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Political impact of the EU energy transition: A geopolitical analysis

Abstract. The purpose of this study was to identify the geopolitical implications for the international community of the transition to green energy in Europe. The methods of the study included documentary analysis, content analysis, comparative method, and system analysis. The findings of the study revealed that the energy transition in the European Union reflects a long-term trend towards integration and liberalisation of the energy market, which dates back to the mid-20th century. The analysis of the evolution of the regulatory framework showed that initially the focus was on creating a single market, but in the 21st century, environmental sustainability and carbon neutrality became priorities. Geopolitical developments, including Russia's full-scale invasion of Ukraine, which substantially changed the EU's energy balance, were also examined. The analysis of trends revealed that the European Union dramatically reduced its dependence on Russian energy resources, which led to a shift in global energy flows and Russia's reorientation towards Asian markets. In response to this challenge, the EU intensified its diversification of supplies, increasing imports of conventional energy resources from the United States and Norway. The Chinese government also gained some benefits, namely strengthening its position in the export of solar panels to the European Union, which are critical for the energy transition. The study generalised that the energy transition created a new political balance, where green economies seek to cooperate with likeminded economies, as exemplified by the cooperation between the EU, Chile, and Australia. However, the problem continues to be the struggle for critical resources, which are scarce in the subsoil and owned by most of the world's democracies. The study can be used for lectures and practical classes in international relations and international law

Keywords: critical materials; competition; carbon neutrality; minerals; energy dependence

Introduction

The energy transition from fossil fuels to renewable energy sources is one of the greatest challenges of the 21st century, as it affects environmental, economic, and geopolitical processes. For the European Union, which strives to be a global leader in the fight against climate change, this issue is of strategic significance, as reducing greenhouse gas emissions is viewed as critical to overcoming the effects of global warming. Extreme weather events cause extensive economic losses and threaten food security. At the same time, the energy transition is changing the global balance of power, and dependence on energy imports makes countries politically vulnerable, which was especially evident after Russia's full-scale invasion of Ukraine in 2022.

A. Herranz-Surralles (2024) confirmed that the energy transition within the EU is gaining a geopolitical dimension, which affects decision-making, specifically, the implementation of green industrial policies to stimulate innovation and local production of green technologies, as well as the expansion of grounds for restricting foreign investment in the energy sector. In the context of Russia's full-scale invasion of Ukraine, the EU took faster decisions, such as nationalising foreign energy assets. M. Mišík & A. Nosko (2023) noted Russia's full-scale invasion of Ukraine as a crisis that caused a sharp acceleration in the energy transition, which in the long term will strengthen the EU's independence from external energy suppliers. R. Martyniuk (2024) noted the issues of harmonisation of environmental legislation in the countries seeking to become part of the EU.

However, according to M. Medvedieva *et al.* (2024), with the beginning of the full-scale invasion, most environmental initiatives in Ukraine were suspended, as a large number of innovative enterprises were destroyed or ended up in the temporarily occupied territories. As a result, the Ukrainian government, together with the European Commission, developed the REPowerEU plan to increase energy saving, energy efficiency, and environmental monitoring. Additionally, the plan envisaged that Ukraine would

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become a major transit route for hydrogen transport to European countries. This is relevant in the context of the EU's ability to build political coalitions, as pointed out by T. Jerzyniak & A. Herranz-Surrallés (2024). This includes a form of political arrangements that establish concrete commitments, which greatly facilitates institutional cooperation between actors in international relations. M. Siddi & F. Prandin (2023) shared an analogous opinion. The researchers pointed out that the EU's political priorities in the energy transition have gradually shifted to broad cooperation with 'like-minded' democracies, i.e., Western-style democracies. The catalyst for such cooperation was Russia's full-scale invasion of Ukraine.

F. Proedrou (2023) noted that reducing the EU's dependence on Russian energy resources and developing its own clean energy market offers immense potential for the EU to reduce emissions and develop energy efficiency. However, the positive aspects of decarbonisation are weakened by challenges in fuel diversification, which leads to a fixed use of gas and coal. According to M. Salimi & M. Amidpour (2022), the transition of a considerable number of countries to renewable and clean energy sources reduced the significance of security in the Middle East for US policymakers, which, however, may increase in the future. Considering the above, the purpose of the present study was to identify the key challenges, threats, and opportunities in the transition to clean energy in the EU and the influence of this process on international relations. The objectives of the study were to examine the EU's energy policy, changes in carbon energy supply actors, and the strengthening of the role of renewable energy sources outside the EU.

Literature Review

There is a considerable amount of research that focuses on the use of fossil resources, the transition to renewable energy sources, and the relationship between these processes and democratic transformation. A valuable was made by D. Yergin (1991). In one of the chapters, the researcher described how oil was changing the world order. Yergin noted that the Arab oil embargo in the 1970s caused considerable changes in almost all world economies. The very revenues of oil exporters grew from USD 23 bn in 1972 to USD 140 bn in 1977. The role of oil and the 1973 crisis was also described by G. Blainey (1988). According to Blainey, in the 1970s the world was more dependent on oil than it had been on coal half a century earlier. If a coal embargo had occurred in the steam era, it would not have affected global economic processes, but the oil embargo was more deadly because cars and planes had no alternative to oil.

M. Klare's (2002) monograph was a study of global competition for natural resources under various conditions, including population growth and resource scarcity. The researcher showed how the struggle for oil, water, and other strategic resources for humanity affects international relations and, therefore, occasionally causes conflicts. The core idea of the study is that natural resources contribute not only to development but also become catalysts for conflicts. According to Klare's observations, wars are increasingly becoming a consequence of struggle and control over resources rather than ideological differences or political ambitions.

S. LeVine (2007) describes the fate of post-Soviet countries that had large oil reserves. Western governments, recognising an opportunity to reduce their dependence on the Persian Gulf energy suppliers, sought to establish cooperation with new actors in international relations. The excitement around the region could be compared to the opening of the Suez or Panama Canals. T. Mitchell (2011) examined the relationship between democratic processes and the use of fuels, particularly oil and coal. The researcher proposed the definition of 'carbon democracy' as a sign that energy systems have affected the development of political systems and democratic processes. Mitchell's concept is that it is the extraction and transportation of energy resources that has increased the dependence of large industrial centres on the work of miners, which has increased the ability of the latter to strike and demonstrate, and thus their political influence. At the same time, the rapid transition to the use of oil levelled the possibilities of collective political resistance, as oil production processes did not require large and centralised labour flows.

P. Belkin *et al.* (2013) noted that Europe is a major consumer of energy and therefore faces challenges in meeting its needs. These challenges include growing demand and competition for energy resources from India and China, instability in energy production regions such as the Middle East, and the growing problem of fuel switching amid climate change. V. Smil (2017) explored the role of energy in the overall development of humanity. The study focused on the prehistoric period, namely the use of primitive tools by the first people to extract and use fire for energy needs. Smil paid attention to coal and oil as the causes of the rapid industrial revolution, which was the outcome of the 'energy transition', i.e., the gradual shift from one type of energy source to another. Control over energy sources, according to Smil, determined the course and content of many geopolitical conflicts, as control over resources became one of the decisive factors in international relations.

D. Scholten (2018) noted that the mere availability of renewable energy sources is a game changer in interstate energy relations. Scholten pointed out the differences between renewable energy sources and fossil fuels as their considerable number and variability, the possibility of decentralising generation, and the use of rare earth metals. Another valuable thorough study in the field of cultural history of natural resources was conducted by A. Etkind (2021). The researcher focuses on the fact that diverse types of raw materials have "political properties and therefore can influence the formation of social institutions. In the context of the 21st century, Etkind described resource dependence as an "evil" that negatively affects both climate and geopolitics. The book edited by M. Knodt & J. Kemmerzell (2022) noted that the very idea of coordinated action in the field of energy policy was part of the foundation of the modern EU. The treaty framework of the late 2010s laid the foundation for the modern energy policy of the Union, as energy became a policy area under the joint competence of the EU and its member states.

Thus, initially, research focused on oil as a key geopolitical factor. In the 2000s, the focus shifted to competition for resources and their role in armed conflicts. After 2010, researchers began to look at energy through the lens of

political influence and long-term transformations in democracies. The most recent studies analysed have examined not only fossil fuels, but also renewable energy sources, which are changing traditional energy geopolitics. This indicates a shift from controlling resources to controlling technologies and energy supply infrastructure.

Materials and Methods

The study was based on the review of documents that record the evolution of European energy policy, namely through the Treaty of Rome (1957), Treaty on the European Atomic Energy Community (1957), Euratom Treaty (1957), Single European Act (1987), Green Paper on Greenhouse Gas Emissions Trading within the European Union (2000), Europe's Climate Change Opportunity (2008), and Fit for 55 (2021). The study of the evolution of EU energy policy employed the historical method, specifically to analyse the path to the European Green Deal (2019). The analysis of these documents helped to assess the gradual strengthening of the EU's regulatory role in the energy sector and the impact of climate goals on the Union's policy.

To assess the geopolitical aspects of the energy transition in the EU, a comparative method was applied to identify changes in the structure of international energy cooperation before and after Russia's full-scale invasion of Ukraine. Specifically, the study examined reports by the International Energy Agency (2024), as well as materials by the Bruegel (Keliauskaitė & Zachmann, 2024) and ExPro Consulting (Special material: 5-year…, 2024) think tanks. The assessment of international cooperation in the energy sector was based on the analysis of publications by Kyiv School of Economics (2024), Upstream (Afanasiev, 2024), and Eurogas (2024). The analysis of Energy Monitor (Bindman, 2024), Deutche Welle (China decries…, 2024), and Reuters (Abnett & Chestney, 2024) allowed studying the rhetoric of leading international media on the role of major actors in international relations in changing the global energy balance. Ember (China's solar…, n.d.) was used for a systematic analysis of clean energy supplies.

The economic and political aspects of international cooperation were analysed using a systematic approach to evaluate publications by Diversegy (Emerging Energy…, 2024), reports by the World Economic Forum (Conley, 2023), the European Commission (Chile. Policy background, n.d.; EU-Chile Advanced…, 2023), and The Group of the European People's Party on cooperation between the EU and Chile (EU-Chile agreement…, 2024). The comparative method was employed to investigate the EU-Australia relations based on the materials of the European Commission (EU and Australia…, 2024) and EU regulations (Regulation of the European Parliament and of the Council No. 2024/1252, 2020). The methodology of this study combined the analysis of regulations, content analysis of official and analytical sources, comparative and systematic approaches for a comprehensive study of the EU's energy transition and its impact on geopolitics.

Results

History of the energy transition within the European Union. The development of the EU as a political and economic structure began in the 1950s. It was then that French Foreign Minister R. Schuman proposed the creation of a single market for coal and steel within those countries that would agree to control these sectors of the economy (The birth of the European…, 2020). The primary reason for the significance of such a decision for French politicians was that the newly created economic structure would be necessary to avoid all possible future conflicts between the French and the Germans. By 1954, all possible obstacles to trade in goods such as coal, steel, coke, cast iron, and others between the signatories to the Treaty Establishing the European… (1951), namely the governments of France, the Federal Republic of Germany, Italy, Belgium, the Netherlands, and Luxembourg, had been virtually levelled. Accordingly, trade in these goods grew in the 1950s. This was made possible by the establishment of clear rules and control over trade. Specifically, the European Coal and Steel Community set production limits, quotas, and fixed prices. Furthermore, the organisation could impose fines on companies that violated the generally accepted rules.

Later, in 1957, the same governments signed the Treaty of Rome (1957), the Treaty on the European Atomic Energy Community (1957), and the Euratom Treaty (1957). The key goals of these treaties were to promote research and better disseminate technical information, codify shared safety standards to protect industrial workers and the public, facilitate research, and ensure that civilian nuclear material was not used for other purposes, including military ones. The significance of these treaties in the 1950s was underlined by the major role of nuclear power as a source of energy for most Eastern European countries (Euratom Treaty, 1957). However, the safety standards and the level of protection of workers were low, which was an added incentive for the adoption of the relevant treaties.

In 1987, the Single European Act (1987) was additionally adopted. This treaty aimed to remove barriers by creating a single market within which goods, services, people, and capital could move freely. Its adoption was a major step towards liberalising the energy sector. Specifically, it introduced competition between energy operators, which gained the status of trans-European, and introduced market prices, energy transmission, and distribution (High School, 2023). However, at the beginning of the 21st century, a new challenge gradually emerged, namely climate change, as greenhouse gas emissions from anthropogenic activities caused a serious increase in the average temperature of the planet. In March 2000, the European Commission presented the Green Paper on Greenhouse Gas Emissions Trading within the European Union (2000), which contained certain proposals on the type and ideas of an emissions trading system in the EU. In 2005, the first phase of the EU emissions trading programme was launched (Development of EU ETS, 2020). It covered CO_2 emissions from oil refineries, coke ovens, ferrous metal production and processing, and other aspects of the economy. As a first stage, the programme did not show sufficient effectiveness, which is why it later became more stringent. As of 2025, the fourth phase, which runs from 2021 to 2030, is still relevant. Overall, this programme aims to force businesses, organisations, companies, etc., to pay a tax on emissions, which helps reduce emissions and generates more funds for the green transition within the EU.

Europe's Climate Change Opportunity (2008) noted compelling evidence that the cost of inaction will be high, ranging from 5% to 20% of GDP (gross domestic product). Additionally, rising oil and gas prices reflected that competition for energy resources was becoming more pronounced, and thus energy efficiency and renewable energy could become the most profitable investments. The two key targets set by European leaders were to reduce greenhouse gas emissions by at least 20% by 2020, and if necessary to increase this figure to 30% if an international agreement were adopted; and to increase the share of renewable energy sources in EU energy consumption to 20% by 2020. However, due to the only relative success of this initiative, in 2014 the targets were adjusted to 2030 (High School, 2023).

Between 2008 and 2013, primary energy consumption in the EU decreased by 118 million tonnes, or 1.4%, due to economic problems after the global crisis (Betzüge, 2015). The share in global primary energy consumption fell to 13% in 2013, compared to 16% in 2008. In 2013, the share of energy from renewable sources was 6.6%, but fossil fuels still dominated the EU's energy mix with 77%. Oil production declined to 8.4% between 2008 and 2013, while gas production fell by 5.2% per year. Additionally, due to Germany's abandonment of nuclear power, its use within the EU decreased by 10%. As for hydroelectric power plants, energy production doubled in the same period, particularly in countries such as Germany, Italy, Spain, and the UK.

A historically significant decision within the EU was the adoption of the European Green Deal (2019). The primary goal of this initiative is the complete absence of greenhouse gas emissions in the EU by 2050, and economic growth that is not related to the use of fossil resources. The first stage is to reduce emissions by at least 55% by 2030, which was adopted within the framework of the Fit for 55 (2021). The EU's energy policy as a factor of stability and well-being of the entire European community was finally established after Russia's full-scale invasion of Ukraine, which led to an increase in the share of investments in the energy transition (Fig. 1).

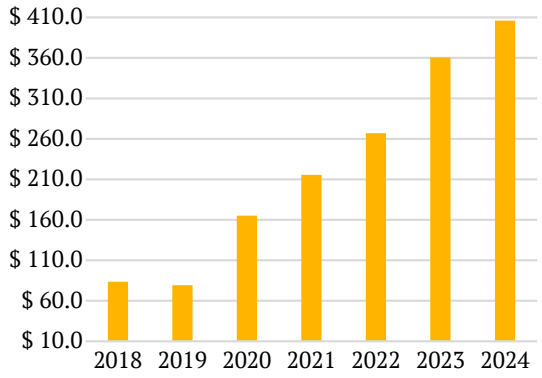

Figure 1. EU investments in the energy transition (USD bn)

Source: developed by the author of this study based on data from The International Energy Agency (2024), R. Holman & J.S. Lefort (2024)

As Figure 1 demonstrates, in 2018-2019, investment in the EU's energy transition was relatively low. In 2020, they almost doubled, indicating a change in the energy course. This area was stipulated in the European Green Deal (2019) as the EU's fundamental climate policy strategy. Accordingly, in 2022-2025, the EU, under pressure from foreign policy factors and geopolitical tensions, managed to counter numerous energy security risks, regained control over the energy market, and accelerated the transition to climate neutrality. According to the European Commission's website (State of the Energy Union Report, 2024), at the international level, the EU committed itself to leading a global initiative to triple the capacity of renewable energy production and to double energy efficiency in the transition away from fossil fuels. Within the EU, 10 times more money is spent on clean energy investments than on fossil fuels, which demonstrates the determination of EU policymakers to make a green transition and the desire to end dependence on other actors in international relations (Holman & Lefort, 2024).

Thus, the EU's energy transition reflects the gradual evolution of economic, political, and environmental priorities that influence the geopolitical balance in the region. Since the 1950s, the foundations for the integration of energy markets have been laid, and since the 1980s, a phase of liberalisation has been initiated, which has contributed to increased competition and economic integration. However, the climate challenges of the 21st century have necessitated a revision of energy strategies, which has led to a course of action within the EU to reduce dependence on fossil fuels, replacing them with increased renewable energy production and the introduction of carbon dioxide emission quotas. Thus, the EU's energy policy in the 1950s and 2020s was focused on maximising the internal stability of the community and strengthening the EU's role as a global leader in addressing environmental and energy challenges. Additionally, reducing the EU's dependence on other actors in international relations in terms of carbon trade substantially affects Russia's ability to wage a full-scale war against Ukraine, thereby changing the geopolitical and geostrategic threat landscape in the 21st century.

Impact of the 2022 energy crisis on the geopolitical situation in Europe and the world. Since 2022, measures have been taken within the framework of the EU to gradually reduce dependence on Russian fossil fuels. In March 2022, EU leaders agreed that a reduction in dependence on imports of Russian gas, oil, and coal should be achieved in the shortest possible time (European Council, 24-25..., 2024). This was critical from the standpoint that persistently rising energy prices were affecting European businesses and citizens, and that this range of threats was being exacerbated by military aggression against Ukraine. According to the data published on the European Council website (EU sanctions..., 2024), 90% of the EU's oil imports from Russia are subject to a ban. The European Council's press release also noted that the ban was significant, as about 50% of total oil exports from Russia went to the EU. The situation was somewhat different with Russian gas imports, which, according to Foreign Policy (Hockenos, 2025), accounted for up to 18% of total EU gas imports (Table 1).

Table 1. Gas imports to the European Union (Tw/h)

Category	2021	2022	2023	January-August 2024
Imports through Ukraine	409	193	140	112
Imports through other gas pipelines	1,080	472	140	115
Liquefied natural gas transportation	145	195	183	150
Total imports of Russian gas	1,634	860	463	377
Total imports	3,856	3,751	3,250	2,072

Source: compiled by the author of this study based on data from U. Keliauskaitė & G. Zachmann (2024)

The information in Table 1 shows a gradual reduction in dependence on Russian gas supplies. This reflects the diversification of energy supply sources and the adaptation of European energy markets. It is in 2025 that the most significant changes in Russian gas imports to the EU can be expected. This is related to the termination of the agreement on the transit of Russian gas through Ukraine on 1 January 2025 (Special material: 5-year..., 2024). Slovakia and Hungary may suffer the greatest losses in this situation, which, combined with a certain pro-Russian stance of their governments in 2025, could cause further tension within the European Union.

However, the EU's refusal to buy Russian energy has not reduced Russia's role and share in global energy exports. Sanctions have not been a factor in reducing oil exports, and thus the Russian authorities continue to keep oil on the world market and have almost no problems with its transportation. As of the beginning of 2022, almost half, namely 3.8 million barrels per day, were exported to the EU, and another 4.2 million barrels to India, Turkey, China, the UK, the US, and other countries (Kyiv School of Economics, 2024). As of August 2024, only 0.3 million barrels were exported to the EU, while 2.1 million barrels were exported to China, 1.7 million barrels – to India, 0.6 million barrels – to Turkey, and 2.4 million barrels – to other countries. Therewith, the Russian authorities could have received much less benefit from the sale if oil prices had stayed low. In different periods of 2022, Russian oil prices ranged from an average of USD 70 to USD 89 per barrel. The lowest prices were from the end of 2022 to April 2023, but at the end of 2024, prices hovered around the USD 70 mark, only slightly below the levels prior to the full-scale invasion.

Russia's leadership is also looking for new ways to supply its gas to circumvent EU restrictions and keep its economic gains. As noted in an Upstream publication, the Russian government is moving forward with a strategic plan to ensure the construction of a new export route for natural gas supplies to China (Afanasiev, 2024). This pipeline will pass through Kazakhstan, which will both further maximise Central Asia's dependence on Russia and provide an opportunity to sell gas to China. According to the Russian official, if the project is implemented, the volume of gas deliveries could reach up to 10 billion cubic metres of gas per year to Kazakhstan and 35 billion cubic metres of gas per year to China. No exact timeline was given, but according to previous statements by Russian officials, the pipeline could be operational by 2029.

Along with the rapid energy transition in the EU, the US geopolitical position in the world has also changed. Following Russia's full-scale invasion of Ukraine, the EU's desire to reduce its dependence on Russian energy has become inextricably linked to climate goals by 2050. Imports of liquefied natural gas from the US play a vital role in achieving each of these goals and help to stabilise electricity prices for consumers in Europe. US LNG is crucial for Europe's energy transition as it is based on long-term and reliable supply relationships, which helps to decarbonise the energy sector. US production capacity is particularly relevant in places where there is a high dependence on coal, such as Germany, to support the gradual transition away from coal in industry (Eurogas, 2024). In percentage terms, the EU imported 28% of its total LNG from the US in 2021, rising to 43% in 2022 and slightly increasing to 46% in 2023 (Bindman, 2024). In 2024, the EU already accounted for as much as 55% of total US LNG exports. This example demonstrates the adaptation of US energy markets to fundamental changes in the European energy balance.

Against the backdrop of Russia's large-scale invasion of Ukraine in 2022, the Norwegian government began to meet 30% of Europe's energy needs. According to S. Horváth (2025), in the third quarter of 2024, Norway became the second largest supplier of crude oil to the EU member states with a share of 14%. In terms of liquefied natural gas, Norway was fifth with a share of 7.1%, which, although not extremely high, is 70% greater in the same period in 2023. Overall, Norway has covered 2% of the world's crude oil needs since 2022 and is the 12th largest oil producer in the world. Thus, since 2022, the EU has been gradually reducing its dependence on Russian fossil fuels, which has led to considerable changes in the region's energy balance. Russia has redirected its oil and gas exports to China, India, and Turkey, while Europe has increased its imports of liquefied natural gas from the United States and Norway. The cessation of gas transit through Ukraine in 2025 could affect the stability of supplies in the south-eastern part of the EU.

Shaping of a new political balance of power through renewable energy. Along with the energy transition within the EU, cooperation with many actors in international relations is becoming more relevant, and their resources are useful for accelerating this process. Chile, Brazil, and Argentina are among the world's best economies with developing energy markets (Emerging Energy..., 2024). According to the World Economic Forum, the Chilean government has set a goal of converting up to 70% of consumer energy into renewable energy by 2030 and becoming a carbon-neutral country by 2050 (Conley, 2023). These plans are indeed ambitious, exceeding the targets set for the EU by 2030. Accordingly, governments that aim to achieve lower emissions are becoming more attractive for cooperation.

In December 2023, at the 10th meeting of the EU-Chile Joint Steering Committee, many areas for future cooperation were identified, including the energy sector (Chile.

Policy background, n.d.). It was decided to establish close cooperation through Mission Innovation. Chile was also invited to join the EU's co-financing partnership for the transition to clean energy under the Horizon Europe initiative and to invest in various programmes related to climate neutrality. Furthermore, Chile is a major player on the global stage that can supply critical materials for the energy transition. In 2023, an updated EU-Chile Advanced Framework Agreement (2023) was agreed. According to one of the members of the European Parliament, J. Warborn, this agreement will increase EU exports to Chile to EUR 4.5 bn, as well as ensure the supply of critical raw materials and clean energy (EU-Chile agreement…, 2024). Specifically, access to materials such as lithium (essential for solar panels) and green hydrogen, which are among the most significant for the transition to a green economy, will be facilitated.

Australia is also a valuable country for cooperation with the EU. In May 2024, representatives of the EU and Australia signed a package of agreements based on the use of Australian mineral resources and European green experience to help both sides achieve carbon neutrality by 2050 (EU and Australia…, 2024). Specifically, it is planned to diversify the supply of critical materials to the EU necessary for the green transition, as well as to develop Australia's domestic minerals sector. The partnership covers a wide range of minerals value chains, including exploration, production, and processing. Additionally, the partnership focuses on mitigating harmful impacts in countries where the EU and Australia have common interests to benefit local communities. Concrete areas of cooperation include the integration of sustainable commodity value chains through research, innovation, promoting joint projects, creating new business models, and ensuring the sustainable production of critical materials.

However, Australia and Chile are not the only countries with which such memoranda have been signed. Since 2021, the European Commission has been establishing ties on raw materials in accordance with EU legislation on critical materials (Regulation of the European Parliament and of the Council No. 2024/1252, 2020). Specifically, cooperation was established with Ukraine and Canada in 2021, Kazakhstan and Namibia in 2022, Argentina, Chile, Zambia, the Democratic Republic of the Congo, Greenland in 2023, and Rwanda, Norway, and Uzbekistan in 2024 (EU and Australia…, 2024). However, overall, Australia is one of the most significant players on the global stage for clean energy cooperation. During the 2020s, the Australian government signed agreements on clean energy cooperation with the governments of China, Germany, India, Japan, the Republic of Korea, Singapore, the United Kingdom, the United States, and the Netherlands (Memorandum of Understanding Between…, 2024). The cooperation covers the areas of exploring options for trading Australian hydrogen and its derivatives, developing solar energy supply chains, green hydrogen, energy transportation and storage, removing barriers to joint large-scale green enterprises, low-emission steel and iron ore production, developing and deploying low-emission fuels, decarbonising industry, and introducing technologies for integrating variable renewable energy.

A critical issue in the energy transition is the struggle for resources. According to a report by the European Bank (2023), as the struggle for resources is only growing, many influential mining companies are seeking and buying up mines around the world. Although the greatest number of such mines and quarries are owned by firms from the US and Canada, it is Chinese companies that have stepped up their activity in 2013-2023. According to the report, the number of Chinese mines has doubled since 2013 in Africa, where about 30% of the world's mineral reserves are concentrated. If there are no mineral resources within a given country, firms will often seek to buy mines abroad or import critical materials from their trading partners that they consider reliable. Reliability in this context is defined by analogous political systems, values, and other features that bring countries closer together in the geopolitical context. The report determined the value similarity of countries according to their votes in the UN General Assembly (UNGA). That is, if a country voted the same way as the United States, it belongs to the first bloc, and if it voted the same way as China, it belongs to the second bloc. Accordingly, the first bloc consists of the EU, Moldova, Ukraine, Australia, South Korea, the UK, the US, some Pacific and other countries. The second bloc includes all other countries. Based on this, it was concluded that the reserves of critical resources such as zinc, lithium, nickel, graphite, chromium, platinum, etc. are mainly contained in the subsoil or under the control of the second bloc countries. With few exceptions, the first bloc countries dominate the extraction of boron, zirconium, hafnium, and helium.

Against the backdrop of the EU's energy transition, the role of the Chinese government in the production and sale of green technologies is also strengthening. In February 2024, the Xinhua News Agency published a report stating that in the context of severe economic difficulties, China's production of the 'new three', namely electric vehicles, lithium-ion batteries, and solar panels, has improved extensively, reaching an increase in exports of 29.9% in 2023 (Economic essay…, 2024). A major sector in this regard is the export of electric vehicles. In 2023, over 100,000 electric cars and hybrids were exported from China (China decries…, 2024). Additionally, in 2023, these exports increased by as much as 70% compared to 2022 and were valued at USD 34.1 bn. The largest recipients of electric vehicles were European countries, to which about 40% of them were exported. At the beginning of 2024, Chinese electric cars were subject to a 10% duty within the EU, with Deutscher Welle analysts noting that an increase in this duty to 25% could happen very soon. However, by the end of 2024, the duty was already 45.3% for Chinese electric vehicles, as massive Chinese subsidies for them were harming healthy competition in the global market. In 2023, the EU member states reached record solar power production capacity (Abnett & Chestney, 2024). However, most modules, panels, and parts came from China, in some cases as much as 95%. According to the analytical company Ember, the rapid growth of Chinese solar panel exports to the EU has been observed since 2020. However, it became most pronounced with the start of Russia's full-scale invasion of Ukraine. While in January 2020, 1.75 GW of solar panel capacity was shipped to the EU, in March 2023, this figure reached as much as 12.63 GW, setting a record (China's solar…, n.d.). From May to the end of 2024, these figures were declining, but this phenomenon was also noticeable in previous years, as there is no urgent need to export solar panels in the autumn and

winter. Accordingly, during the energy transition to the EU, the Chinese government has launched mass production of a component that is critical for the EU and has made a profit.

The development of a green transition is becoming not only the prerogative of high-ranking officials from the EU, but also from other countries. One of the most illustrative examples is the relationship between Norway and Canada (Rowlands & Sareen, 2025). Each country has relatively green grids, with 80% of electricity in Canada coming from carbon-free sources, and 98% in Norway. These figures are even more significant considering that in most countries of the world, up to 60% of electricity is generated from fossil fuels. Accordingly, the bilateral cooperation between these governments, which began in 2023, is of interest to the rest of the world in replacing existing carbon-dependent infrastructure.

The European green transition has also influenced the attitudes of the Gulf states towards their overdependence on fossil resources. According to N. Kozhanov (2024), other countries, including the EU, are putting increasing pressure on the Gulf states to accelerate their energy transition and make oil more environmentally friendly (Kozhanov, 2024). Accordingly, Gulf producers are forced to take measures to minimise harmful emissions from both production and transportation of oil products. Pressure from the international community to implement climate agreements and commitments led to Arab states participating in the COP 27 and COP 28 climate summits in 2022 and setting their own zero emissions targets in early 2024. However, in the face of the need to increase the role of renewable energy sources, the Gulf countries are taking steps to create a special form of circular economy that would still be based on hydrocarbon resources. For example, Saudi Arabia is promoting the concept of a circular carbon economy, which does not reject the use of carbon resources but proposes the introduction of mandatory measures to offset emissions through the Carbon Capture, Utilisation and Storage technology.

Another example of green cooperation is the Beyond Oil and Gas Alliance (BOGA). It is an international alliance of interested governments that have agreed to work together to phase out fossil fuels, including oil and gas. The Alliance was established by the governments of Denmark and Costa Rica, and as of 2025, it includes France, Ireland, Portugal, Sweden, Spain, and some other countries. Governments that join BOGA (n.d.) must sign a document and are then assigned to one of three levels of membership. The core member level obliges governments to stop all new concessions or licensing of oil and gas production, associate members must make efforts to stop financing oil and gas production and take all possible measures to do so, and the friends level of membership is a commitment to work with other parties to achieve emission reduction goals. The above-mentioned coalition can truly become a global political force, but gradually. The coalition's influence can grow through economic leverage, various diplomatic initiatives, and public support. At the same time, such coalitions may face resistance from energy lobbies and governments whose economies rely on fossil fuels.

Thus, the development of a new political balance and points of power through the promotion of renewable energy initiatives is a vivid example of how the world order is changing. The development of renewable energy sources is creating new centres of influence and strengthening the role of countries investing in this area. At the same time, the acute dependence on critical materials dramatically intensifies global resource competition, further emphasising international polarisation. However, for the EU, the energy transition has become not only a challenge but also an opportunity to strengthen new bilateral relations. Thus, the energy transition is a factor not only in reducing emissions and developing technologies, but also in defining a new architecture of international relations. Such a transformation, however, requires a structural approach and cooperation between governments seeking to adapt to new conditions, but the struggle for resources complicates this process.

Discussion

E. Ciappi (2023) highlighted the supranational features of the European Coal and Steel Community as the 'cornerstone' of European integration. The conclusions made by the researcher are quite prudent, as the findings of the study revealed that the beginning of European integration was conditioned by the integration of the energy sector. At the same time, P. Belkin *et al.* (2013) noted that the EU energy policy is facing new challenges. This is in line with the findings that the key trend in the 21st century is the control of energy supply infrastructure. The establishment of the European Coal and Steel Community was aimed at pooling key resources to avoid all possible and potential conflicts. In the following years, by 1954, trade barriers were removed, making the integration of the economies of France, Germany, and others go much better, along with an increase in trade. G. Aristizabal-H *et al.* (2023) also noted the significance of energy market integration after the Second World War but emphasised that high profits from coal mining began to decline in the 1960s. However, their conclusions need to be clarified, as the decline in coal profits did not mean a decline in the strategic role of coal for the European energy sector, but rather a decline in its use due to the emergence of new energy sources, specifically nuclear power. However, integration also meant the development of nuclear power, as the study findings indicated. Specifically, the treaties adopted in 1957 contributed to its development, along with the improvement of safety standards and the prevention of the use of the peaceful atom for military purposes. The above is in line with the statement of O. Quirico (2023) in the context of the above treaties, who noted that the common market simply could not exist without a proper energy policy. M. Gerlini (2024) explored the aspect of the creation of the Euroatom in 1957, along with the prevention of its use for military purposes. However, the researcher pointed out that the Euroatom staff in the late 1950s was very inexperienced and lacked nuclear competence, unlike scientists from the United States or the United Kingdom who had worked in this field during the Second World War. The reason for the difference in the interpretation of the initial stages of nuclear power integration lies in the differing views on this system. The aforementioned researcher described them in terms of management efficiency, while the present study was based on the fact of European energy security.

The study also demonstrated the significance of the adoption of The Single European Act (1987), as it contributed to the liberalisation of the energy market and created competition between energy operators. I. Ydersbond (2025) also discussed the value of this document as a legal basis for a single internal energy market for electricity and gas. M. Błażejowska *et al.* (2024) confirmed the significance of the emissions trading system in the EU. The researchers also added that this mechanism is the largest compliance-based mechanism in the world. The development of the energy market in 2020 is inextricably linked to the adoption of the European Green Deal (2019) in the EU, which set a critical goal of achieving zero emissions by 2050, and at earlier stages – reducing emissions by 55% by 2030. However, J. Hereu-Morales *et al.* (2024) disagreed with the effectiveness of the agreement. Specifically, the initiative does not mention the environmental impact of renewable energy production systems and their acute dependence on rare earth metals.

American companies have managed to benefit from the EU energy crisis. Specifically, this applies to liquefied natural gas, whose exports to the EU accounted for 55% of the total. D. Wood (2024) agreed with the above statement, writing that Europe is increasing imports of liquefied natural gas. The above is also consistent with the findings of S. Chen *et al.* (2024), who pointed out that the aspect of import growth in the EU is essential in terms of diversifying energy supplies. The Chinese government has also considerably strengthened its position in the global green transition market. This was evidenced, specifically, by the rapid growth in sales of Chinese electric vehicles to the EU, according to the study. X. Zhao *et al.* (2024) agreed with this statement, as the Chinese government has become a global leader in electric vehicle sales. The EU's critical dependence on China is also evident in the import of solar panels. Statistics from the study revealed that imports in this area from China have increased over 12 times since 2020. This situation is reducing global demand for fossil fuels, which in the long term could exacerbate the economic situation in the leading fossil fuel exporting countries. A statement confirming the above can be found in the study by A. Ikevuje *et al.* (2024). The researchers noted that countries such as Venezuela are facing challenges due to declining oil demand and increasing demand for renewable energy.

O. Nilsen & K. Luczy (2023) reported that in the new geopolitical environment, Norway's role in supplying conventional energy resources to the EU is crucial. This is consistent with the findings of the present study that Norway has become one of the crucial suppliers of conventional energy resources to the EU. F. Hermundsdottir *et al.* (2024) pointed out that Norwegian energy companies additionally have strict environmental regulations. The conclusions drawn by the researchers are quite relevant, as the energy transition within the EU is also a driver for other economies to be more environmentally friendly.

Apart from the above, the international community is developing aspirations for mutual cooperation between 'green' governments, i.e., those that have set emission reduction targets in their structural documents, as exemplified by the renewed cooperation between the EU and Chile analysed in the current study. I. Torreblanca (2024) also pointed out that cooperation between the EU and Chile is significant in terms of the energy transition of both parties. Another actor in international relations that has become crucial for the global and European energy transition is Australia, with whose government the EU has established close cooperation in the 2020s. Y. Ghorbani *et al.* (2024) also pointed out that countries rich in so-called GEMMs (green energy minerals and metals), including Australia, have great energy potential and even geopolitical influence. In the context of the above, according to the study, a noticeable increase in the share of Chinese mining companies is observed in Africa, which creates an imbalance in world trade and increases China's geopolitical role. S. Nkala (2024) also reported this, confirming that Chinese investment in Africa's mining sectors is motivated not by commercial benefits but by the geopolitical interests of the Chinese authorities. The energy transition policy also affects the Gulf countries, which are consistently implementing their own green technologies under pressure from the international community. The above statement is consistent with the findings of M. Islam & A. Ali (2024), as already in 2022, the total renewable energy capacity in Saudi Arabia, Qatar, and Oman reached 443 MW, 824 MW, and 688 MW, respectively.

Additionally, as for Australia, the government is developing relations not only with EU countries, but also with the United States, Japan, and even India and the Republic of Korea. This helps to develop solar energy supply chains and allows heavy industry to achieve decarbonisation. For instance, in the case of the Republic of Korea, H. Park *et al.* (2024) noted that importing green hydrogen from Australia could greatly facilitate a sustainable energy future for the country. However, geopolitical tensions could potentially increase in the world due to the greater control of some governments over critical resources compared to other governments. K. Ibekwe *et al.* (2024) also reflected on this, pointing out the aspect of resource control as a mechanism for strengthening one's own diplomatic influence. Overall, the EU energy transition is transforming not only domestic energy policy but also determines the order in the architecture of international relations with new alliances and relationships. The energy transition in the EU is causing both internal and external changes. Therewith, competition for control over critical materials is intensifying, affecting the geopolitical balance of power and international relations.

Conclusions

Thus, the history of energy market formation within the EU revealed that dependence on conventional energy resources has created dependence and strong political ties. For the development of the EU, the energy market factor has become one of the most crucial for an effective integration model and at the same time has created risks of vulnerability. Accordingly, the events associated with the rejection of Russian energy resources demonstrate the urgency and indispensability of diversifying sources and developing own capacities. Europe's energy market itself has been constantly transforming under the influence of threats and external factors that are relevant at a given time, and thus the transformation process has become the basis for a strategic energy transition in the 21st century to a more sustainable model capable of responding to

challenges. This assertion proves that the flexibility of markets for supply chains is crucial in terms of ensuring the sustainability of energy security and the overall geostrategic stability of the region.

The shift away from conventional resources within the EU following Russia's large-scale invasion of Ukraine has reduced the influence of certain energy suppliers, including Russian oil, by 90%. The reorientation of the EU's energy needs has opened opportunities for other actors in international relations. Specifically, Norway became one of the key suppliers of oil and gas to the EU in 2023-2024. Additionally, gas imports from the United States have increased, making them a valuable partner in diversifying the energy balance. The energy transition in the EU also affects the Gulf states. The participation of these governments in COP 27 and COP 28, as well as their commitments to emission reductions and green technologies, are among the consequences of the EU's green transition policy.

Additionally, the development of a new political balance through the development of renewable energy shows how the development of modern technologies and access to critical materials affects the distribution of power on the global stage. Strengthening positions in the international environment is not the result of force and coercion, but rather the use of natural and technological advantages that benefit both sides in alliances or agreements. Still, it is the aspect of the criticality of many resources and their uneven distribution that is a factor of polarisation in international relations, as a series of critical resources for the energy transition are controlled by the Chinese government and its closest partners. The limitations of the presented study included the lack of data on the amount of investment by individual actors in international relations in the field of the 'green transition'. Future research on this topic could rely on more up-to-date data on the results of the European Green Deal, the first phase of which is expected to achieve results by 2030.

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Conflict of Interest

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