peaking at 65% in Italy.

Key impacts of the crisis include:

1. **Decreased Private Consumption:** This is the main reason for stagnating

GDP.

2. **Reduced Investments:** The investment gap has widened since 2021.

3. **Declining External Competitiveness:** The EU's competitiveness has significantly deteriorated compared to the pre-2020 period.

As a result, EU GDP growth is projected to be modest, at 1.0% in 2023 and 1.7% in 2024, following a growth rate of 3.5% in 2022.

The average budget deficit reached 3.4% of GDP in 2022, exceeding Stability and Growth Pact requirements, with similar levels expected in the next two years. The energy crisis and green transition are increasing public spending, necessitating a prudent approach. Utilizing private investment through guarantee schemes like the European Fund for Strategic Investments (EFSI) could help address these challenges.

the unemployment rate in the EU was 6.1% in December 2022 unchanged since April and the lowest since 2000 an economic slowdown is expected to hinder employment growth, particularly affecting energy-intensive industries. While the energy crisis impacted the euro area variably, some member states faced more severe declines in their energy balances, showing that the crisis disproportionately affected countries based on their energy mix and import reliance. Inflation has created broader economic challenges, affecting competitiveness. (Jakub Rybacki, Marcin Klucznik, 2023)

5 The EU policy responses to the crises :

Governments and international bodies are implementing various strategies to address energy crises, focusing on energy security, renewable energy promotion, and consumption management. Key measures include:

1. **Supporting Energy Transition:** Diversifying energy sources enhances the euro area's resilience to external shocks. In 2022 and 2023, there was a significant increase in wind and solar power installations, with 57 GW and 69 GW added, resulting in a 36% rise in capacity compared to 2021. The share of renewable energy in the electricity mix increased from 37% to 45%.

2. **Shifting Production Models:** Adopting less energy-dependent production methods can strengthen the economies of euro area countries.
3. **Market Integration:** Greater integration of European energy markets may help reduce price discrepancies and volatility.

However, these resilience-boosting policies may conflict with maintaining competitiveness among euro-area firms. The European Union's Communication on a European Economic Security Strategy, released on June 20, 2023, outlines a framework to align economic and security interests, promote EU competitiveness, and collaborate with like-minded countries on economic security.

Table 1 The impacts of the main important EU policies on the energy market.

EU Policy	Description of the Impacts on the Energy Market
Renewable Energy Directive (RED) [259-263,267,268]	The Renewable Energy Directive (RED II) aims for the EU to achieve a 32% share of renewable energy consumption by 2030, up from 22% in 2020, and encourages investment in wind, solar, and biomass technologies. In 2021, renewable sources provided 26% of the EU's electricity, rising from 16% in 2010. The upcoming RED III sets a target of 40% renewable energy by 2030, focusing on heating, cooling, and transport. It also introduces a goal of 14% renewable energy in the transport sector, promoting a shift from fossil fuels and creating new opportunities for renewable energy producers.
Energy Efficiency Directive (EED) [264,265,269-272]	The directive promotes energy efficiency across various sectors, encouraging the adoption of energy-efficient technologies. It aims to reduce the EU's primary energy consumption by 32.5% by 2030 by establishing minimum energy performance standards for buildings, appliances, and vehicles. Additionally, it offers incentives for energy-efficient renovations and investments. Consequently, the EU has made significant strides in energy efficiency, with primary energy consumption per capita decreasing by 20% between 2005 and 2021.
Renewable Energy Directive (RED) [259-263,267,268]	The Energy Efficiency Directive (EED) aims to improve energy efficiency across various sectors by encouraging the adoption of energy-efficient technologies and practices. Its main objective is to reduce the EU's primary energy consumption by 32.5% by 2030. To achieve this goal, the directive sets minimum energy performance standards for buildings, appliances, and vehicles, while also providing incentives for energy-efficient renovations and technologies. This initiative has driven up demand for energy-efficient products and changed traditional energy consumption patterns. From 2005 to 2021, the EU saw a 20% reduction in primary energy consumption per

Title : The impact of crises on energy prices (2021-2023)
European Union Case

	capita, demonstrating significant improvements in energy efficiency among member states.
Energy Efficiency Directive (EED) [264,265,269-272]	The Energy Efficiency Directive (EED) aims to enhance energy efficiency across various sectors, targeting a 32.5% reduction in the EU's primary energy consumption by 2030. It sets minimum performance standards for buildings, appliances, and vehicles while providing incentives for energy-efficient renovations. This has led to a 20% decline in primary energy consumption per capita in the EU from 2005 to 2021..

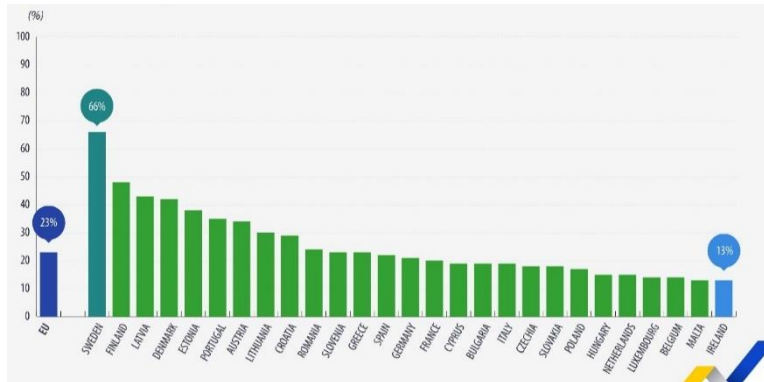
Source: Authors' analysis based on references [259-291].

6 Technological and market shifts :

1. **Fossil Fuel Transition:** The European Union aims to reduce its reliance on fossil fuels, promoting a more sustainable, independent, and climate-compatible economy.
2. **Energy Security:** Moving away from fossil fuels will enhance the EU's energy security, even though short-term investments in alternative energy sources are necessary.
3. **Energy Trilemma:** Policymakers must balance affordability, energy security, and climate impact.
4. **Multiple Renewable Pathways:** The transition will utilize various energy sources, such as solar, wind, and bioenergy, to phase out fossil fuels by 2050.
5. **Policy Support:** Comprehensive policies at both the EU and national levels are essential for a successful transition to renewable energy.

In 2022, the European Union's share of renewable energy reached 23%. The target for 2030 has been increased to 42.5%. Energy security and efficiency, along with the importance of critical minerals such as lithium and cobalt, are emphasized as crucial for the transition to renewable energy, particularly in light of the Ukraine crisis.

Figure 6 overall share of energy from renewable sources in 2022



Source: eurostat

7. CONCLUSION

The energy crisis of 2022 has fundamentally reshaped the economic and political landscape of the EU, highlighting the urgent need for a robust and sustainable energy strategy. While immediate challenges such as inflation and budget deficits demand attention, the crisis has also accelerated the transition towards renewable energy sources, presenting both opportunities and obstacles. As the EU seeks to diversify its energy supply and enhance resilience against external shocks, it must navigate the complexities of balancing economic competitiveness with environmental goals. The ongoing investments in renewable energy infrastructure and the pursuit of energy efficiency will be vital for the EU's long-term stability and growth. Ultimately, the lessons learned from this crisis can guide the EU towards a more sustainable and secure energy future, ensuring that it is better prepared to handle future challenges in the global energy market.

Results of the Study

The findings highlight that the energy crises of 2021-2023 resulted in significant volatility in energy prices, influenced by supply chain disruptions, geopolitical tensions, and shifting demand patterns. Key results include:

- A notable rise in wholesale energy prices, with natural gas prices in the EU peaking at unprecedented levels.
- An increase in energy poverty across the EU, with approximately 50 million households unable to afford adequate energy services.

- A potential acceleration in the adoption of renewable energy sources as countries seek to diversify their energy portfolios and reduce dependency on fossil fuels.
- A recognition of the need for policy reforms that address both immediate supply concerns and long-term sustainability goals.

8. Bibliography List:

- Bożena Gajdzik ,Radosław Wolniak. (2024, 02 18). *mdpi*. Récupéré sur The Influence of the Global Energy Crisis on Energy Efficiency: A Comprehensive Analysis: <https://www.mdpi.com/1996-1073/17/4/947#:~:text=Paradoxically%2C%20the%20negative%20effects%20of,significant%20advances%20in%20energy%20efficiency.>
- AFFAIRS, D. G. (2024, 1 21). Developments of energy prices in the euro area.
- Ellingsund, V. (2023). Analysis of the Russo-Ukrainian war and the 2022 Energy Crisis in the Context of Hybrid Threats.
- François MIGUET Natacha VALLA. (2022). *How have major economies responded to the COVID-19 pandemic? Consequences for growth trajectories and debt sustainability.*
- Hoang, A. T. (2021, 11 23). Impacts of COVID-19 pandemic on the global energy system and the shift progress to renewable energy.
- <https://pie.net.pl/en/cee-monthly/>. (2024).
- Jacques, S. (2023). *The impact of the Covid-19 pandemic and the factors influencing its effect on financial performance: Evidence from Belgian companies*. Récupéré sur <http://hdl.handle.net/2268.2/18734>
- Jakub Rybacki Marcin Klucznik. (2023, 12). *CEE Economic*. Récupéré sur https://pie.net.pl/wp-content/uploads/2023/12/Miesiecznik-Makro_11-23_EN.pdf
- Jerneck, M. (2007). Understanding the EU-Russia Energy Relations.
- MASTANTUONO, A. (2023). Opinion of the European Economic and Social Committee on the impact of the energy crisis on the European economy. *Official Journal of the European Union*.

Tertre, M. G. (2023). Structural changes in energy markets and price implications: effects of the recent energy crisis and perspectives of the green transition.

Vicente Javier Clemente-Suárez - ORCID, Eduardo Navarro-Jiménez - ORCID, Libertad Moreno-Luna. (2021, 06 02). *Mdpi*. Récupéré sur The Impact of the COVID-19 Pandemic on Social, Health, and Economy: <https://www.mdpi.com/2071-1050/13/11/6314>