

Energy Market Shocks, Sovereign Finance, and the Energy–Blue Economy Nexus

Sibel Elif Özdilek ^{1*}

¹ Ufuk University, Ankara, Türkiye

*Corresponding email: elif.ozdilek@ufuk.edu.tr

Abstract

This chapter explores the response of governments to the energy price shock through fiscal policy and highlights adaptations in the strategies of responding to spillover effects from short term challenges to long term goals of energy security, sovereign fiscal resilience, and transformation. It raises the conceptual and policy question of how energy shocks impact energy justice, inflation, industrial competitiveness, external accounts, public expenditures, borrowing, and transitions of a given country or region. It aims to contribute to a nuanced understanding of how fiscal policy can both mitigate the adverse effects of the price shock on vulnerable groups and promote the structural transformation of the economy without compromising public debt sustainability. The chapter employs theoretical frameworks of complex interdependence and neofunctionalism. The former was used to understand the mechanisms of mutual gains and asymmetry, while the latter allowed for exploring spillover effects of energy cooperation on broader areas of regulation and politics. It uses a qualitative comparative case study methodology that relies on a documentary analysis of primary and secondary sources, including international organizations' reports and academic literature. The study covers the global region with a focus on the EU and Ukraine as the priority case. The key findings highlight that the majority of countries adopted a mix of subsidies, tax benefits, price regulation, compensatory transfers, state reserves, and loans to cushion the population, industry, and the energy sector from price shocks. The analysis of the 2022 shock response, however, highlights the shift towards a structural transformation agenda that includes renewable energy, liquefied natural gas (LNG), and electricity, as well as the modernization of grids and nuclear energy. The chapter concludes that the fiscal response to the energy price shock requires a multi-layered approach that considers the short- and long-term effects of the adjustments while prioritizing strategic areas of investment. It also stresses that the fiscal response to the shock goes beyond the direct effects of price fluctuations on budgets, public expenditures, and public debt. The response strategies affect sovereign debt sustainability, fiscal space for energy transition, and borrowing capacity of governments at any given point in time. The chapter demonstrates how energy security, fiscal policy, and the Blue Economy are interconnected through an analysis of offshore wind, solar, and ports, electricity infrastructure, and logistics.

Keywords: European Union, Energy Security, Energy Shocks, Russia-Ukraine War, Fiscal Responses

1. Introduction

Since the 1970s, energy market shocks have required policymakers to take extraordinary fiscal measures to stabilize their economies, households, and energy markets. This form of intervention, initially used as a short term solution, has evolved into complex sets of expenditures, borrowing, industrial and energy policies, and infrastructural projects. In the context of the larger international situation, the EU response to the Russia-Ukraine war is one of the most far-reaching fiscal interventions in contemporary geopolitics addressing energy-

related shocks. For this reason, this paper aims to demonstrate how the EU-Ukraine case may serve as the paradigmatic example of the global fiscal response to energy market shocks.

Complex interdependence theory and neofunctionalism provide the theoretical foundation for this paper. First, applying the logic of complex interdependence is essential to understand the nature of energy-related interactions between the EU and Ukraine. For the proponents of this theory, interdependence represents the shift from vertical, sovereign interactions to horizontal ones that create opportunities but also vulnerabilities for states engaging in it (Keohane and Nye, 1977). As such, interdependence is a characteristic feature of international relations in the energy sector. Ukraine is simultaneously a transit country, a buffer state, and a strategic partner for the EU in terms of energy security. Second, neofunctionalism helps explain how the question of energy shapes the nature of the EU's enlargement and deepening. Neofunctionalism theory posits that spillover effects emanating from specific policy areas, such as the energy sector, lead to the emergence of new integration processes promoting regional economic and political integration (Haas, 1958; Schmitter, 2004).

When examining the literature on the topic, it becomes evident that the research on this issue prioritizes the analysis of the EU foreign policy, economic resilience, and security dimensions in the context of the Russia-Ukraine war (Darmayadi and Megits, 2023; Siddi, 2022; Anghel and Jones, 2022). In turn, the question of the energy security implications of Ukraine's candidacy has been rarely raised, despite the significant challenges that Ukraine, as a candidate member state, faces because of Russia's invasion. Similarly, the analysis of the EU enlargement and deepening processes rarely incorporates the factor of energy security as an intervening condition (Anghel and Džankić, 2023; Sapir, 2022; Buchkovska, 2024). Therefore, the present paper's originality lies in its emphasis on the importance of the energy factor in the EU's relations with Ukraine. The current paper will first provide a background on historical trends in the processes of the EU's enlargement and deepening within the context of energy governance. In particular, the next section will highlight the evolution of the institutional framework pertinent to the energy sector and the ways in which it has responded to the challenges of diversification and energy security. Following this, the paper will proceed to the analysis of the dynamic interrelations between the EU and Ukraine, emphasizing the key events that occurred since 2014, namely the Euromaidan revolution and the subsequent EU-Ukraine Association Agreement, the Russia-Ukraine war, and the annexation of Crimea by Russia. The paper will utilize the case study method to investigate the ways in which Ukraine's energy relations with the EU have been evolving since 2014. The choice of this method is justified by the fact that Ukraine plays a major role in the EU's energy and enlargement policies.

2. Background

Energy market shocks have repeatedly led to large scale economic, fiscal, and geopolitical effects. From the oil crises of the 1970s to the COVID-19 pandemic and the Russia-Ukraine war, increasing energy prices caused inflation, rising production costs, a decrease in the purchasing power of households, and budgetary pressures (International Energy Agency [IEA], 2023; International Monetary Fund [IMF], 2023). These factors made energy security a crucial pillar of fiscal and economic policy. Fresh observed evidence further displays that oil-price shocks transmit asymmetrically across global energy markets, with the effects of price upsurges different from those of price declines across nations (Rehman et al., 2025).

Governments typically reacted to energy shocks by introducing short-term subsidies, tax reductions, price regulation, and direct transfers to families and businesses. However, the 2022

crisis showed that these measures could also become part of the broader agenda of energy diversification and structural transformation. Governments combined emergency support with investments in renewable energy, electricity infrastructure, LNG terminals, energy efficiency, and other areas to reduce dependence on energy sources subject to supply disruptions (OECD, 2023; Sgaravatti et al., 2023).

The link between energy shocks, sovereign finance, and the long-term transition to renewable energy and electricity can also be seen. While large-scale fiscal interventions could alleviate the burden for households and businesses during the crisis period, they could also come at the expense of increased public borrowing and reduced fiscal space in the future. Meanwhile, investments in renewable energy, electricity infrastructure, LNG terminals, and offshore energy could secure the energy supply while promoting a gradual transition to a more robust economy. This leaves governments with the difficult task of balancing short-term and long-term challenges posed by an energy crisis (Blanchard, 2019; OECD, 2023).

3. Global Energy Market Shocks: Evolution and Fiscal Policy Responses

Over the past century, energy market fluctuations have become an integral part of the global economic environment. Starting with the oil crises of the 1970s, energy-related shocks turned into major economic and geopolitical events with significant fiscal repercussions. The main characteristic of energy crises that occurred in 1973, 1979, 2008, 2020, and 2022 is that they involved major disruptions to the supply chains, resulting in soaring energy prices. Such price surges impacted the rate and degree of inflation, the balance of payments, industrial production, and public finances (International Energy Agency [IEA], 2023; International Monetary Fund [IMF], 2023).

The fiscal repercussions of energy-related shocks became especially evident following Russia's invasion of Ukraine. According to the Bruegel Energy Crisis Tracker, the governments of EU member-states allocated hundreds of billions of Euros to provide fiscal support to citizens, businesses, and various energy-intensive industries in response to the price surge initiated by the war (Sgaravatti et al., 2023). In particular, Germany announced an energy stabilization package worth over 200 billion Euros. In France, Spain, Italy, and several other EU countries, extensive subsidies, tax cuts, and price regulations were introduced to alleviate the impact of skyrocketing electricity and gas prices on the populations and businesses (European Commission [EC], 2023; Sgaravatti et al., 2023). In this light, it is possible to note the paradigmatic shift in the way energy price shocks are addressed within the EU.

These fiscal responses to the energy price shock have inevitable consequences for the sovereign capital structures of individual states. First and foremost, the expansionary fiscal policies that most member states adopted to address the consequences of the war necessitate higher public borrowing, growing deficits, and the issuing of additional sovereign debt. In the context of public debt dynamics and the fiscal sustainability of individual states, the implications of energy price shocks are especially complex. Even though countercyclical fiscal interventions on behalf of governments might respond to the immediate challenges posed by energy-related shocks, they create difficult sustainability conditions for public finances in the longer term. As a result, states that intervene in energy markets to stabilize them face the need to balance their short-term and long-term fiscal objectives (Blanchard, 2019; International Monetary Fund [IMF], 2023; Reinhart and Rogoff, 2010).

Beyond the short-term economic stabilization and the long-term implications for public debt, modern fiscal responses to energy-related shocks tend to incorporate significant transformative interventions. In particular, public investments in the areas of renewable energy, electrification,

and new transmission infrastructure play an important role in modern fiscal responses, as they allow not only to address immediate challenges but also to promote economic transformation and sustainability. In this regard, fiscal interventions can be regarded as both immediate responses to energy price shocks and as the transformative force that promotes long-term economic and energy transitions (European Commission [EC], 2022; European Investment Bank [EIB], 2023).

Fiscal responses to energy-related shocks are also noteworthy within the context of the overarching Blue Economy concept. The investments in offshore wind, LNG, and other energy-related technologies and infrastructure that national governments allocate to address the consequences of energy price shocks are largely attributable to sovereign financing mechanisms, public-private partnerships, and green bonds. Thus, energy security, fiscal sustainability of governments, and the development of the Blue Economy are inextricably linked and should be considered within the context of integrated approaches to these issues.

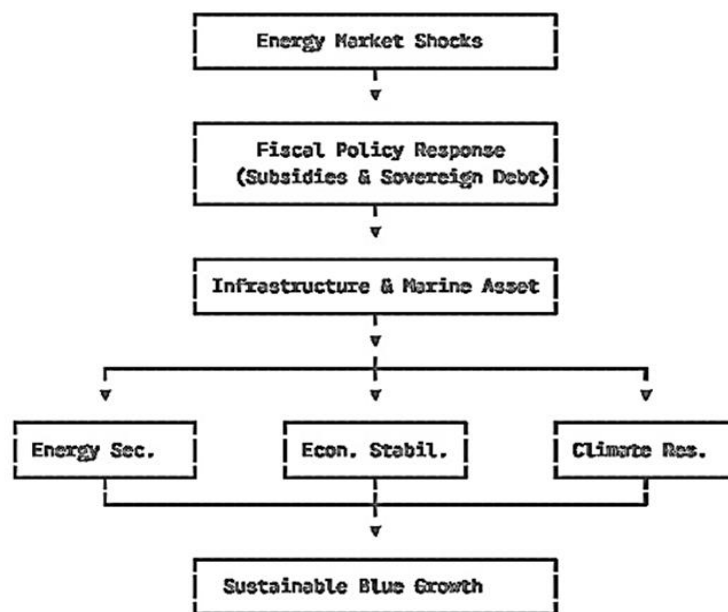


Figure 1: Global Fiscal Response Framework for Energy Market Shocks

(Source: Authors' Own Work)

Figure 1 represents the conceptual framework proposed to understand the changing nature of fiscal responses to major energy market shocks. It is hypothesized that in response to energy shocks, fiscal policy instruments initially tend to take the form of emergency measures to provide relief to taxpayers, stabilize prices, and ensure financial market stability. Over time, as energy shocks persist, fiscal policy begins to shift toward measures that promote the structural transformation of the economy.

The energy market shocks observed in 2022 resulted from a combination of factors, including the post-pandemic recovery in global energy demand, supply-side constraints, geopolitical tensions, and, most significantly, Russia's invasion of Ukraine, which further disrupted energy supplies and intensified price volatility. Beyond supply-side and geopolitical interruptions, climate-connected news has also become a key source of information that affects European energy markets, with market responses changing across nations and market situations (Rehman et al., 2026). Moreover, governments worldwide responded with short term energy market stabilization measures and initiated various long-term programs to enhance energy security

while also supporting the transition to clean energy. However, the fiscal responses to the energy crisis have been different in various countries. This is because the responses were tailored to meet the specific domestic needs of different countries. This section highlights the fiscal response to the energy crisis of 2022 in the US, UK, Japan, South Korea, China, and India.

a. United States (US)

The US unveiled an energy plan that will provide immediate relief to consumers while also making substantial investments in clean electricity, networks, and energy in the long run. The Inflation Reduction Act (IRA) of 2022 is a future-oriented package that addressed the near-term energy price challenges while also helping to achieve long-term energy security and decarbonization objectives. The IRA of 2022 provided tax cuts and incentives for clean energy production and consumption while also creating a favorable environment for manufacturing and energy production to reduce inflationary pressures in the economy.

The most significant IRA provisions that relate to addressing the energy price challenges and support of alternative energy sources include:

- Strategic petroleum reserve (SPR) release: This provision facilitated the strategic release of crude oil from the SPR to help temper the price surges in the US.
- Clean energy tax incentives: These provisions extended and expanded tax credits for clean energy production, including wind, solar, and others.
- Federal subsidies for renewable energy: The provision includes billions of subsidies for supporting renewable energy production and enhancing the manufacturing process of hybrid electric vehicles and other clean transportation means.
- Energy security through industrial policy: This provision promotes domestic production of minerals and electronics for clean energy technologies and reduces the country's reliance on foreign supplies.

b. United Kingdom (UK)

Unlike the US, which focused on the long-term benefits of addressing high energy prices, the UK's energy plan was more short-term since it focused on protecting consumers from high gas prices. In addition to consumer protection, the UK government also wanted to avoid indirect taxation on gas and electricity. Consequently, the UK government announced the introduction of an Energy Price Guarantee (EPG), which ensured that all firms and households received lower electricity and gas prices than those available on the market.

The most significant fiscal policy response to the energy crisis in the UK includes:

- Energy Price Guarantee (EPG): This scheme ensured that all firms and households paid electricity and gas prices of £2500 on average per year for the next two years.
- Energy Bills Support Scheme: This scheme provided all households with a rebate of £400 to help reduce the burden of high energy bills.
- Windfall Tax: The UK government imposed a windfall tax on energy firms with excessive profits to fund the energy price support schemes.
- Household support: In addition to the EPG, the UK government also provided direct support to households.

The UK perspective was to cushion consumers from the negative impacts of high energy prices, especially the household sector. The consumer compensation and direct support to households were short-term measures that failed to consider the long-run benefits of high energy prices.

Table 1: Major Global Fiscal and Policy Responses to Energy Market Shocks (2022–2026)

Country	Short-Term Response	Long-Term Focus	Main Emphasis	Sources
United States	SPR releases; clean-energy tax credits	Clean-energy investment and manufacturing	Energy transition & security	U.S. Department of the Treasury (2023)
United Kingdom	Energy Price Guarantee; consumer support	Energy security and low-carbon investment	Affordability & inflation control	Department for Business, Energy & Industrial Strategy [BEIS], 2023; Department for Energy Security and Net Zero [DESNZ], 2024
Japan	Fuel subsidies; conservation; LNG measures	Nuclear restarts; renewables; LNG diversification	Supply security & price stability	International Energy Agency [IEA] (2024); EIA (2024)
South Korea	Fuel-tax reductions; demand management	Nuclear and renewable-energy expansion	Energy security & green transition	International Energy Agency [IEA] (2025)
China	Coal expansion; price and supply measures	Renewables, grid development and energy security	Supply stability & economic growth	National Bureau of Statistics of China [NBS] China (2023)
India	Fuel-tax reductions; LPG subsidies	Renewable expansion and energy access	Affordability & energy access	Government of India, Ministry of Petroleum and Natural Gas. (2023); Ministry of New and Renewable Energy [MNRE] (2025)

Source: Authors' compilation based on International Energy Agency (2024, 2025), National Bureau of Statistics of China (2023), U.S. Department of the Treasury (2023), and other relevant government sources

Table 1 presents a selection of short-term measures such as subsidies, tax breaks, and regulation of prices, and long-term adjustments including investments in renewable energy, nuclear power plants, and economic restructuring, adopted by different countries to handle energy shocks during the period of 2022-2026.

4. Theoretical and Conceptual Framework

4.1 Neofunctionalism Theory

Neofunctionalism was pioneered by Ernst B. Haas and became one of the most influential approaches to studying the European integration process since the formation of the European Coal and Steel Community (ECSC) and the European Economic Community (EEC) in the late 1950s. First of all, neofunctionalism seeks to explain the transition in regional integration from economic cooperation to economic-political integration (Niemann, 2021). It is based on the principles of federalism, functionalism, and communication theories.

Both Ernst B. Haas and Leon N. Lindberg agreed that integration is a long-term process driven by specific functions that emerge and evolve over time within certain regional institutions. Haas states that “the process of integrating between states is the gradual change of the political interests, loyalties, and actions of those individuals who represent these states in regard to a

new supranational authority, whereby this new authority can affect (and determine) the behavior of the individual member states through institutional means”. By contrast, Lindberg argues that integration “is a process in which political actors voluntarily restrict their ability to make decisions regarding their international and domestic policies in favor of decision-making by a selected group of individuals or institutions”. Thus, while describing the mechanism of systemic transformation as integration theory’s central concept and forecasting the emergence of new identities of member-states (Niemann, 2021), Haas puts more emphasis on the transformation of political actors in the EU integration process, whereas Lindberg highlights their active role.

Neofunctionalism’s theories undermine several key concepts of realism, which was the dominant paradigm in international relations during the turn of the 20th century. In his writings, Haas particularly highlights the importance of regionalist values to achieve win-win situations for the transaction partners via international bargaining and compromise rather than zero-sum as predicted by realists (Niemann, 2021). Neofunctionalism adheres to the logic of pluralism in American political science and regional studies. Thus, integration processes are no longer confined to international negotiations between state societies but include various actors in the international system, including government agencies, interest groups, and networks.

4.2 Complex Conceptual Approach in Interdependence Theory

Robert O. Keohane and Joseph S. Nye Jr.’s theory of Complex Interdependence is the core framework for analyzing the energy relationship between the EU, Ukraine, and Russia. The theory of economic interdependencies advanced by Richard N. Cooper and others served as the basis for developing the theory of complex interdependence. Complex interdependence was inspired to a considerable extent by Cooper’s writing on international economic interaction between states (Energy Charter Treaty, 1994). It is assumed that complex interdependence will contribute to understanding how enhanced transnational connections have shaped interactions of all types, including confrontations, as well as institutions that promote collective action.

Complex interdependence concept includes a distinction between sensitivity and vulnerability. Sensitivity reflects the responsiveness of an actor’s existing policy to possible external changes, while vulnerability describes the ratio between the costs incurred when an actor must adopt undesired policies and the benefits associated with retaining the preferred policies. The differentiation between sensitivity and vulnerability allows for understanding the bargaining process between states. The states differ in vulnerability; therefore, a state with a relatively low vulnerability has an advantage over another state with a high level of vulnerability (Holsti, 1978).

Weaker states may seek to engage in multiple interrelationships as a way to reduce the risks involved when they have to rely on any one actor, thereby ensuring that they can maintain their preferred policies. Accordingly, when the capabilities of states are imbalanced, the influence of the stronger actor on the weaker actor’s policy making may be limited to a certain extent. Furthermore, the weaker actor may deliberately reduce its dependence on the stronger actor. Reducing dependence is the strategy that was used by Canada to decrease its vulnerability to the United States by expanding trade ties with Europe and Japan. As a result, states can benefit from limiting their exposure to other states in economic matters (Holsti, 1978). Accordingly, interdependence is the interaction between states characterized by vulnerability and exchange, with actual interdependence only being possible if there is the possibility of discontinuing the interaction.

This study aims to analyze the EU’s energy relationship with Ukraine using the concepts of vulnerability and sensitivity to show how complex interdependence shaped the ability of both

sides to negotiate on this issue, as well as the ability to develop alternative energy sources and thereby transform the political landscape in Europe.

5. The Evolution of the European Energy Governance

5.1 Foundations of European Energy Governance

The declaration was made in the context of post-WWII international relations, when the territorial integrity of Germany was at stake. The Ruhr region was the center of Germany's coal and steel industry, which made it the powerhouse of the country's economy and military-industrial complex. At the same time, the Marshall Plan, designed to restore the war-torn European economies, was being implemented by the United States in close cooperation with France. The plan's designers realized that the revival of Germany meant its potential military expansion, which was unacceptable in the context of Cold War international relations. However, France did not want Germany to continue its development as the regional economic powerhouse, as it would undermine the European recovery.

In the 70s, another energy crisis undermined the growth of the economies of EU members, revealing structural imbalances between the member states, while stimulating social inequality and inflation (Schubert et al., 2016). International actors, including the USA, Japan, and emerging Asian Tigers, recognized the need for another round of European integration, which would address the new challenges. Consequently, statesmen revisited the prospects of the Common Market and acknowledged the necessity of securing energy supply to address supply-side imbalances.

The reform of the European energy market was complicated by the energy sovereignty issue. Due to the complex interrelation between energy and state sovereignty, the common energy market's development lagged behind other redistributive policies. The 1988 paper 'Internal Energy Market', which was the first attempt to introduce common energy market principles, aimed to apply common market rules to energy, remove state monopolies, and stimulate competition processes in electricity and natural gas sales (Schubert et al., 2016).

5.2 Deepening the European Energy Integration

In the 2000s, the driving forces for deepening European integration in the energy sector were formed. The new wave of reforms was inspired by the Union's desire to externalize its internal market rules to secure the energy supply to the EU's neighboring countries and manage the liberalization of the energy sector, along with the sustainability agenda. The key institutional step undertaken to achieve these goals was the creation of the Energy Community in 2006, which formalized the commitments of the Energy Community members to adopt the EU's internal energy market rules as a model for their own legislation. The new institutional arrangement allowed the Union to stabilize politically and economically vulnerable regions in Southeastern Europe, while securing the stability of the energy supply to the EU members via energy sector harmonization.

The Green Paper European Strategy for Sustainable, Competitive and Secure Energy was developed by the EU Commission in 2006 as well, and it served as the conceptual framework for the Union's energy sector strategy for years to come. Notably, the liberalization of the EU energy market, which implied the possibility for consumers to choose their electricity suppliers in other EU member states, was considered a pivotal condition for achieving market competitiveness and diminishing natural market monopolies. The strategy, which integrated the principles of sustainability, competitiveness, and security of supply, became the cornerstone for the subsequent development of the EU's energy governance.

In particular, the renewable energy sources roadmap and the action plan on energy efficiency, both addressing the Union's leadership role in climate protection, allowed the EU to strengthen its reputation as the global leader in energy efficient development. Finally, the strategic vision of the EU in the energy sector became manifested through the creation of the long-term frameworks of the EU governance in the field, such as the Renewable Energy Roadmap and the Action Plan on Energy Efficiency. According to the authors, the EU's strategic approach to energy security and sustainable development, as well as the institutional arrangements it provided for energy governance, demonstrated the interplay between its economic competitiveness and decarbonization agenda (European Commission [EC], 2006).

At the same time, the growing institutional complexity of EU governance, the expansion of the EU itself, and emerging challenges, including climate change, energy security, and international conflicts, questioned the effectiveness of the status quo. It prompted the EU members to amend the treaties governing the Union's competencies in order to balance the efficiency of the decision-making processes and the sovereignty of the member states. The Lisbon Treaty, which was signed with recognition of its role as the most significant treaty in the history of the EU, was able to address these challenges.

After the Lisbon Treaty was ratified, the European Union was able to create new strategic frameworks to secure its foreign policy objectives. In particular, the Europe 2020 Strategy, which was officially adopted in 2010, integrated the innovation-driven development of the EU economies, smart growth concepts, and sustainability principles into a single policy framework. The strategy provided the EU members with concrete goals to reduce the impact of their economies on the environment, including targets to reduce greenhouse gas emissions and to step up the share of renewable energy sources (European Commission [EC], 2010). Overall, the concepts introduced by the Europe 2020 Strategy and related policies demonstrated the EU's ability to combine its economic growth and competitiveness to promote sustainability.

5.3 EU Enlargement Waves and Energy

The enlargements that occurred between 2004 and 2007 were one of the most significant events in the development of the EU. The newly admitted members benefited substantially from the financial and institutional support provided by the existing EU members. At the same time, the EU itself profited from the enlargement as it established a solid foundation for further trade, investment, and market development (Vachudova, 2014). Additionally, all enlargement countries received support in implementing the Enlargement Strategy, which was based on the principles of good governance. It aimed to promote economic integration while delivering systematic institutional and democratic reforms in the enlarged EU (Balfour and Stratulat, 2012). In other words, during this period, the EU was able to promote democracy beyond the principles of globalization through its enlargement policy (Vachudova, 2014). However, the narrative about further EU enlargement became increasingly controversial with the onset of the 2008 global economic crisis, and the rising unemployment rates significantly changed the public discourse on the EU (Vachudova, 2014).

The Lisbon Treaty gave Member States a legal opportunity to leave the Union for the first time, and they even had the option to reestablish themselves as independent states. In other words, Europe transitioned from 28 to 27 governments after the UK decided to quit the EU. They left it mainly due to sovereign reasons, the desire to regain control of immigration, and political and military considerations about losing out on security and policy making influence in the EU (Keskin, 2019).

The current EU enlargement process admits numerous countries that have entered into candidacy negotiations. In particular, the following states are officially considered as candidates: Ukraine, Türkiye, Bosnia and Herzegovina, Albania, Georgia, Moldova, Montenegro, Serbia, North Macedonia, and the Candidate Country North Macedonia. They should receive the approval of all Member States for their applications for EU membership to gain candidacy. After that, the EU evaluates the prospect of the candidate country in detail to determine whether it meets all criteria and conditions to be a full member. The annual negotiation guidelines presented by the EU to candidate countries serve as a benchmark for their readiness for EU accession. Once all requirements are fulfilled, an Accession Treaty is negotiated between the EU and the candidate country, which is then signed and ratified by all Member States as well as the candidate country.

6. The EU-Ukraine Energy Partnership in the New Geopolitical Environment

6.1 Regulatory Convergence under the EU-Ukraine Association Agreement

The EU-Ukraine Association Agreement can be used as an example of how the EU's neighborhood policy, or ENP, contributes to the EU-Russia strategic relations. In this sense, it is useful to remember the symbolic meaning of Ukraine for the EU neighborhood policy. In particular, as the ENP was developed to promote political association and economic integration with the EU's neighbors, Ukraine became a strategic partner for the EU, with its regulatory framework serving as a role model for other non-EU countries. This is especially evident when we consider the ENP's strategic importance for EU-Russia relations. As noted by Benita Ferrero-Waldner, the EU High Representative for Neighborhood and Enlargement Policy, ENP aims to strengthen the relationship with neighbors, as well as to build wider strategic partnerships, though it does not rule out enlargement (Van der Loo, 2016). In other words, the EU's strategic partnership with Ukraine and the ENP in general do not exclude the possibilities of Ukraine's EU accession, yet they do not facilitate it either (Van der Loo, 2016). Nevertheless, as Ukraine became the first country to sign the Association Agreement in the framework of the ENP, its status as an example for the rest of the post-Soviet states remained unparalleled.

Energy governance was one of the key areas of the EU-Ukraine Association Agreement due to the specific geopolitical conditions surrounding Ukraine and Russia. The Ukrainian authorities and public opinion were both favorable to the Association Agreement's signing as they recognized that Ukraine's energy security could only be achieved through active participation in the European energy market. Hence, Russia's initiative to build the South Stream Pipeline to diversify its gas exports to Eastern Europe via Ukraine was viewed by the Ukrainian authorities and public as an attempt to gain more influence over Ukraine (Wolczuk, 2016). Consequently, energy interdependence between Ukraine and the EU was no longer exclusively economic as it acquired an important geopolitical dimension (Wolczuk, 2016).

6.2 The Fiscal and Energy Policy Responses to the Russia-Ukraine War

Energy is essential in implementing any nation's foreign policy. Experts believe that since Russia has recognized the strategic importance of energy, it has turned to using it as a source of power and weapons of mass destruction, and Keypour and Hendla (2019) argue that it can weaponized the energy market. Russia disrupted natural gas supplies to Ukraine, which not only posed a threat to Ukraine's energy security but also to the EU's energy security. The EU now recognizes the need to ensure its energy security. According to the REPowerEU Plan, which was approved in 2022, it intends to achieve this by making renewable energy sources a priority. Expanding the use and production of renewable energy sources will reduce the EU's

dependence on Russian energy resources and ensure its energy security. This will demonstrate the EU's strong commitment to energy security through a competitive and sustainable energy market, which will contribute to achieving the objectives of the European Green Deal.

According to the data presented in below, between 2014 and 2018, although Qatar's share in the EU's LNG imports decreased, while Russia's increased, Trinidad and Tobago and Peru supplied about a quarter of the EU's LNG. At the same time, the EU imported natural gas from the US (less than 0.5%) and Russia (less than 0.5%).

Table 2: Comparative Fiscal Responses to Major Energy Market Shocks (2021–2024)

Economy	Major Fiscal Response	Main Policy Instruments	Primary Objective
European Union	REPowerEU, NextGenerationEU	Energy subsidies, sovereign borrowing, renewable energy investment, LNG infrastructure	Energy diversification and long-term energy transition
United States	Inflation Reduction Act (IRA), Strategic Petroleum Reserve releases	Clean energy tax credits, public investment, strategic oil reserve releases	Inflation reduction, energy security, decarbonization
United Kingdom	Energy Price Guarantee	Household energy price caps, direct fiscal support	Consumer protection and inflation control
Japan	Fuel Subsidy Program	Fuel subsidies, electricity price stabilization	Household support and economic stabilization
India	Excise Duty Reductions	Fuel tax cuts, fertilizer and energy subsidies	Price stabilization and protection of low-income households
China	Energy Price Stabilization Measures	Electricity price regulation, coal production support, industrial subsidies	Industrial stability and energy supply security
South Korea	Fuel Tax Reduction Policy	Temporary fuel tax reductions, electricity support measures	Inflation mitigation and household assistance

Source: Compiled by the authors based on European Commission (2022, 2023), Sgaravatti et al. (2023), OECD (2023), U.S. Department of the Treasury (2023), Department for Business, Energy & Industrial Strategy (2023), Department for Energy Security and Net Zero (2024), Government of India, Ministry of Petroleum and Natural Gas (2023), National Bureau of Statistics of China (2023), and International Energy Agency (2025).

Table 2 below demonstrates the main fiscal policy responses undertaken by the Governments of selected advanced and emerging economies to the recent energy market shocks. Despite the differences in institutional and energy-related capabilities, countries typically applied similar sets of instruments to mitigate the adverse effects of the COVID-19 outbreak and Russia-Ukraine conflict on their economies. In particular, states provided various forms of support to households and businesses, including energy subsidies, tax cuts, and direct transfers; used public borrowing to compensate for the loss of fiscal revenue; and invested in energy infrastructure and renewable energy sources to ensure long-term supply security and energy independence. It is noteworthy that, in the context of increasing energy prices, public authorities have gone beyond the short term relief measures and pursued structural fiscal policies that promote sustainability and resilience to future energy related shocks. The energy crisis in the EU is one of the most significant manifestations of the global trend, implying that the region is a typical setting for investigating the impact of energy price hikes on fiscal policies at different levels.

7. Fiscal Governance and Sovereign Finance during Energy Crises

7.1 Government Intervention during Energy Crises

Recent energy-market disruptions can increase inflation, reduce industrial production, and raise energy expenditures for governments and households. These pressures encourage governments to intervene in energy markets to protect economic stability and social welfare, linking energy security more closely with fiscal policy (International Monetary Fund [IMF], 2023; International Energy Agency [IEA], 2023).

The recent energy crisis in the EU demonstrates how governments intervened through subsidies, tax reductions, and direct support to households and businesses to limit price increases and ensure energy supply. Fiscal support across the EU reached several hundred billion euros during 2021–2023, highlighting the active role of public authorities in addressing energy-related challenges (Sgaravatti et al., 2023).

Table 3: Evolution of Fiscal Responses to Major Global Energy Crises

Energy Crisis	Dominant Fiscal Measures	Long-term Policy Outcome
1973 Oil Crisis	Fuel subsidies, rationing	Strategic petroleum reserves
1979 Oil Crisis	Price controls, public borrowing	Energy diversification
2008 Global Financial Crisis	Infrastructure spending	Green recovery initiatives
COVID-19 Pandemic	Utility bill support, stimulus packages	Sustainable recovery policies
Russia–Ukraine War	Energy subsidies, tax reductions, green investment	Energy transition and fiscal resilience

Source: Authors’ compilation based on European Commission (2022), OECD (2023), Sgaravatti et al. (2023), International Energy Agency (2023), International Renewable Energy Agency (2023), and World Bank (2023).

As summarized in Table 3, successive energy crises have expanded the fiscal response scope from short-term stabilization measures to a comprehensive energy transition.

7.2 Public Debt and Sovereign Borrowing

This is because large-scale fiscal interventions usually entail increasing public spending and putting pressure on sovereign budgets. Since energy subsidies and stabilization funds are rarely allocated from the government’s fiscal reserves, most policy measures rely on sovereign borrowing, deficit financing, and debt issuance to intervene in energy markets. Consequently, energy price shocks tend to affect the sovereign capital structure by increasing public borrowing and debt levels while altering the government’s liability composition. Notably, the concept of sovereign capital structure is derived from the corporate finance, where it is explained as an optimal mix of debt, equity and retained earnings which decrease the overall cost of capital and enhance the business value (Rehan et al., 2024a, 2024b, 2023). Thus, if growing energy prices affect the sovereign capital structure, they may surge government borrowing requirements, increase debt-servicing burdens, and change the structure of sovereign liabilities, mainly when governments intervene through fiscal measures to stabilize energy markets. For instance, the EU Member States increased sovereign financing to support gas storage, LNG infrastructure, and Electricity grids after Russia’s invasion of Ukraine. At the same time, the governments sustained investments in renewables and accessed regional financing instruments like NextGenerationEU and REPowerEU to finance reforms (European Commission [EC], 2022; European Investment Bank [EIB], 2023). Besides the short-term stabilization role, increased public borrowing tends to increase fiscal responsibility and the government’s ability to repay the additional sovereign debt. According to Blanchard (2019) and Reinhart and Rogoff (2010), fiscal policy faces a tradeoff between maintaining

macroeconomic stability through short-term deficit expansion and restoring fiscal sustainability in the long run.

7.3 Financing the Energy Transition

Apart from the short term stabilization measures, the governments intervened through sovereign financing instruments to facilitate energy transition. The latter entails large scale investments in renewable energy, hydrogen, offshore wind, electricity networks, and LNG infrastructure, among others. Some of the most prominent instruments used to finance the energy transition include sovereign green bonds, sustainable bonds, and public investment funds.

In the case of the EU, borrowing for energy transition is characterized by a shift from short term stabilization to long-term transformation. In other words, the Union's public debt has a dual role in managing the impact of Russia's invasion of Ukraine on its energy markets and transitioning towards climate neutrality and strategic energy autonomy. First, the surge in public borrowing has helped cushion the adverse economic consequences of the gas and oil price hikes. Second, the increased sovereign financing is geared toward reducing the EU's reliance on imported energy in the long run. In essence, the EU exemplifies how public debt can be used to maneuver energy transitions and sovereign capital structure while considering fiscal sustainability and macroeconomic stability (OECD, 2023; European Commission [EC], 2023).

7.4 Building Fiscal Resilience for Future Energy Transitions

The fiscal expansion via sovereign bonds and deficit financing to cushion the effect of the energy crisis has raised concerns regarding fiscal sustainability. The surge in public borrowing and deficits may constrain the government's ability to respond to future economic shocks, especially when combined with rising debt servicing costs (Blanchard, 2019). Therefore, governments should formulate energy security policies that promote fiscal resilience and intergenerational equity in addition to short-term stabilization.

This is especially important for the EU as it plans to undergo an extensive energy transition over the next few decades (European Commission [EC], 2023; International Energy Agency [IEA], 2023). Consequently, the energy transition requires responsible sovereign borrowing and fiscal policies that promote public investments.

8. Energy Security, Blue Economy and Sustainable Investment

8.1 Linking Energy Security with the Blue Economy

The concepts of energy security, as well as the blue economy, have been considered separately in policy and research, with energy security emphasizing energy sources and geopolitical aspects. However, the need for energy transition has enhanced the intersection between the two concepts in the promotion of the sustainable use of ocean resources for economic growth.

The relevance of the maritime environment to energy transition requires the formulation of supportive fiscal policies for the Blue Economy and sustainable investment while facilitating sovereign public debt expansion to fund the rising costs of energy transition. With the need for many countries to reduce their reliance on hydrocarbons, offshore wind, solar, and LNG have become attractive options for investment. Consequently, the Blue Economy has become linked to energy security as many states prioritize investments in maritime transportation, renewable energy sources, and other ocean-based activities (European Commission [EC], 2024; OECD, 2020). The Blue Economy concept entails promoting economic growth, social equity, and environmental sustainability while ensuring sustainable use of ocean resources. Current

evidence also highlights the significance of technological and economic transformation in supporting energy security and sustainable development (Ul-Haq et al., 2025).

The blue economy agenda covers a wide range of themes from maritime transportation to offshore wind and solar energy, with the central idea being the sustainable use of oceans, coastal areas, and water resources (World Bank, 2017). Energy infrastructure and activities fall under the Blue Economy, as offshore wind, electricity networks, shipping routes, and associated coastal installations play a crucial role in national energy security strategies. Therefore, energy security has become one of the factors considered in investment in ocean-based infrastructure and sustainable development (OECD, 2020; United Nations, 2023).

Analytical Causal Mechanism of the Energy–Fiscal–Blue Economy Nexus to understand how energy market disruptions drive coastal economic transformation, it helps to trace the relationship between fiscal intervention and Blue Economy outcomes through six sequential stages:

Energy Market Shock: Geopolitical and supply-side disruptions originating outside the immediate market drive acute volatility and sharp price spikes in global energy markets.

Energy Infrastructure Investment: Capital flows into strategic, large-scale energy infrastructure, including grid modernization, gas storage, and transport corridors.

Fiscal Response: Governments introduce emergency, short-term measures such as subsidies, tax cuts, and price regulation to stabilize households and domestic industry.

Offshore & Maritime Deployment: Capital is directed toward marine-based assets such as offshore wind farms, floating solar installations, LNG import terminals, and Floating Storage Regasification Units (FSRUs).

Blue Economy Development: Over time, these investments produce wider Blue Economy outcomes: smarter port logistics, larger coastal supply chains, new maritime jobs, and stronger coastal economic resilience.

Sovereign Financing: When fiscal pressures persist, governments turn to sovereign borrowing, debt issuance, and targeted capital instruments, including sovereign green bonds and blue finance frameworks, to expand fiscal space.

8.2 Offshore Renewable Energy and Maritime Energy Infrastructure

The transition to a low-carbon energy system has increased the importance of offshore renewable energy infrastructure in the public agenda. Wind power installations, floating solar power plants, offshore hydrogen production facilities, and electricity transmission systems are some of the priority areas currently under consideration to develop diversified and low-emission economies. The offshore renewable energy strategy of the EU, which makes offshore wind power one of the pillars of future energy security, is one of the first concrete initiatives in this direction (European Commission [EC], 2020).

The war between Russia and Ukraine not only influenced the process of adapting to climate change but also demonstrated the vulnerability of the European Union's gas supply infrastructure as a whole. This factor shaped the new trends in offshore energy development as the redirected financial resources from the initial energy security projects to long-term investments in renewables. Such allocations can both meet the needs of energy security and stimulate the economic growth of coastal states through job creation and innovation driven competitive advantages (International Renewable Energy Agency [IRENA], 2023; European Investment Bank [EIB], 2023).

8.3 LNG Terminals, Ports and Coastal Infrastructure

Another important area in which the impact of Russia's invasion of Ukraine on geographical priorities in Blue Economy investments can be observed is LNG infrastructure. In response to

the reduced gas flows from Russia, several European countries have made significant public investments in FSRUs, import terminals, port infrastructure, and coastal facilities to receive LNG. Natural gas imports by Germany, the Netherlands, Poland, Finland, and several Baltic states have diversified significantly as the result of increased access to alternative supply routes, including LNG terminals and FSRUs.

As a result of increased public expenditures on upgrading terminal facilities at several EU ports, ports now serve as multimodal transportation hubs hosting a wide range of energy related activities, from international LNG trade to supporting offshore renewable energy, hydrogen corridor, and electricity interconnection projects. Public expenditures on developing and upgrading port infrastructure have therefore become critical to ensuring both energy security and economic competitiveness in coastal areas and promoting the growth of the Blue Economy. Consequently, the impact of changes in gas supply and demand on public expenditures on LNG infrastructures can be seen as a key factor affecting the geographical distribution of Blue Economy investments in the EU (United Nations Conference on Trade and Development [UNCTAD], 2023; European Commission [EC], 2024).

8.4 Financing the Blue Economy

The increasing emphasis on promoting investment in the Blue Economy and sustainable development requires enhanced sovereign financing to support the significant upfront costs associated with offshore infrastructure. Hence, from an investment perception, the growing integration of sustainability considerations into financial markets also generates opportunities for divergence between socially responsible funds and energy commodities, mainly under different market conditions (Rehman et al., 2021). The use of sovereign green bonds, bonds, development banks, and other climate specific financing instruments helps achieve the dual goals of enhancing energy security and supporting sustainable development. Sustainable investment now entails considering the short-term and long term benefits associated with maritime infrastructure funding.

Thus, the role of sovereign fiscal policy in supporting energy security has shifted from short-term macroeconomic stabilization to long term investment and sustainable development. As highlighted by OECD (2022) and World Bank (2023), blue finance has become an integral component of green finance in the promotion of private and public investment in sustainable ocean based activities. This is because the former relies on government backed financial instruments to reduce the risks associated with large scale, long term investments in offshore renewable energy, transportation, and related infrastructure. The emphasis on blue finance exemplifies how the energy transition agenda promotes holistic fiscal policy in support of energy security and sustainable development.

8.5 Policy Implications: Integrating Fiscal Policy, Energy Security and Blue Growth

The above implications are especially relevant in the context of the EU as its energy security agenda entails significant fiscal investment in the Blue Economy. The REPowerEU Plan, for instance, requires substantial public investment in offshore renewable energy, LNG, smart ports, and associated hydrogen infrastructure, among others. Therefore, the EU's response to the energy crisis illustrates how fiscal policy can strengthen energy security, support the transition toward a carbon-neutral economy, and stimulate investment in Blue Economy infrastructure. The crisis also highlights how sovereign fiscal policies and public borrowing can support energy transition, fiscal sustainability, and macroeconomic stability.

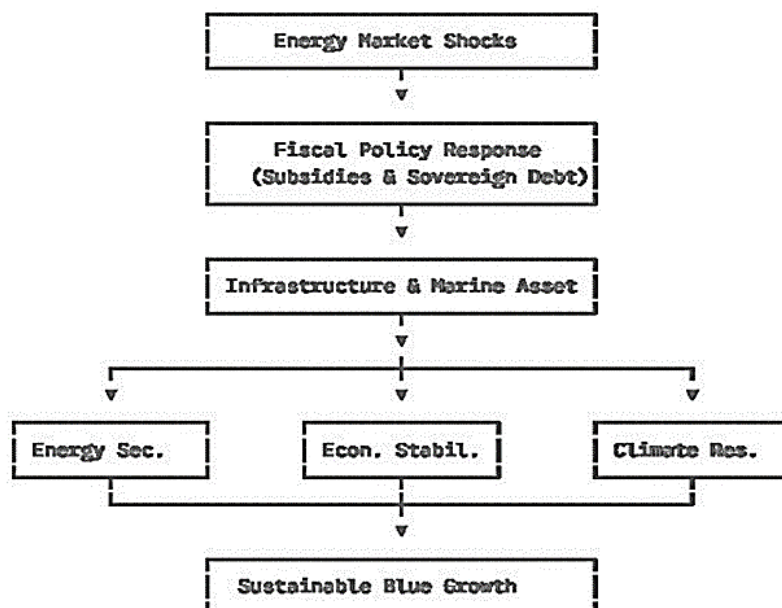


Figure 2: Interaction between Energy Security, Fiscal Policy and Sustainable Development
(Source: Authors' Own Work)

Figure 2 indicates the relationship between fiscal policy, energy security, and sustainable development.

9. Conclusions

The findings discussed in this chapter indicate that energy market shocks have gradually changed the role of fiscal policy. Measures initially introduced to provide immediate relief from rising energy prices are increasingly being combined with longer-term policies addressing energy security, public finance, and economic transformation. Subsidies, tax reductions, and direct support remain important during crises, while public investment and new financing arrangements can strengthen energy systems and reduce future vulnerabilities. Sovereign borrowing is an important source of financing during periods of economic pressure. Green bonds, blue finance, and other sovereign financing instruments can support renewable energy, grid modernization, and related infrastructure. However, higher public debt may reduce the capacity of governments to respond to future shocks, making sound debt management an important part of energy-transition policies. The link between energy security and the Blue Economy is particularly important for coastal and maritime economies. Investment in offshore wind, floating solar, smart ports, and related infrastructure can support energy diversification while promoting sustainable economic activity. The experience of the European Union, including REPowerEU and NextGenerationEU, shows how public financing can contribute to energy resilience and structural transformation. Future research should therefore examine how governments can balance sovereign debt, energy security, and Blue Economy investment to strengthen fiscal resilience and support sustainable development.

10. Future Research Directions

The analysis offered in this chapter raises numerous questions requiring further in-depth investigations that may contribute to a better understanding of the relationships between energy market shocks, fiscal policies, and long-run structural change. Firstly, future research on the topic should go beyond proving qualitative comparisons and apply mixed and quantitative

methods. Secondly, there is a need for conceptualizing the evolution of regional energy partnerships and enlargement using theories of complex interdependence and neofunctionalism, which could be applied to the processes of regulatory spillovers and infrastructural connectivity to identify the role of energy security as an enabler or barrier to deeper economic and geopolitical integration. Lastly, the relationships between fiscal interventions, energy security, and the Blue Economy require a more in-depth analysis. The current study focused on the regional level of analysis; therefore, the following research should be conducted to assess the relationships between offshore wind power, floating solar power, LNG terminals, floating storage and regasification units, smart ports, and other elements of the Blue Economy in multiple coastal and island states.

REFERENCES

- Anghel, V., & Džankić, J. (2023). *The European Union and enlargement politics after the Russia–Ukraine war*. Routledge.
- Anghel, V., & Jones, E. (2022). Is Europe really forged through crisis? Pandemic EU and the Russia–Ukraine war. *Journal of European Public Policy*, 29(5), 766–785.
- Balfour, R., & Stratulat, C. (2012). *The enlargement of the European Union*. European Policy Centre.
- Blanchard, O. (2019). Public debt and low interest rates. *American Economic Review*, 109(4), 1197–1229. <https://doi.org/10.1257/aer.109.4.1197>
- Buchkovska, A. (2024). Energy security and EU enlargement policy in Eastern Europe. *East European Politics*, 40(1), 55–73.
- Darmayadi, A., & Megits, N. (2023). The Russia–Ukraine war and European energy security transformation. *Energy Strategy Reviews*, 48, 101091.
- Energy Charter Treaty. (1994). *Energy Charter Treaty and related documents*. Energy Charter Secretariat.
- European Commission. (2006). *Green paper: A European strategy for sustainable, competitive and secure energy* (COM/2006/105 final). Publications Office of the European Union. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52006DC0105>
- European Commission. (2010). *Europe 2020: A strategy for smart, sustainable and inclusive growth* (COM/2010/2020 final). European Commission.
- European Commission. (2020). *An EU strategy to harness the potential of offshore renewable energy for a climate neutral future* (COM/2020/741 final). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0741>
- European Commission. (2022). *REPowerEU plan* (COM/2022/230 final). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:230:FIN>
- European Commission. (2023). *European economic forecast: Autumn 2023* (Institutional Paper 258). Directorate-General for Economic and Financial Affairs. <https://doi.org/10.2765/325116>
- European Commission. (2024). *The EU Blue Economy Report 2024*. Publications Office of the European Union. <https://doi.org/10.2771/186064>
- European Investment Bank. (2023). *EIB investment report 2022/2023: Resilience and renewal in Europe*. European Investment Bank. <https://doi.org/10.2867/307689>
- Department for Business, Energy & Industrial Strategy. (2023). *BEIS annual report and accounts 2022 to 2023: Financial statements*. GOV.UK. Available at: <https://www.gov.uk/government/publications/beis-annual-report-and-accounts-2022-to-2023/financial-statements> (Accessed on: 13 September 2026).
- Department for Energy Security and Net Zero. (2024). *DESNZ annual report and accounts 2023 to 2024: Financial statements*. GOV.UK. Available at:

- <https://www.gov.uk/government/publications/desnz-annual-report-and-accounts-2023-to-2024/financial-statements> (Accessed on: 13 September 2026).
- Government of India, Ministry of Petroleum and Natural Gas. (2023, March 24). *Cabinet approves targeted subsidy to Pradhan Mantri Ujjwala Yojana consumers*. Press Information Bureau. Available at: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1910518> (Accessed on: 13 September 2026).
- Haas, E. B. (1958). *The uniting of Europe: Political, social, and economic forces, 1950–1957*. Stanford University Press.
- Holsti, K. J. (1978). A new international politics? Diplomacy in complex interdependence. *International Organization*, 32(2), 513–530.
- International Energy Agency. (2023). *World energy outlook 2023*. International Energy Agency.
- International Energy Agency. (2025). *Korea 2025: Energy policy review*. IEA. Available at: <https://www.iea.org/reports/korea-2025> (Accessed on: 13 September 2026).
- International Monetary Fund. (2023). Fiscal monitor: Climate crossroads: Fiscal policies in a warming world. International Monetary Fund. <https://doi.org/10.5089/9798400250286.089>
- International Renewable Energy Agency. (2023). Renewable energy statistics 2023. International Renewable Energy Agency. <https://www.irena.org/Publications/2023/Jul/Renewable-energy-statistics-2023>
- International Energy Agency. (2024). Electricity 2024: Analysis and forecast to 2026. IEA. Available at: <https://www.iea.org/reports/electricity-2024> (Accessed on: 13 September 2026).
- International Energy Agency. (2025). *Korea 2025: Energy policy review*. IEA. Available at: <https://www.iea.org/reports/korea-2025> (Accessed on: 13 September 2026).
- Keohane, R. O., & Nye, J. S. (1977). *Power and interdependence: World politics in transition*. Little, Brown.
- Keskin, F. (2019). *Avrupa Birliği tarihi ve politikaları*. Seçkin Yayıncılık.
- Keypour, J., & Hendla, I. (2019). The annexation of Crimea: A realist look from the energy resources perspective. *Baltic Journal of European Studies*, 9(3), 148–165. <https://doi.org/10.1515/bjes-2019-0027>
- Ministry of New and Renewable Energy. (2025). *2025 marks highest-ever renewable energy expansion in India's energy transition journey*. Government of India. Available at: https://ngm.mnre.gov.in/admin/uploads/176794038987418Press%20Release_Renewable%20Energy%20Capacity%20in%202025.pdf (Accessed on: 13 September 2026).
- Niemann, A. (2021). *Neofunctionalism*. Oxford University Press.
- National Bureau of Statistics of China. (2023). *Statistical communiqué of the People's Republic of China on the 2022 national economic and social development*. Available at: https://www.stats.gov.cn/english/PressRelease/202302/t20230227_1918979.html (Accessed on: 13 September 2026).
- OECD. (2020). *Reframing financing and investment for a sustainable ocean economy*. OECD Publishing. https://www.oecd.org/en/publications/reframing-financing-and-investment-for-a-sustainable-ocean-economy_eb0780e6.html
- OECD. (2022). *Financing a sustainable ocean economy*. OECD Publishing.
- OECD. (2023). *Aiming better: Government support for households and firms during the energy crisis*. OECD Publishing.
- Rehman, M. U., Kashif, M., Naifar, N., & Shahzad, S. J. H. (2021). Socially responsible funds and traditional energy commodities: a diversification perspective for investments. *Frontiers in Environmental Science*, 9, 709990.

- Rehan, R., Khan, M. A., Fu, G. H., Sa'ad, A. A., & Irshad, A. (2024a). The determinants of Shariah banks' capital structure. *International Journal of Economics and Financial Issues*, 14(5), 193-202.
- Rehman, M. U., Jaral, R., Ghardallou, W., Kashif, M., & Vo, X. V. (2026). Market reactions to climate news: Evidence from European energy markets. *International Review of Economics & Finance*, 105257.
- Rehan, R., Sa'ad, A. A., Haron, R., & Hye, Q. M. A. (2023). Inspecting sector-specific capital structure determinants: The case of Malaysian Shariah firms. *International Journal of Applied Economics, Finance and Accounting*, 17(2), 402-414.
- Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a time of debt. *American Economic Review*, 100(2), 573–578. <https://doi.org/10.1257/aer.100.2.573>
- Rehman, M. U., Nautiyal, N., Alessa, N., Kashif, M., & Vo, X. V. (2025). Crude signals: Asymmetric adjustments in energy markets to global oil price shocks. *Journal of Environmental Management*, 391, 126567.
- Rehan, R., Sa'ad, A. A., Fu, G. H., & Khan, M. A. (2024b). The determinants of banks' capital structure in SAARC economies. *Edelweiss Applied Science and Technology*, 8(4), 417-433.
- Sapir, A. (2022). *European Union enlargement in geopolitical context*. Bruegel.
- Schmitter, P. C. (2004). Neo-neofunctionalism: Déjà vu, or all over again? In A. Wiener & T. Diez (Eds.), *European integration theory* (pp. 45–74). Oxford University Press.
- Schubert, S. R., Pollak, J., & Kreutler, M. (2016). *Energy policy of the European Union*. Palgrave Macmillan. <https://doi.org/10.1007/978-1-137-38884-1>
- Sgaravatti, G., Tagliapietra, S., Trasi, C., & Zachmann, G. (2023). *National fiscal policy responses to the energy crisis*. Bruegel.
- Siddi, M. (2022). The Russia–Ukraine war and European energy security. *Survival*, 64(1), 7–24.
- United Nations Conference on Trade and Development. (2023). *Review of maritime transport 2023: Towards a green and just transition*. United Nations. <https://unctad.org/publication/review-maritime-transport-2023>
- U.S. Department of the Treasury. (2023). *The Inflation Reduction Act's benefits and costs*. Available at: <https://home.treasury.gov/news/featured-stories/the-inflation-reduction-acts-benefits-and-costs> (Accessed on: 13 September 2026).
- United Nations. (2023). *The sustainable blue economy*. United Nations.
- Ul-Haq, J., Visas, H., Rehan, R., Hye, Q. M. A., & Abbas, S. (2025). Toward energy security: The role of industrial intelligence and high-quality economic development. *International Journal of Management and Sustainability*, 14(2), 530-547, <https://doi.org/10.18488/11.v14i2.4213>
- Vachudova, M. A. (2014). EU leverage and national interests in the Balkans: The puzzles of enlargement ten years on. *Journal of Common Market Studies*, 52(1), 122–138. <https://doi.org/10.1111/jcms.12081>
- Van der Loo, G. (2016). *The EU–Ukraine Association Agreement and Deep and Comprehensive Free Trade Area: A new legal instrument for EU integration without membership* (Vol. 10). Brill | Nijhoff.
- Wolczuk, K. (2016). Managing the flows of gas and rules: Ukraine between the EU and Russia. *Eurasian Geography and Economics*, 57(1), 113–137. <https://doi.org/10.1080/15387216.2016.1174072>

World Bank. (2017). *The potential of the blue economy: Increasing long-term benefits of the sustainable use of marine resources for small island developing states and coastal least developed countries*. World Bank.

World Bank. (2023). *Global economic prospects*. World Bank.

Additional Reading

Blanchard, O. (2023). Fiscal policy under low interest rates. MIT Press.
<https://doi.org/10.7551/mitpress/14858.001.0001>

Bosmans, P., & de Mariz, F. (2023). The blue bond market: A catalyst for ocean and water financing. *Journal of Risk and Financial Management*, 16(3), 184.
<https://doi.org/10.3390/jrfm16030184>

Mammetti, V., Zenios, S. A., & Morelli, G. (2026). Are sovereign debts sustainable under energy transition? *Energy Economics*, 157, 109230.
<https://doi.org/10.1016/j.eneco.2026.109230>

Key Terms and Definitions

Key Term	Definition
1. Energy Market Shock	A sudden and significant disruption in global energy supply or demand that causes sharp price increases, inflationary pressure, and broader macroeconomic instability.
2. Energy Security	The reliable availability of energy at affordable prices, achieved through diversified sources, resilient infrastructure, and reduced exposure to external supply risks.
3. Fiscal Response	Government measures such as subsidies, tax relief, price regulation, and direct transfers used to cushion households, firms, and energy markets from the immediate effects of energy price shocks.
4. Sovereign Financing	The use of public borrowing, debt issuance, and state-backed financial instruments to fund emergency support and longer-term energy infrastructure investments.
5. Fiscal Resilience	The capacity of public finances to absorb energy-related shocks and sustain necessary spending without undermining long-term debt sustainability or future policy space.

Disclosure of Delegation to Generative AI

The authors declare the use of generative AI in the research and writing process. According to the GAIDeT taxonomy (2025), the following tasks were delegated to GAI tools under full human supervision:

(No specific tasks selected)

The GAI tool used was: GPT 5.2.

Responsibility for the final manuscript lies entirely with the authors.

GAI tools are not listed as authors and do not bear responsibility for the final outcomes.

Declaration submitted by: Sibel Elif Özdilek