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ROLE OF THE EUROPEAN UNION IN DRIVING THE ENERGY TRANSITION OF MEMBER STATES – CASE STUDY OF THE EUROPEAN UNION DRIVING THE ENERGY TRANSITION OF SWEDEN

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Abstract:
The study examines how the European Union drives the energy transition of its Member States, using Sweden as a case study, a leader in the global energy transition. As a global leader, Sweden serves as an ideal benchmark for the effectiveness of the European Union's energy transition efforts. The study answered the research problems: P1: What is the impact of the European Union as a driver of energy transition on Sweden's energy transition? P2: What main benefits does Sweden gain from implementing the EU energy policy? The answer was based on a qualitative analysis of the selected sources, including official and current Swedish strategic documents on energy transition, as well as analytical and statistical sources from Swedish government agencies. The European Union is a driver of energy transition through legislation, financing, and the ability to legitimise implemented reforms, as well as a forum for cooperation. However, for a country like Sweden, EU action is insufficient, and Sweden is forced to modify EU law to be more radical and better suited to its transition.

Keywords: energy transition, driver of energy transition, energy policy, European Union, Sweden, Sustainable Development Goals

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Introduction

The energy transition is a trend emerging among countries worldwide. Currently, due to the significant impact of climate change, many countries are seeking to address it by transforming their energy systems. They are doing this through energy policy, which aims to transform a given entity's current energy system. International organisations also play a key role in this process, providing a forum for exchanging experiences and views in this area and guiding the way forward in energy policy.

International organisations, such as the European Union and the United Nations, play a crucial role in coordinating the energy transition process. The UN is implementing the 2030 Agenda for Sustainable Development, one of its key goals being to combat climate change, including through energy transition (United Nations Development Programme, 2015). To this end, the EU implements, among others, UN recommendations and its own recommendations, which it enforces as a whole and by individual states. The UN proposed Sustainable Development Goals in its 2030 Agenda. These goals set trends for global transformation. From the perspective of the country's energy policy and energy transition, two goals are crucial: Goal 7, Affordable and Clean Energy, and Goal 13, Climate Action (United Nations Department of Economic and Social Affairs, 2015a; 2015b).

The key transition plan from the EU perspective is the European Green Deal (EGD). Countries' energy transitions are crucial to the climate transition. Energy plays a key role in this regard. As the world's most integrated international organisation, the EU has the opportunity to become a global transition leader in this regard. A common EU perspective on climate change, the climate transition, and the energy transition is crucial to European integration and to combating climate change. The EU can play a significant role in this regard and support Member States' energy transitions for the common good.

Literature Review

The role of the European Union in energy policy is primarily limited to the competences in this area set out in the European Union's treaties. The most crucial document regarding EU treaty competences in the energy field is the *Consolidated version of the Treaty on the Functioning of the European Union*. According to this Treaty, EU competences in the field of energy are shared

with the Member States. This means that both the EU and its Member States have separate competences in energy policy (*Consolidated version of the Treaty on the Functioning of the European Union*, 2012, p. 5). The European Union's energy policy is based on three key pillars: a competitive internal market, ensuring energy supply security, and promoting sustainability (Talus & Aalto, 2017; Wojtkowska-Łodej, 2015; European Commission, n.d.). This corresponds to the four sub-points enshrined in Article 194 of the *Consolidated version of the Treaty on the Functioning of the European Union*. They concern ensuring the functioning of energy markets, ensuring the security of energy supply, promoting energy efficiency and energy savings, as well as developing new and renewable forms of energy, and promoting the interconnection of energy networks (*Consolidated version of the Treaty on the Functioning of the European Union*, 2012, pp. 88–89). Consequently, the EU possesses numerous soft skills that enable it to support and drive the energy transition of the entire EU and its individual countries. Importantly, these are mainly soft solutions (Talus & Aalto, 2017).

The EU, as a community of states and the most integrated regional international organisation, has several key strategies binding on all EU Member States. These include numerous plans related to the goals of the energy transition, as well as the overall energy policy. These plans aim to define the direction of EU energy policy development and support the energy transition (Gueye et al., 2025). Currently, the most crucial document in this regard is the EGD. In it, the European Commission outlines the goals of the EU's climate policy (including energy policy). The EU introduces it in packages, which are then implemented by states and EU institutions. The primary objective of the EGD is for the EU to achieve climate neutrality by 2050 (European Commission, 2019). The EU, as an organisation with legal personality, can introduce its own projects and enact secondary legislation in the field of energy policy (Talus & Aalto, 2017). Hence, the EGD and its subordinate branches are a key element of the EU's climate and energy policy. This means that, within the framework established by the EGD, the EU proposes and implements various types of secondary law, which member states then implement (Vezzoni, 2023). This gives the EU significant influence over national energy policies, enabling it to drive change in its member states. It thus becomes a driving force for the energy transition when its impact is genuinely positive and when it pursues a specific goal. It is therefore essential to define the drivers of the energy transition and how it can be effectively driven.

Drivers of the energy transition are among the key issues that researchers studying the energy policies of states and other entities in the energy transition sector discuss. However, it is first essential to define the energy transition process. The energy transition refers to the shift from a system based on high-emission energy sources to one based on low- or zero-emission energy sources (Harichandan et al., 2022). High-emission resources, such as coal, crude oil, and natural gas, are examples of this. Low- or zero-emission resources include renewable energy sources such as solar, wind, hydroelectric, and bioenergy. The long-term coexistence and interaction of these drivers positively impact the progress of the energy transition (Bass & Grøgaard, 2021). Drivers are categorised into several groups driving the energy transition. Among these, the literature highlights the political and legal drivers of the entity's political and legal system, as well as environmental, technological, economic, and social drivers (Muhire et al., 2024). From this perspective, the drivers the EU influences in its Member States are important because the EU can become a driver of energy transition in a Member State.

Research on how the EU drives the energy transition in its Member States is limited. Research primarily focuses on other aspects of EU energy policy. The role of the EU in the energy transition of its Member States has been studied mainly by examining the effects of European energy and climate policies on them. For example, a study conducted by Ch. Feliziani compares the impact of EU energy policy on the legislative systems of countries such as the United Kingdom and Italy (Feliziani, 2013). Other studies examine, among other things, the impact of individual administrative units within countries on local energy transitions. The study compares the effects of this on the regional governments of Sweden and Denmark, which are considered to be the leading countries in the EU's energy transition (Liljenfeldt et al., 2025). The research also covers the potential negative effects of EU energy policy on Member States (Ossowska, 2019). They also concern individual sectors influenced by EU energy policy, such as the economy or legal system, without approaching the issue holistically (Miciuła & Stępień, 2018; Wiśniewski et al., 2024). It is therefore essential to examine how the EU can serve as a driver of energy transition in its member states, using an appropriate example.

According to literature and international rankings, Sweden is recognised as a global leader in the energy transition. Sweden also has the largest share of renewable energy in its energy mix, particularly in the heating sector, and relies heavily on a combination of nuclear and renewable energy. Furthermore, it is

a leader in the EU's energy transition in the transport sector (Eurostat, 2024; World Economic Forum, 2025; Cruciani, 2016; Thalberg, 2022; International Energy Agency, 2019; 2024). Therefore, Sweden, as a leader of the energy transition in the EU and globally, is an ideal example for examining how the EU, through its influence on Sweden, can drive the country's energy transition. Sweden's experience with the EU in driving the energy transition may be important for countries transitioning efficiently as well as for those whose transitions are less efficient. For countries efficiently managing the energy transition, as well as for countries similar to Sweden, the lessons from Sweden may be important because they can compare themselves to the Swedish case and see what the key elements of the EU's influence on the transition in that country are, and see how these solutions can be efficiently used in their own country. In other countries, they can see how the EU's influence can be used more effectively in the later stages of the energy transition, examine the problems of more advanced countries, and identify what will be politically relevant in the future.

Characteristics of the Swedish Energy Transition

Sweden, a country with excellent access to rivers and forests, has from the outset prioritised renewable energy in its energy system. The primary energy sources on which the Swedish energy system relied were hydropower and biomass (primarily forest-based). Later, fossil fuels, specifically crude oil, were added (Stefański, 2025). Sweden is also among the first countries in the world to begin the energy transition. It is assumed to have started in the 1970s, coinciding with the transition of the heating system (Melin, 2022). The 1970s were also marked by an oil market crisis, which compelled Sweden to seek alternative energy sources beyond fossil fuels (Vattenfall, n.d.). The overall changes were further intensified by the rise of anti-nuclear sentiment in Sweden in the 1970s, which ultimately led to a 1980 referendum on nuclear energy. In a referendum, Swedish citizens decided to phase out nuclear energy gradually. This forced Sweden to either focus on renewable energy sources or return to fossil fuels (Jansson-Myhr, n.d.).

Sweden, whose energy sector has been based on renewable energy from the outset, was well-positioned for further development. The lack of access to coal or to crude oil meant the country had no opportunity to develop its fossil fuel sector. Although it has been gradually phasing out nuclear energy,

the government has had an easier path to becoming a global leader in the energy transition. An excellent geographic location for renewable energy development, combined with limited access to fossil fuels, is just one of the key drivers. Other drivers are clearly political and social. The high level of social awareness of energy in Sweden during the 1970s and 1980s, including significant attention to energy and environmental issues among the political class, was crucial (Stefański, 2025). Examples of such awareness include the establishment of the Ministry of the Environment in 1986, the development of social movements with ecological themes, and the introduction of a tax on CO2 emissions in 1991 (Knaggård, 2009; Government Offices of Sweden, n.d.; Sterner, 2020).

Sweden developed its energy system in the 1990s and early 2000s, primarily based on renewable energy sources. The decision to gradually phase out nuclear energy resulted in the closure of many nuclear reactors during those years (Stefański, 2025). Therefore, wind energy and biomass combustion were developed. A key change in this trend was the introduction of the Energy Act in 1997, which mandated the complete phase-out of nuclear energy and full reliance on renewable energy sources (Åstrand & Neiji, 2003). In the early 2000s, several subsidies were introduced to support the development of renewable energy sources, including wind energy subsidies, percentage-based subsidies, and certificates for the construction of renewable energy power plants, which at one point fuelled the transition (Åstrand, 2005). In subsequent years, Sweden implemented CO2 tax increases and also benefited from the ETS. While the state tax remained key, the ETS system continued to play a significant role. Sweden also introduced subsidies for photovoltaic development in 2016. Subsidising renewable energy development has enabled Sweden to become a leader in the energy transition. An additional aspect that characterises the Swedish energy system is the renewed acceptance of nuclear energy as a key element of the Swedish energy mix. Ulf Kristersson's government incorporated nuclear energy into Sweden's energy transition plans after the 2022 elections and made it one of the two default energy sources alongside renewable energy. Importantly, Sweden's success to date is mainly due to its long-term energy policy and clear focus on renewable energy sources, as well as the advantages inherent in its geography and geology (Stefański, 2025).

Methodology

The research field of this study is the European Union's energy transition and its relationship with Sweden's energy transition. The study examines the European Union's role as a driver of energy transition in its member states, using Sweden as a case study and as a global leader in the energy transition. Therefore, this study aims to research how the EU can drive the energy transition of its member states.

The research problems adopted are: P1: What is the impact of the European Union as a driver of energy transition on Sweden's energy transition? P2: What main benefits does Sweden gain from implementing the EU energy policy? It is crucial to understand, with a case study, the effects and consequences of the European Union's energy transition policies in its Member States. In response to the research questions, the following hypotheses were adopted: H1: The European Union has a limited impact on Sweden's energy transition. For a country like Sweden, a leader in the global energy transition, EU action will be insufficient to drive it. Consequently, EU solutions will be insufficient. H2: The main benefits for Sweden are the ETS system and financial benefits related to EU funds. Therefore, the EU's benefits for the leading country are reduced to legislative and financial issues. The hypothesis will be verified in the study's conclusions.

The basic research method is the case study. The chosen case study is the EU's role in driving Sweden's energy transition. Other research methods and techniques were also adapted to the case study. The primary one is critical source analysis. The sources studied are Swedish energy policy documents, specifically those related to the energy transition, as well as statistical and analytical data. A critical analysis of sources involves examining the EU's positive influence on Sweden's energy transition, specifically its role as a driver. The documents examined will be Swedish energy and climate policy strategies, given their interconnectedness, with consideration of the EU's role. Statistical and analytical data on Sweden's energy transition and its relationship with the European Union will also be important for research. Among such statistical and analytical materials, key examples include those from the Swedish Energy Agency, the Swedish Environmental Protection Agency, and other Governmental sources, such as briefs and statements. They document its goals and achievements to date, often indicating how it uses its energy transition drivers. It is also important to establish time criteria for selecting the most critical

Swedish documents related to the energy transition within the EU. The adopted dates begin in 2019, the year the EGD was launched.

The introduction of the „Policy diffusion" category is also crucial. From the perspective of the role of EU energy and climate policy in a member state's transition, this issue is crucial to understanding the problem. According to this category, the political decisions of one entity can influence those of another. It is the product of interdependence among the entities involved (Maggetti & Gilardi, 2016). In this study, the decisions of the European Union, in line with its diffusion policy, can influence those of a member state, such as Sweden. In this context, Europeanisation is important, understood strictly in terms of the European Union. In this sense, it is necessary to examine the European Union's influence on the policies of its member states, which significantly shape their laws and policies. The Union then sets trends, serves as a point of reference, and stimulates political change (Wach, 2016, p. 18). These two categories are needed to understand, from a theoretical perspective, the potential importance of the European Union as a driver of energy transition policy in its member states.

Results

The crucial factor, from the European Union's perspective, influencing the Swedish energy transition is the climate and energy policy plan a given country submits to the European Commission. Sweden has revised its 2021–2030 plan several times, with the final version published in 2024. The Swedish government is applying this flexible approach to two national laws that are crucial for research: the Climate Action Act and the Long-Term Direction of Energy Policy (Government Offices of Sweden, 2024a, pp. 5–8).

For Sweden, the entire ETS system is important from the European Union's perspective and its impact on the energy transition. The ETS currently plays an important role in accelerating Sweden's energy transition. However, the key for Sweden should be the ETS2 system. From its entry into force, this system finances the energy transition through the collection of this fee and encourages emissions reductions by lowering electricity bills. Therefore, it is a mechanism that drives the transition in financing and provides incentives for companies to reduce greenhouse gas emissions faster (Swedish Energy Agency, 2025). According to statistics, overall emissions in sectors covered by the ETS have declined since 2019. This is visible across many sectors. In the

sector that emits the most greenhouse gases, electricity and heating, emissions fell by approximately 24.5% between 2019 and 2025. Moreover, from 2024 to 2025, emissions across all sectors covered by the ETS amounted to 4.3% (Swedish Environmental Protection Agency, 2026a). This is a larger difference than the EU average, which fell by 1.3% during the same period (European Commission, 2026). The ETS allows Sweden to manage its energy transition more efficiently. Statistically, Sweden performed significantly better than the EU average between 2024 and 2025. This may indicate that Sweden is better able to utilise the system to manage the transition efficiently than the rest of the EU. Sweden is reducing emissions faster than the EU average, but it is noticeable that this system may be insufficient in the long term.

This is why Sweden considers implementing the ETS 2 system a cornerstone that, according to the Swedes, could significantly drive Sweden's energy transition. Still, it is insufficient and needs to be modified at the country level (*Sweden's updated National Energy and Climate Plan 2021–2030*, 2024, pp. 14–15). Sweden's ETS2 scope goes beyond what the European Union requires, treating the system only as a basis for further changes related to the energy transition. As part of the directive's implementation, the Swedish government plans to expand the ETS2 system to sectors not required by the EU, such as the railway system and agricultural and forestry machinery. Sweden views the EU's solutions as insufficient, yet they constitute an ideal basis for introducing broader regulations. In this case, the European Union is providing Sweden with the impetus for change, although Sweden considers the ETS2 project itself insufficient and in need of significant expansion (Government Offices of Sweden, 2024c; Swedish Energy Agency, 2026b). In terms of the ETS2 system, it is insufficient for Sweden and requires expansion. As a leading country seeking to maintain its status, Sweden needs stronger regulations. The ETS2 system is not radical enough for Sweden. Therefore, for this system to become a driver, it must be remodelled for Sweden. Additionally, the desire to add its own sectoral solutions to ETS2 may indicate that Sweden treats EU law as a basis for more comprehensive legal regulation of sectoral energy transition.

Also important from Sweden's perspective is the framework of the EU's energy and climate policy, which is included in Fit for 55 and the entire Green Deal. For Sweden, the EU's climate and energy targets are a key determinant of the transition's effectiveness, allowing it to adjust the pace while remaining a leader in this area within the EU. Sweden must implement EU law in the

fields of energy and climate as soon as possible, as this will enable the transition to be executed efficiently and quickly (Government Offices of Sweden, 2024b, pp. 37–55). The EU's climate policy is considered ambitious yet achievable, and the EU is seen as a potential centre of the global energy transition. The European Green Deal is treated as a trend-setting idea not only for Europe but also for the world. It is vital for Sweden that the Fit for 55 Package be implemented as soon as possible, as it is a key mechanism driving the energy transition in Sweden and across Europe. The EU plays a crucial role in the LULUCF sector. Sweden is one of the largest beneficiaries of the European Union's climate and energy policies. Additionally, initiatives such as ReFuelEU Aviation and FuelEU Maritime are important.

Sweden believes that some of the European Union's climate policy actions and the phase-out of fossil fuels are too slow and sometimes insufficient. The Swedes believe the EU's plans are too general and require further clarification. Swedes want European energy and climate policy to be even more ambitious, while maintaining a realistic approach. They believe the current approach is too unradical (Government Offices of Sweden, 2023, pp. 39–46). For Sweden, these solutions primarily serve as a stimulus for further change and help keep Sweden at the forefront of the energy transition. Sweden builds on these solutions, modifying them to meet its needs to drive the transition more efficiently (Swedish Environmental Protection Agency, 2026). Therefore, in a country like Sweden, the EU will not be a driving force for long-term, detailed plans. It means that Sweden does not consider EU policy sufficient. Driven by Sweden's own interests, which impose more regulations than EU law requires, Sweden wants the EU system to be more radical and better adapted to Swedish conditions. This is also evidenced by the criticism of the future ETS2 system's insufficiency for Sweden. The solutions offered by the Green Deal are insufficient for Sweden and are therefore subject to criticism. Sweden is reducing emissions more efficiently than the EU average and introducing more restrictive laws to better manage the energy transition. However, Sweden believes the EU is pursuing the transformation too slowly and too radically, and its role in this regard is reduced to that of a legislator whose laws are imperfect and require modification, but whose size allows it to drive the transition more broadly. However, it is doing so too weakly.

According to the Swedes, EU funds and financial mechanisms are also important, particularly the EU Just Transition Fund and the entire Cohesion Policy. These funds help drive transition in regions that may lack financial

resources, particularly in the industrial sector (Government Offices of Sweden, 2024b, pp. 22, 140). Importantly, the EU also finances local energy transitions, as well as transitions across many sectors (transport, renewable energy, energy efficiency, energy security), and creates appropriate laws to drive them. In this respect, the EU acts as both a legislator and a driver. The Swedish government primarily focuses on the European Union's role as a stimulus, trendsetter, forum for energy policy cooperation, and financier of the energy transition (*Sweden's updated National Energy and Climate Plan 2021–2030*, 2024). The industrial transition makes it easier for Swedish companies to invest in countries that are less well-off in the energy transition. Significantly, however, the EU does not hinder the implementation of more stringent solutions in Sweden. However, such solutions make Sweden less competitive compared to other EU countries (Government Offices of Sweden, 2024a, pp. 66–67). The financial perspective, combined with the state's revenue from the ETS and the future ETS2, seems as crucial to Sweden as its imperfect legislation. Financial mechanisms are indeed driving Sweden's energy transition. They accelerate it and reduce greenhouse gas emissions, as evidenced by Sweden's faster greenhouse gas reduction than the EU average, despite being a leader in the global transition and already emitting fewer greenhouse gases than many other countries.

Conclusions

Answering the research question P1: What is the impact of the European Union as a driver of energy transition on Sweden's energy transition? The European Union's impact is limited. This stems from Sweden's need for broader, more radical solutions to the energy transition. This is evidenced by the planned modifications to the ETS2 system. The EU's energy policy is insufficient for Sweden. The EU sets standards and helps legitimise the reforms being implemented. The EU's role in Sweden's transition is primarily based on legislation and financing, and it also allows Sweden to become a leader in the energy transition within the EU. Therefore, Hypothesis 1 is confirmed.

Regarding P2: What main benefits does Sweden gain from implementing the EU energy policy? The main benefits for Sweden from the European Union's role as a driver of the energy transition are primarily legislative, stemming from the EU's trend-setting role and its ability to legitimise certain ideas, such as the ETS2. Furthermore, financial benefits are also crucial. For Sweden, the EU also provides a platform for energy cooperation with member states. This

allows Sweden to coordinate and integrate efforts related to the energy transition. Therefore, Hypothesis 2 is partially confirmed, as the main benefits also concern the trendsetting nature of the European Union's energy and climate policy, the legitimisation of introducing legal changes, and the scope for international cooperation.

For a country like Sweden, a global leader in energy transition and a country that bases its energy production on a mix of renewable energy sources and nuclear energy, which additionally has excellent conditions for the development of renewable energy sources due to geography, economic development, and social support, as well as long-term policy, the European Union does not have a significant impact on its energy transition. The EU has limited impact because it must tailor its proposed changes, such as Fit for 55, the EGD, or ETS2, to countries that are less successful in energy transition and have different energy systems. For Sweden, which is implementing this transition efficiently, this impact is insufficient. The conclusions from Sweden may differ from those of other countries, particularly those that are much less effective at implementing energy transitions. For such countries, EU energy proposals such as ETS2 or EGD may be too radical and difficult to implement. Sweden's case is different, and to drive the energy transition, this country requires more radical and effective solutions than ETS2 or other EU projects. This forces Sweden to modify EU solutions.

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ROLA UNII EUROPEJSKIEJ W NAPĘDZANIU TRANSFORMACJI ENERGETYCZNEJ PAŃSTWA CZŁONKOWSKIEGO – STUDIUM PRZYPADKU NAPĘDZANIA SZWEDZKIEJ TRANSFORMACJI ENERGETYCZNEJ PRZEZ UNIĘ EUROPEJSKĄ

Streszczenie

W badaniu analizuje się, w jaki sposób Unia Europejska napędza transformację energetyczną swoich państw członkowskich, wykorzystując Szwecję jako studium przypadku, lidera w globalnej transformacji energetycznej. Jako globalny lider, Szwecja stanowi idealny punkt odniesienia dla skuteczności wysiłków Unii Europejskiej w zakresie transformacji energetycznej. Badanie odpowiedziało na problemy badawcze: P1: Jaki jest wpływ Unii Europejskiej jako siły napędowej transformacji energetycznej na transformację energetyczną Szwecji? P2: Jakie główne korzyści odnosi Szwecja z wdrażania polityki energetycznej UE? Odpowiedź oparto na jakościowej analizie wybranych źródeł, m.in. oficjalnych i aktualnych szwedzkich dokumentów strategicznych dotyczących transformacji energetycznej oraz źródeł analitycznych i statystycznych szwedzkich agencji rządowych. Unia Europejska jest siłą napędową transformacji energetycznej poprzez prawodawstwo, finansowanie i możliwość legitymizacji wdrażanych reform, a także poprzez forum współpracy. Jednak dla kraju takiego jak Szwecja działania UE są niewystarczające i Szwecja jest zmuszona zmodyfikować prawo UE, aby było bardziej radykalne i lepiej dostosowane do jej transformacji.

Słowa kluczowe: transformacja energetyczna, czynnik napędzający transformację energetyczną, polityka energetyczna, Unia Europejska, Szwecja, Cele Zrównoważonego Rozwoju

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