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Grigolia, Maria:

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Gutachter*in: Seelkopf, Laura

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Geschwister-Scholl-Institut für Politikwissenschaft
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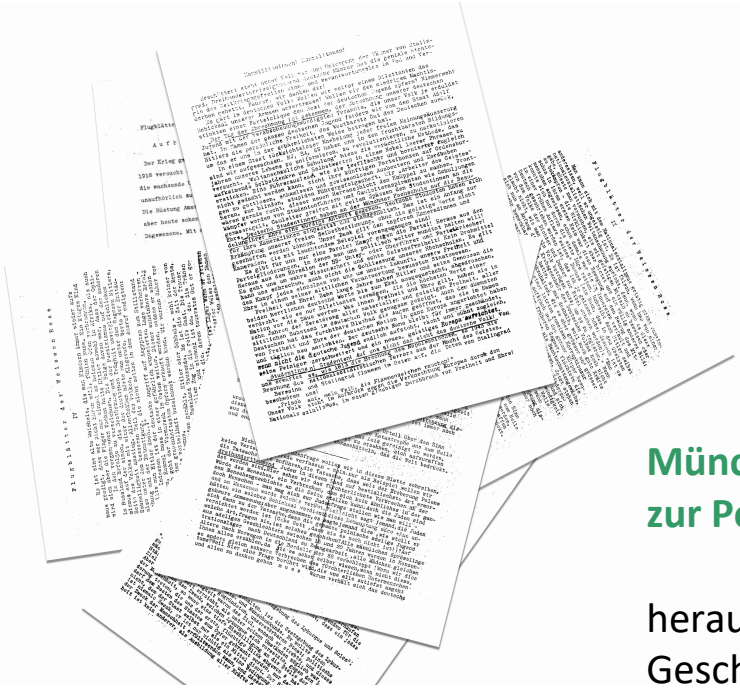

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Maria Grigolia

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Abstract

In times of crisis, environmental leaders remain crucial in promoting environmental policies that raise the international profile of climate change. But leaders need to be able to act - can they do so in times of crisis, and what influences them to do so? My study examines why countries that share the role of environmental leaders respond differently to the economic crisis traced back to Russia's invasion in Ukraine. Using a Most Similar Systems Design (MSSD), I analyse the performance style of Germany and Austria along three dimensions: national policies, implementation of the EU regulatory framework for clean energy transition, and infringement procedures in the environment, energy and climate sectors to identify the factors that cause a divergence in response. My findings show that policy capacity, infrastructure readiness and energy resilience are crucial factors in explaining why environmental leaders can show different responses during economic crises. The study shows that the nature of the crisis is important in determining whether a leader maintains or relinquishes its role, and that environmental leaders need to prepare for the transition to clean energy in order to successfully maintain their role as environmental leaders in the future.

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List of Abbreviations

BMWK – Federal Ministry for Economic Affairs and Climate Protection (Bundesministerium für Wirtschaft und Klimaschutz)

BMK – Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie)

BSI – Federal Office for Information Security (Bundesamt für Sicherheit in der Informationstechnik)

DIR – Directive 2019/944 on common rules for the internal market in electricity

EAG – Renewable Energy Expansion Act (Erneuerbaren-Ausbau-Gesetz)

EEG – Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz)

EIA – Environmental Impact Assessment Act

EnWG – Energy Industry Act (Energiewirtschaftsgesetz)

EU – European Union

EWG – Renewable Heat Act (Erneuerbare-Wärme-Gesetz)

GHG – Greenhouse Gas

NECP – National Energy and Climate Plan

NEHG – National Emission Certificate Trading Act (Nationales Emissionszertifikatehandelsgesetz)

RED – Directive 2018/2001 on the promotion of the use of energy from renewable sources

TJ – Terajoules

WEEE – Waste Electrical and Electronic Equipment

1. Introduction

With ongoing global crises, it stays critical that governments uphold their commitments to implementing environmental policies. However, such crises often lead to a shift in political priorities, with public attention being diverted from concrete climate policies to more immediate concerns (Genschel et al., 2024). This highlights the need to assess the resilience of governments in maintaining environmental policy in times of crisis, and to examine the wider implications at a structural level. Countries that are recognised as environmental leaders play a central role in driving international climate commitments (Andersen & Liefferink, 1997). Their leadership becomes particularly important in times of crisis at the governmental level, when competing priorities threaten long-term climate goals (Genschel et al., 2024). Understanding the factors that influence a leader to maintain its role in the face of challenges provides valuable insights for addressing the ongoing climate crisis in the future.

Russia's military invasion of Ukraine on 24 February 2022 (Davis, 2024) triggered unprecedented economic challenges for EU member states (European Central Bank, 2022; Grajewski, 2022). The German economy suffered significant losses, estimated at 2.5% of GDP (Deutsche Welle, 2023), similarly to Austria seeing rising energy costs and inflation (Statistics Austria, n.d.). Yet, Germany reduced its dependence on Russian gas from 55% of total imports before the war to nearly zero by the end of 2022 (Reuters, 2022; Eurostat, 2024). Prior to the invasion, over 40% of Europe's natural gas originated from Russia (Thomson, 2022), with Austria relying on 80% of its total imports (Die Presse, 2023; Austrian Energy Agency, 2022, p.3). By the end of 2024, Austria's dependence had risen to a critical level of over 98%, until Russia stopped supplying in November 2024 (Barigazzi, 2024). Despite being Russia's largest gas customer (Gross & Stelzenmüller, 2022), Germany successfully eliminated Russian gas imports by the end of 2022 (Reuters, 2022; Eurostat, 2024).

The different positions of both countries lead to a real-world puzzle (Gustafsson & Hagström, 2018), which has not yet been thoroughly explored in relation to the following research question posed in my bachelor's thesis: **Why do countries with a common environmental leadership status respond differently to an economic crisis?** While existing literature suggests that economic crises do not inherently undermine environmental leadership (Melidis & Russel, 2020), this study seeks to identify factors that drive such divergence amidst this economic crisis.

I employ a comparative case study analysis using the most similar system design (MSSD) with elements of process tracing. Through this methodological approach I begin my analysis mainly with the onset of the economic crisis traced back to the beginning of war in Ukraine on 24 February 2022 (Davis, 2024). An inductive research design guides me on analysing both countries each on three key dimensions: the implementation of national policies during the crisis, the adoption of the EU regulatory framework relevant to energy transition, and ongoing infringement proceedings initiated by the European Commission in the sectors environment, energy and climate. In doing so, I identify broader implications for future research by uncovering the factors that explain the divergent trajectories of two environmental leaders in response to a common crisis.

I find that policy capacity, infrastructure readiness and energy resilience are critical factors that allow Germany to maintain its environmental leadership, while these factors put Austria in a comparatively clear challenge. Furthermore, my found factors build on previous literature explaining what drives environmental leadership (Jänicke, 2005; Knill et al., 2012; Liefferink & Wurzel, 2017), compared to factors from previous literature, not being able to explain this observation amongst leaders (Jänicke, 2005; Jänicke & Jacob, 2006; Liefferink et al., 2009; Melidis & Russel, 2020;). Building on the acknowledgement of extensive literature on environmental leadership existing (Melidis & Russel, 2020, p.199), my paper elaborates on the complex interplay of factors influencing this role, with a specific focus on crises. My study contributes to the existing literature in the following way. First, it identifies key factors that drive leaders to maintain their role during crises. Second, my findings provide insights for practical implications for environmental leaders in long-term environmental governance in the face of ongoing converging global crises. Third, I assess how previous literature on explaining environmental leadership can be applied within the context of this economic crisis. The broader significance of my study lies in identifying practical insights that countries can apply to effectively lead in environmental policy during times of uncertainty.

The structure of my paper is as follows: In chapter two, I define environmental leadership as the dependent variable, discuss how it has been measured previously, and explain how I measure it in my study. In chapter three, I introduce the main independent variable, the economic crisis, and outline additional factors from literature that can not directly explain the divergent trajectories of Germany and Austria. In chapter four, I comparatively analyse both countries along the three dimensions: national policies, implementation of EU directives and infringement proceedings to subsequently identify the factors that influence their environmental

leadership. In chapter five, I test the robustness of my found factors and address existing limitations of my study. Finally, in chapter six, I conclude by considering the broader implications of my findings for future research.

2. Environmental Leadership

The dependent variable within my paper is conceptualised as environmental leadership, which refers to an actor's ability to set ambitious goals, implement stringent policies or lead through new initiatives in environmental policy (Knill et al., 2012). Furthermore, a country is considered to be an environmental leader when it sets examples for other countries to follow, whether intentionally or not (Andersen & Liefferink, 1997). On the European level, leadership also entails being among the first to introduce environmental innovations or having the highest level of ambition in environmental policy, as demonstrated by countries such as Austria and Germany (ibid.). This holds true even during the global financial crisis of 2008-2014, when both countries, along with other environmental leaders, maintained their status through effective implementation of EU environmental policies, at a time of economic constraints (Melidis & Russel, 2020).

Within literature, environmental leadership has been measured using a different set of indicators, some of which can be derived from the definition of what makes a leader in this area. Indicators include the timing of an environmental policy adopted, the rigor and development of the regulatory instruments, and resulting policy outcomes (Knill et al., 2012, p. 36). In the literature on European environmental policy, the effective implementation of EU environmental policies, such as in times of economic crisis, is also a key indicator of leadership (Melidis & Russel, 2020). In my chapter four of my analysis, I measure the development of Germany's and Austria's environmental leadership by their responses through the national policies they have implemented, i.e. what decisions the countries' governments have made to reduce their dependence on Russian imports, to accelerate their environmental targets and, in this matter, to strive for energy diversification. I also measure the implementation of the EU regulatory framework for clean energy transition and the number of infringement proceedings sent to both countries by the European Commission in the two sectors of environment, energy and climate. But how does environmental leadership relate to energy transition or reducing dependence on Russian gas in my study?

Vitsenko (2024) highlights how being dependent from Russian gas imports has revealed significant environmental challenges and slowed progress towards sustainable energy systems.

In this context, achieving full energy independence from Russia has shown to be critical for both security within Europe and at the same time environmental sustainability (ibid.). In May 2022, the European Commission launched the 'REPowerEU' plan to reduce dependence on imported Russian fossil fuels and accelerate the clean energy transition by diversifying energy and investing in renewable energy (European Commission, 2022a). Previously to this, the European Union has had prioritised a green energy transition as a cornerstone of its sustainability agenda, which can be seen through efforts in the 'European Green Deal', introduced in 2019, setting the ambitious goal of achieving net-zero greenhouse gas emissions by 2050 to position Europe as the first climate neutral continent (European Commission, 2019). Supporting this vision, the 'Clean Energy for All Europeans' package focuses similarly on improving energy efficiency, increasing renewable energy targets and modernising energy systems (Directorate-General for Energy, 2019), which also requires member states to develop national energy and climate plans (NECPs) to align national policies with EU targets (ibid.). Through these initiatives, the EU emphasises the importance of meeting environmental objectives, advancing the energy transition and reducing dependence on fossil fuels, in particular Russian imports, to support energy independence.

Part of my study is therefore to measure Germany's and Austria's efforts to meet EU targets for energy diversification and transition, and their continued ambition in the ares environment, climate and energy, to identify the factors that influence their environmental leadership responses. Through this I assess the ability of both countries to maintain their leadership during economic upheaval, while aiming to find the key factors driving their divergent approaches.

3. Factors That Influence Environmental Leadership

I conceptualise the economic crisis as the main independent variable. For both countries, Germany and Austria, historically being recognised as environmental leaders (Liefferink & Wurzel, 2017; Melidis & Russel, 2020), 24 February 2022 marks the beginning of new economic austerity across Europe, with the European Central Bank (2022) pointing to the role of this war in raising energy and commodity prices, increasing the risk of inflation and slowing the Eurozone economy, while Russia's war on Ukraine resulted in further increasing already high gas and oil prices and raised concerns about sustainable energy supplies (Grajewski, 2022). Melidis & Russel (2020) show that the previous global financial crisis did not necessarily undermine environmental leadership, as Germany and

Austria maintained their role during the 2008 financial crisis by aligning EU policies with national frameworks. Yet divergent responses of both countries during this crisis, particularly in addressing their dependence on Russian gas as outlined in the introductory part of this paper, raise critical questions about what the actual factors are, that are driving their different positions.

Previous literature has identified several factors that generally influence environmental leadership, but these do not fully explain the divergence observed during the current economic crisis. Among these factors is EU membership, which provides a common environmental baseline and a platform for anchoring national policy innovations at the European level (Jänicke & Jacob, 2006; Liefferink et al., 2009). As EU member states, Germany and Austria operate within the same regulatory framework and climate targets. Furthermore, the strength of 'Green' Advocacy Coalition (Jänicke, 2005, p.136) can influence environmental leadership of a country. Both Germany and Austria had similar political governance structures during the energy crisis, with the Green Party participating in their respective governing coalitions: In Germany, the Greens held key ministerial portfolios, including economic affairs and climate change, under Robert Habeck (Bündnis 90/Die Grünen, n.d.). In Austria, the Greens governed in a coalition with from January 2020, with Leonore Gewessler leading climate and energy policy (Die Grünen, n.d.). This joint political influence demonstrated a shared commitment to climate and energy policy. Despite these commonalities the divergence in Germany and Austria's responses to the economic crisis remains unexplained, suggesting the need to examine additional factors.

Factors identified in literature that influence environmental leadership but can not explain the variation in responses:

Economic Crisis	Economic crisis traced back to Russia's war in Ukraine	Melidis & Russel, 2020
The Strength of Green Advocacy Coalition	Green Party participation in governing coalitions	Jänicke, 2005, p. 136
EU-Membership	Both EU member states	Jänicke & Jacob, 2006; Liefferink et al., 2009

Moreover, choosing an MSSD is the most appropriate approach, as both countries share a similar starting point for analysis with being dependent on Russian gas and facing similar economic and geopolitical pressures following the outbreak of the war in Ukraine (Deutsche Welle, 2023; Statistics Austria, n.d.; European Central Bank, 2022; Grajewski, 2022), to identify further factors that actually do influence different leadership responses. In the next chapter I conduct the comparative case analysis between Austria and Germany.

4. Case Study: Germany and Austria

In the first part I look at national policies implemented and how each country has responded, certainly in combining the amendment of environmental goals, addressing Russian dependence and the related challenge of energy diversification. In the second part, I examine how both countries have implemented key EU legislative directives aimed at facilitating the transition to clean energy. The REPowerEU plan, introduced by the European Commission in May 2022, specifically addresses the energy market disruptions which were caused by Russia's invasion of Ukraine and clearly aims the acceleration of clean energy transition and reducing reliance on Russian fossil fuels (European Commission, 2022a). To assess member states' preparedness prior to REPowerEU, the analysis takes into account the legislative foundation established under the 2019 ‘Clean Energy for All Europeans’ package, which similarly to REPowerEU, promotes clean energy transition (Directorate-General for Energy, 2019).

Within my study I focus on selected articles of the following EU Directives, while my selection is inspired by the analysis of the Ecologico Institute (Sina et al., 2024):

- Directive 2019/944 on common rules for the internal market in electricity (DIR) (European Parliament, 2019).
- Directive 2018/2001 on the promotion of renewable energy (RED) (European Parliament, 2018).

Here, I assess differences in implementation behaviour and the ability to show leadership in the energy transition before and during the crisis. Finally, I look at the infringement cases brought by the European Commission in 2022, 2023 and 2024. Infringement proceedings are legal actions taken by the European Commission against Member States that do not fulfil their obligations under EU law in various sectors or policy areas (European Commission, n.d.). In this part, I assess how Germany and Austria have maintained their environmental policy focus during the crisis. I provide an overview of the number of ongoing infringements for both sectors

and the type of cases in the two sectors environment, energy and climate for both countries for the available months in 2022, 2023 and 2024.

4.1 Germany

Fossil Fuels Supply 2022 vs. 2023 in Germany (International Energy Agency 2023a)

Energy Unit	2022 (TJ)	2023 (TJ)	Percentage Change
Coal	2,324,142	1,810,748	-22.09%
Oil	3,791,774	3,502,604	-7.63%
Natural Gas	2,795,241	2,661,234	-4.79%

Russian dependence, energy supply and renewable share Germany

Building on the initial observation that Germany has been rapidly reducing its dependence on Russian gas (Reuters, 2022; Eurostat, 2024), subsequent developments during the crisis can be analysed regarding overall dependence on Russian imports, energy supply diversification and the share of renewables. Natural gas imports from Russia peaked at 5.2 billion cubic metres in December 2021 but fell sharply to 953 million cubic metres in August 2022 (Eurostat, 2024). At the start of the crisis in 2022, 55% of Germany's natural gas supply came from Russia (Reuters, 2022). However, by the end of 2022, Germany had completely stopped importing natural gas via pipelines from Russia (Reuters, 2022; Eurostat, 2024) and instead diversified its supply, with 48.6% now coming from France, the Netherlands and Belgium (Rashad & Wacket, 2024), marking its first critical attempt to diversify energy sources. A similar trend can be seen for crude oil. According to the German Federal Statistical Office, Germany's dependence on Russian crude oil imports fell dramatically from 36.5% to just 0.1%, due to the EU's oil embargo sanctions package, which phased out Russian oil imports (Statistisches Bundesamt, 2023). To compensate for this reduction, Germany increased its oil imports from alternative sources, including Norway, the United Kingdom, Kazakhstan, the United States and the United Arab Emirates (ibid). Between 2022 and 2023, Germany achieves significant reductions in its total energy supply, with coal consumption falling by 22.09% and oil consumption by 7.63%, reflecting its commitment to phase out high-carbon fossil fuels (International Energy Agency,

2023a). However, the comparatively smaller initial decline in natural gas consumption of 4.79%, without having a comparison with Austria's situation, highlights a continued reliance on this resource during Germany's energy transition amidst the crisis (ibid.). What can be added to this context yet is that Germany's complete elimination of gas imports from Russia (Reuters, 2022; Eurostat, 2024) is even more remarkable, demonstrating a clear leadership in advancing energy diversification efforts, certainly during the economic austerity. Furthermore, renewable energy usage in Germany increased over the period, contributing 43.7% of electricity supply in 2022 and rising to 53.5% in 2023 (International Energy Agency, 2023a). By mid-2024, renewables accounted for 58% of electricity consumption, which reflects a notable acceleration in the expansion of specifically wind power, followed by photovoltaics, biomass and hydropower (Statistisches Bundesamt, 2024). For a full interpretation of these figures, a comparison with the situation in Austria is instructive.

National policies

The first key legislative measure was the Easter Package, introduced in April 2022, which set an accelerated target of achieving 80% renewable electricity by 2030 and designated renewable energy as a matter of public interest (Federal Ministry for Economic Affairs and Climate Action, 2022). The package emphasised the expansion of wind and photovoltaic systems, streamlined approval processes and updated grid expansion plans to ensure that the German infrastructure keeps pace with an accelerated use of renewable energy (ibid). The package further prioritised to abolish the Renewable Energy Sources Act (EEG) surcharge in order to simplify the self-consumption of renewable energy within society, and to strengthen consumer protection (ibid).

To reduce dependence on Russian gas, the German government passed the LNG Acceleration Act in May 2022 that streamlined approvals for the construction of LNG terminals (Bundesministerium für Wirtschaft und Klimaschutz, 2022a). Yet what is remarkable her is that this Act concretely emphasised that this measure only serves only as an interim solution for energy security, while the priority of achieving a climate-neutral energy supply is still maintained (ibid. p.1). At the same time, to accelerate energy diversification, the Onshore Wind Energy Act of July 2022 was introduced through which the German Bundestag decided that 1.4% of Germany's land area to be designated for onshore wind energy development by 2027 (The Federal Government, 2022). This decision also aimed at streamlining bureaucratic processes to speed up the expansion of wind projects (ibid). At the time only 0.5% of area were

actually used for onshore wind energy (ibid.), which marks an ambitious step by Germany to amend this matter.

The EEG 2023 was passed by the Bundestag in July 2022 (Bundesministerium für Wirtschaft und Klimaschutz, 2022b), in which the target of 80% renewable energy consumption by 2030 was officially codified. The amendment introduced a streamlined framework for the approval of renewable energy projects, particularly solar and again wind projects, with a concrete focus on prioritising the expansion of renewables (ibid.). It incentivised solar installations, promoted the use of green hydrogen and abolished surcharges for self-generated electricity (Bundesregierung, 2023). These measures show that the German government managed to address the energy security concerns exposed through the crisis and at the same time to ensure that Germany's renewable energy expansion remains on track, amid the crisis. Further measures were enacted in January 2024 with the revision of the Building Energy Act (GEG), requiring new heating systems to use at least 65% renewable energy from mid-2028 (Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen, n.d.). In April 2024, the Solar Package I was passed, which concretely simplified the installation of photovoltaic systems and overall further strengthened the goals of the Easter Package and the EEG 2023 by accelerating the use of renewable energies (Die Bundesregierung, 2024).

By 2023, Germany's prompt response began to yield significant results, particularly in advancing its climate goals. GHG emissions fell by 10.1% compared to 2022, the largest annual reduction since 1990 (Umweltbundesamt, 2024). This brought total emissions down to around 673 million tonnes of CO_2 equivalent, a 46% reduction on 1990 levels (ibid.). The reduction was mainly driven by an increased share of renewable energy, a decline in fossil fuel energy production, and reduced energy demand from industry and consumers (ibid.). These achievements are in line with Germany's broader climate targets, which include a 65% emissions reduction by 2030 and GHG neutrality by 2045 (ibid.).

During the economic crisis, Germany implemented targeted measures to reduce its dependence on Russian gas, diversify its energy sources and accelerate its environmental goals. Key measures include the Easter Package, the EEG 2023, the Onshore Wind Energy Act, the GEG and the Solar Package I, all of which prioritised the combination of accelerating environmental targets and the rapid expansion of renewable energy as outlined above. Germany has taken an ambitious, targeted and focused approach. By 2023, efforts resulted in a 10.1% reduction in GHG emissions (Umweltbundesamt, 2024) and achieved significant reductions in its total energy supply, with coal and oil consumption falling significantly, reflecting its

commitment to phase out high-carbon fossil fuels (International Energy Agency, 2023a). A proactive approach can be seen at the example of Germany to turn the economic crisis into an opportunity and implement effective targeted national policies.

Implementation of EU regulatory framework

In the previous chapter, I looked at the general policies enacted by Germany. How has Germany advanced its energy transition during the study period? Alongside the EEG, a key measure is the Energy Industry Act (EnWG), amended during the crisis to concretely increase grid flexibility and facilitate the integration of renewable energy sources (Ackermann et al., 2024). This happened through §14a of the EnWG (Bundesamt für Justiz, 2024a), which came into effect in January 2024 and authorises grid operators to temporarily reduce the power consumption of heat pumps or electric vehicle charging stations, with the aim to maintain a grid stability (Bundesnetzagentur, n.d.). At the same time, this measure supports the integration of a higher share of renewable energy specifically into the grid (ibid.). The following chapter analyses how concrete legislation have further supported the energy transition before and during the crisis.

Dynamic Pricing, Active Consumers, Demand Response

Under the EnWG, Germany made significant progress in implementing key provisions of the EU Electricity Directive: Article 11 DIR on the right to dynamic electricity price contracts (European Parliament, 2019) has been fully implemented, with a short delay of eight months (Sina et al., 2024). This directive has been transposed into German law under §41a (2) EnWG, giving customers with smart metering systems access to dynamic price contracts, which all suppliers are obliged to offer transparently (Sina et al., 2024; Bundesamt für Justiz, 2024b). Through this measure the law supports participation among consumers and supports a modernisation of the German energy grid (Sina et al., 2024). Similarly, the provisions of Article 15 DIR on active consumers (European Union, 2019) are reflected in German national law: In §41a EnWG the term of an active customer is defined which guarantees that final consumers have the right to act as active participants in energy production and management without being subject to discriminatory technical or administrative requirements (Sina et al., 2024; Bundesamt für Justiz, 2024b). The absence of significant regulatory barriers encourages greater consumer participation, increases system flexibility and supports the integration of renewable energy sources (Sina et al., 2024). The implementation of Article 17 DIR on demand response through

aggregation (European Union, 2019) has also been largely achieved (Sina et al., 2024), with a delay of eight months (ibid). While some challenges to full implementation remain, the legal framework under the EnWG is largely in place (Sina et al., 2024).

Smart Metering Systems and Data Accessibility

In accordance with Article 19 of the DIR on smart metering systems (European Union, 2019), Germany has fully implemented the legal framework and no further transposition is required (Sina et al., 2024). This puts Germany at the forefront of energy management in the EU. Standards for interoperability and security in smart metering systems are set by the German Federal Office for Information Security, which develops technical guidelines to ensure system security and compatibility (Federal Office for Information Security, n.d.). Despite a comprehensive framework so far, deployment has been slow, with less than 1% of households equipped with smart meters by 2022 (Sina et al., 2024). To address this concrete challenge, the amended Measuring Point Operation Act (MsbG) of December 2022 mandates a 95% deployment rate by 2030, with interim targets of achieving 20% by the end of 2025 and reaching 50% by the end of 2028 (itemsnet, 2023). Here Germany's ambitious targeted approach during the economic crisis can be seen to improve data accessibility through smart metering systems, in line with the EU regulatory framework.

Grid Flexibility and Capacity Mechanisms

Regarding Article 32 DIR on incentives for the use of flexibility in distribution networks (European Union, 2019), Germany has made partial progress in implementing this directive (Sina et al., 2024). While Article 32(3) is fully operational, the flexibility framework under Article 32(1) remained incomplete (ibid.). Yet, Germany further continues to promote grid flexibility through regulatory adjustments and investments throughout the crisis. For example, the Federal Network Agency approved route corridors for 5,000 km of power lines by the end of 2022, facilitating the transport of renewable energy from northern regions which marks a key step in grid expansion (Bundesnetzagentur, 2023). Amidst the ongoing crisis, the German government also approved a €1.3 billion subsidy to reduce electricity grid fees for consumers in 2025 to stabilise electricity prices and support grid modernisation efforts (Alkousaa, 2024).

Renewable Energy and Self-Consumers

Germany has made significant progress in implementing Article 16 of the RED on the organisation and duration of the permitting process (European Union, 2018) to support the development and operation of renewable energy projects, although it has been 14 months behind the EU deadline (Sina et al., 2024). Amendments to the Spatial Planning Act were introduced in 2023 to streamline the planning process for renewable energy installations, such as onshore and offshore wind turbines, by better integrating spatial and urban land use planning (IKEM, 2023). Meanwhile, Article 17 RED, focusing on grid connections (European Union, 2018) was implemented on time to ensure the integration of small-scale renewable installations and improve grid resilience (Sina et al., 2024). Regarding Article 21 RED on self-consumers of renewable energy (European Union, 2018), the German regulatory framework generally has been supporting consumers who want to use renewable energy with minimal barriers (Sina et al., 2024). However, challenges remained, such as the requirement for a single legal entity to manage joint renewable energy projects (ibid). To address this, in July 2024 Germany enacted legal changes that allow tenants and apartment owners to install solar panels on balconies, while limiting restrictions imposed by landlords or housing associations (Haufe, 2024).

Two things can be seen: First, Germany is largely in line with EU requirements for a clean energy transition, with many measures having been implemented before the crisis (Sina et al., 2024). Secondly, Germany has made notable progress during the crisis by adopting concrete measures to fill gaps, such as the EnWG or the MsBG (Bundesministerium der Justiz, 2024b, 2023; itemsnet, 2023). These concrete legislative changes streamlined processes for renewable energy installations (IKEM, 2023; Haufe, 2024). Moreover, the German Federal Network Agency approved power line routes to concretely expand grid capacity, and the government allocated a total of €1.3 billion to stabilise electricity prices and at the same time support grid modernisation (Bundesnetzagentur, 2023; Alkousaa, 2024), all of which mark a targeted approach of Germany to lead in environmental policy and energy transition even during economic austerity.

Infringement proceedings

How many infringement cases have been brought against Germany during the current crisis that are relevant to its environmental leadership? An analysis of infringement cases related to the environment, energy and climate transition provides an insight into Germany's ambition

and focus during the study period, which covers the years 2022, 2023 and 2024. Between 2022 and 2024, Germany faces five infringement cases related to environmental protection and three cases related to energy and climate policy, which highlights Germany's strengths, but also that the country does face challenges in focusing on environmental policy, as discussed in the following sections:

Regarding environmental infringements, Germany failed to adequately protect bird habitats under the Birds Directive (2009/147/EC) and delayed in adopting noise action plans for major roads under the Environmental Noise Directive (2002/49/EC), both infringements issued in March 2024 (European Commission, 2024b). In October 2023, Germany faced cross-border waste management problems with illegal shipments of waste to Poland, leading to action under the Waste Shipment Regulation (EC) No 1013/2006 (European Commission, 2023). In July 2024, Germany was cited for failing to meet recycling targets under the Waste Framework Directive (2008/98/EC) and the Directive on Waste Electrical and Electronic Equipment (WEEE) (2012/19/EU) (European Commission, 2024c). In the area of energy and climate, Germany's delays in transposing the Renewable Energy Directive (2018/2001) were first addressed in May 2022 (European Commission, 2022b), with additional infringement proceedings for incomplete transposition in March 2024 (European Commission, 2024b). In addition, Germany faced proceedings in September 2022 for failing to fully implement the Energy Performance of Buildings Directive (2018/844) (European Commission, 2022c). These delays have affected Germany's progress in renewable energy deployment and building energy efficiency.

Without yet comparing it with the performance of Austria, this part of the analysis shows that while Germany continued to show ambition and focus in the previous two dimensions in implementing targeted national policies and managing the energy system transformation throughout the crisis, challenges do remain. In addition, the analysis of infringement procedures provides that a more nuanced understanding of EU environmental policymaking is necessary. However, this does not yet contradict any of the findings above regarding Germany's active role in implementing national policies or energy transition. In the next step, I will analyse Austria throughout the economic crisis on the same three dimensions and compare the number of infringement cases against Austria, to provide further insight into the performance of both countries during the crisis.

4.2 Austria

Fossil Fuels Supply 2022 vs. 2023 in Austria (International Energy Agency 2023b)

Energy Unit	2022 (TJ)	2023 (TJ)	Percentage Change
Coal	101,584	100,881	-0.69%
Oil	450,880	441,678	-2.04%
Natural Gas	288,460	246,286	-14.62%

Russian dependance, energy supply and renewable share Austria

Before the beginning of the economic crisis, Austria was heavily dependent on Russia for its total imports, with around 80% of its natural gas coming from Russia (Die Presse, 2023). With the Nord Stream and Yamal pipelines out of action, Russian gas continued to reach Austria with pipelines that passed through Ukraine in 2023 (Sullivan, 2024). The share of dependence from Russian gas import even rose to 98% of Austrian gas imports from Russia in December 2023 (ibid). This high level of dependence continued until November 2024, when Russia cut off gas supplies to Austria due to a payment dispute (Barigazzi, 2024). By October 2024, Austria had become the second largest buyer of Russian fossil fuels in the EU, spending €220 million, mainly on pipeline gas (Raghunandan, 2024). Reductions of 0.69% for coal and 2.04% for oil were minimal, indicating limited progress in Austria's transition away from fossil fuels (International Energy Agency, 2023b). Although a significant reduction of 14.62% in natural gas was achieved between 2022 and 2023 (International Energy Agency, 2023b), the country was still highly dependent on Russian gas (Sullivan, 2024). A dependence that raises the critical question of Austria's efforts to reduce its dependence and diversify its energy supply. Throughout the crisis, Austria maintained a high share of renewables, with renewables accounting for 78% of electricity generation in 2022, rising to 87% in 2023 (BMK Infothek, 2024), similar to Germany, where the share of renewable electricity rose by around 10% in one year (International Energy Agency, 2023a). During the crisis, however, this was undermined by a stagnation of renewable electricity production and relatively weak reduction of gas consumption compared to other EU countries (Die Presse, 2023). Austria had to produce more electricity from gas because renewable energy production stagnated (ibid). This stagnation is particularly linked to a decline in hydropower production, which suffered significantly from

drought conditions in 2022 (ibid.). As a result, Austria's reliance on gas has continued, exposing vulnerabilities in its energy system and limiting its ability to increase resilience through the expansion of renewable energy(ibid.).

National policies

In June 2022, Austria enacted the Gas Diversification Act (GDG), which aims to reduce the country's dependence on Russian natural gas in §1 of the Act (Food and Agriculture of the United Nations, 2022). The law further provides funding for companies to procure non-Russian gas and convert facilities to alternative energy sources (ibid.). Shortly afterwards, in July 2022, a draft amendment to the Environmental Impact Assessment Act (EIA) was introduced to streamline approval and appeal procedures for renewable energy projects (Mayer & Wolf, 2023; Parlament Österreich, 2023). In October 2022, Austria introduced a carbon dioxide tax through the National Emission Certificate Trading Act (NEHG), which puts a price on CO_2 emissions from fossil fuels in the transport, waste, agriculture and small industry sectors (International Carbon Action Partnership, 2022). Furthermore, amendments to the Renewable Energy Sources Act (EAG) in April 2022, specifically for renewable energy projects were included (BGBl. II Nr. 149/2022). Adjustments have been made to simplify the application process and improve funding efficiency by streamlining the funding process and reducing the number of annual PV subsidy solicitations (Rieder, 2022). Through the Renewable Heat Act (EWG), which came into force in February 2024, the Act prohibited the installation of fossil fuel heating systems in new buildings (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, n.d.).

Despite the challenges posed by Austria's close energy ties with Russia, the country has shown ambition in its implemented national policies to accelerate renewable consumption. Yet, Austria has made minimal progress in reducing fossil fuel consumption. Between 2022 and 2023, reductions in coal (-0.69%) and oil (-2.04%) were limited (International Energy Agency, 2023b). Critical points have been further raised that given Austria's existing energy infrastructure, challenges do remain with a rather slow development of the renewable energy system (Austrian Energy Agency, 2022). The GDG policy, aimed to diversify gas supplies away from Russia (Food and Agriculture of the United Nations, 2022), also raises concerns about its effectiveness. While Austria has made progress in reducing GHG emissions, achieving a 5.3% decrease in 2023 compared to 2022 (Anderl et al., 2024) - its heavy reliance on Russian gas, which remained at 98% in early 2024 (Barigazzi, 2024), continues to expose significant

vulnerabilities in how Austria is managing to implement targeted national policies that improve its vulnerable energy system. The transition to alternative supplies such as North Sea gas, as well as investment in infrastructure and renewable solutions such as heat pumps and district heating, has also proved costly for Austria (Van Boxel-Woolf, 2024).

The assessment of Austria's performance in implementing national policies, highlights the challenges of the country as it struggles to reconcile the ambition of its implemented national policies with a sustainable energy future. While the country has set ambitious targets, its slow progress in implementing targeted, effective policies during the crisis underlines a significant gap between goal-setting and practical outcomes. While efforts have been made to diversify energy sources, progress remains limited. Fossil fuel consumption has been reduced marginally (International Energy Agency, 2023b), and throughout 2024 Austria was still 98% dependent on Russian gas (Barigazzi, 2024). This highlights the challenges Austria faces in implementing targeted policies in line with its climate goals and in achieving a secure and sustainable energy future.

Implementation of EU regulatory framework

How effectively has Austria implemented EU rules for a clean energy transition? I will contribute to this by looking at one of the deeper issues: how concretely EU energy transition legislation has been implemented by Austria, how Austria has performed in this respect and what challenges remain for the full integration of relevant provisions for a clean energy transition at national level.

Dynamic Pricing, Active Consumers, Demand Response

Austria has only partially transposed Article 11 DIR on the right to dynamic electricity price contracts (European Union, 2019), more than two and a half years after the EU deadline (Sina et al., 2024). Although Austrian law mentions dynamic tariffs, consumers do not have the right to access such contracts, which in its total scope limits demand-side flexibility and prevents the consumers from optimising their energy consumption (ibid). Similarly, Article 15 DIR on active consumers (European Union, 2019) remains incomplete as consumers are not explicitly entitled to sell self-generated electricity through power purchase agreements (ibid). Austria places more emphasis on energy communities than on individual active consumers (Sina et al., 2024). However, a broader participation is constrained by complex regulations and the centralised energy system, which overall means for private consumers that they are limited in

flexibility and consumer engagement (ibid.). In addition, the implementation of Article 17 DIR on demand response through aggregation (European Union, 2019) has been delayed by eight months and Austria still lacks a clear federal or regional framework for consumer participation, which hinders the development of a flexible energy market (Sina et al., 2024). As a result, most Austrian consumers remain disconnected from energy production or storage, and the energy supply system remains largely centralised throughout the crisis (ibid.).

Smart Metering Systems and Data Accessibility

Austria's rollout of smart metering systems under Article 19 DIR (European Union, 2019) faced implementation challenges (Sina et al., 2024). By the end of 2022, only 68% of meters had been installed, falling short of both EU and national targets (Rechnungshof Österreich, 2024). Technical limitations have prevented the full use of smart meters for demand response, and no explicit energy efficiency measures have been implemented (Sina et al., 2024; Rechnungshof Österreich, 2024). The transition to smart meters in Austria has been delayed by at least five years compared to the original target of 2019, which prompted the EU to extend the deadline to the end of 2024 (ibid.).

Grid Flexibility and Capacity Mechanisms

Regarding Article 32 DIR on incentives for the use of flexibility in distribution networks (European Union, 2019), Austria has not fully implemented this directive (Sina et al., 2024). There is no clear grid development plan and concrete incentives for flexibility services are still missing (ibid).

Renewable Energy and Self-Consumers

Delays in Austria's renewable energy approval procedures under Article 16 RED (European Union, 2018) are hindering the expansion of renewable energy installations, as the necessary regulatory laws have not yet been enacted (Sina et al., 2024). To address this issue, Austria introduced a measure through the EIA in July 2022 to streamline the approval process for energy transition and renewable energy expansion projects (Mayer & Wolf, 2023; Parlament Österreich, 2023). Furthermore, the amendment of the EAG was aimed at streamlining small photovoltaic installations (Rieder, 2022), which also positively contributes to an amendment of Austria’s issue in this matter. While Article 17 RED, which focuses on grid connections (European Union, 2018), has largely been implemented, delays persist due to Austria's inconsistent permitting processes at the provincial level (Sina et al., 2024). Furthermore, efforts

to promote renewable energy communities under Article 21 RED (European Union, 2018) have not led to a widespread participation among consumers, which leaves Austria's energy system largely centralised and less flexible (Sina et al., 2024). This persists throughout the crisis.

Of the articles analysed, none has been fully transposed. Article 11 DIR on dynamic pricing and Article 15 DIR on active consumers remain partially implemented (Sina et al., 2024), both limiting consumer participation and flexibility. Article 17 DIR on demand response lacks a clear framework and Article 19 DIR on smart metering has only reached 68% deployment by 2022, falling short of EU targets (Sina et al., 2024; Rechnungshof Österreich, 2024). At all four articles no concrete steps have been done by Austria to improve progress throughout the crisis. Grid flexibility under Article 32 DIR remains incomplete, with no clear incentives or development plans (Sina et al., 2024). The expansion of renewable energy under Article 16 RED faces slow approval procedures, while Article 21 RED on energy communities has failed to encourage broad consumer participation (ibid.). Although Austria has taken steps to streamline approval procedures for energy projects, such as amendments to the EAG for small photovoltaic systems (Rieder, 2022) and measures introduced by the EIA Act (Mayer & Wolf, 2023; Parlament Österreich 2023), systemic shortcomings remain in Austria's centralised energy system hinder the transition to decentralised energy solutions and a clean energy system (Sina et al., 2024). The observed inefficient implementation style weakens Austria's credibility in achieving clean energy transition goals especially due to limits in implementing concrete measures to work on its problems in the energy system.

Infringement proceedings

Analysis of the European Commission's reports for the months available since 24 February 2022 shows the following assessment. Austria faced a total of 23 infringement cases between 2022 and 2024, 16 in the environment sector and 7 in the energy and climate sector:

Environmental cases included failures to protect natural habitats under the Habitats Directive (92/43/EEC) in July 2023 and April 2024 and the Birds Directive (2009/147/EC) (European Commission, 2023b; European Commission, 2024d). Austria also failed to meet air pollution control measures under the National Emissions Directive (2016/2284), leading to proceedings in January 2023 and November 2023 for failing to meet reduction targets for ammonia and particulate emissions (European Commission, 2023c; European Commission,

2023d). In waste management, Austria failed to meet recycling and collection targets under the Waste Framework Directive (2008/98/EC) and the WEEE Directive (2012/19/EU), leading to proceedings in November 2023 and July 2024 (European Commission, 2023d; European Commission, 2024c). In addition, Austria was referred to the Court of Justice for inadequate transposition of the Environmental Noise Directive (2002/49/EC) in June 2023 and for failure to comply with the Environmental Impact Assessment Directive (2011/92/EU) in April 2024 (European Commission, 2023e; European Commission, 2024d).

In the area of energy and climate change, Austria faced delays in the transposition of key EU directives. Ongoing breaches included failure to fully implement the Renewable Energy Directive (2018/2001), which was addressed in September 2022 and October 2024, and the Energy Efficiency Directive (2018/2002) in September 2022 (European Commission, 2022c; European Commission, 2024e). Austria also failed to meet the requirements of the Energy Performance of Buildings Directive (2018/844) in September 2022 (European Commission, 2022c). Further proceedings in September 2022 show that Austria failed to submit an electricity risk preparedness plan under Regulation (EU) 2019/941 (European Commission, 2022c). Furthermore, during the crisis, EU member states were required to submit draft updates of their national energy and climate plans (NECPs) by 30 June 2023 and final updates by 30 June 2024, according to Article 14(1) and (2) of Regulation (EU) 2018/1999. Austria missed the draft deadline, which led the European Commission to send a letter of formal notice for non-compliance in December 2023 (European Commission, 2023f). Subsequently, Austria also failed to submit its final updated NECP by the 30 June 2024 deadline, leading the Commission to send a further letter of formal notice in November 2024 as part of the ongoing infringement procedure (European Commission, 2024f).

Austria faced a significant number of infringements from the European Commission in the sectors environment, energy and climate. This shows that keeping a targeted, ambitious and focused approach in environmental policymaking throughout the crisis has been a challenge for Austria. Between 2022 and 2024, Austria faced 16 infringements in the environment sector and 7 in the energy and climate sector. The missed deadlines for the NECP underlines Austria's inefficiency. Without coordinating these cases, Austria is struggling to position itself as a leader in the environmental and energy transition efforts. Certainly, due to the high number of infringement cases in the sector environment, this dimension shows that Austria struggles with its focus on environmental policy amidst the crisis.

4.3 Comparison

The comparative analysis of Germany and Austria within my study reveals factors that can explain the significant differences in their responses to the economic crisis in the wake of the war in Ukraine. The factors were conceptualised by examining the performance of both countries along three dimensions: national policies, implementation of the EU regulatory framework for energy transition and infringement proceedings sent by the European Commission.

In response to the energy crisis, both Germany and Austria introduced national policies aimed at reducing dependence on Russian gas, diversifying energy sources and accelerating environmental targets. However, Germany's response was much more ambitious and targeted. Germany implemented policies that prioritised reducing dependence on Russia, energy diversification and the expansion of renewables. This effective progress is reflected in a significant reduction in greenhouse gas emissions in 2023 (Umweltbundesamt, 2024) and a significant reduction in fossil fuel consumption (International Energy Agency, 2023a). In contrast, Austria showed ambition through policies such as the GDG, which focused on reducing Russian gas imports, yet these efforts yield limited results as Austria remained heavily dependent on Russian gas throughout the crisis (Barigazzi, 2024). The effectiveness of Austria's implemented policies is undermined due to existing limitations of its energy infrastructure and a slow development of the renewable energy system (Austrian Energy Agency, 2022), while concrete measures by the Austrian government to address these challenges have shown to be limited. In comparison, Germany demonstrated an ambitious but targeted strategy that effectively combined the reduction of Russian energy imports, gas and oil, with the expansion of renewables and energy transition efforts during the economic crisis. Austria has struggled to implement policies that effectively address its energy diversification challenges. Persisting vulnerabilities in Austria's energy system were revealed during the crisis, as the country had to generate more electricity from gas due to stagnating renewable energy production (Die Presse, 2023).

Furthermore, both countries show significant differences in their implementation styles of EU regulatory framework for a clean energy transition. Germany has aligned its energy policy with EU requirements and used the crisis as an opportunity to accelerate its energy transition. Through the implementation of targeted measures to effectively address concrete ongoing challenges, improvements during the crisis were aimed at dynamic pricing contracts, increasing grid flexibility, streamlining renewable energy approvals and expanding support for

self-consumption through subsidies, thus demonstrating a proactive approach to the clean energy transition during this crisis (Sina et al., 2024). In contrast, Austria's transposition of EU directives is fragmented, with none of the directives analysed having been fully transposed. Systemic inefficiencies, particularly in Austria's centralised energy system (Sina et al., 2024), have hampered its ability to meet EU commitments. Unlike Germany, Austria's lack of concrete improvements shows a weakened ability to act as an environmental leader during this period.

On the third dimension, Germany and Austria also show significant differences in the number of infringement proceedings regarding cases in the environment, energy and climate sectors. Infringement proceedings launched against the two countries in 2022, 2023 and 2024 reveal different levels of ambition and focus in their approaches to environmental policy in these areas. During the crisis, Austria faced 16 infringement cases in the environment sector and 7 in the energy and climate sector. This highlights persisting challenges in maintaining environmental policy as a priority throughout the crisis. In particular, the high number of environmental infringement cases sent by the European Commission underlines Austria's challenges in environmental policy. Germany, on the other hand, faced 5 cases in the environment sector and 3 cases in the energy and climate sector, which reflects a better compliance with EU standards and furthermore a continued ambition, a focus on environmental policy during the crisis. The higher number of cases in Austria reveals persistent systemic weaknesses, a lack of targeted ambition in environmental policy, persisting throughout the ongoing crisis.

Identification of additional factors: Explaining environmental leadership during economic crisis

Factors That Can Not Explain Divergence	**Factors That Explain Divergence**
Economic crisis	Policy capacity
The Strength of Green Advocacy Coalition	Infrastructure readiness
EU membership	Energy resilience

In my study, I identify policy capacity, infrastructure readiness and energy resilience as key factors that explain the divergence in environmental leadership during the current crisis. These

factors show that, beyond the economic crisis itself as the primary independent variable, additional factors influence a country's ability to lead effectively in times of crisis. Political capacity, infrastructure readiness and energy resilience influenced Germany to maintain environmental leadership throughout the economic crisis, contrary to Austria.

Policy capacity had a significant impact on the ability how both countries developed throughout the crisis. Germany had a stronger policy capacity that allowed the country to effectively turning the crisis into an opportunity, which differentiates it from Austria, which showed a less stronger policy capacity that can be seen in weaker implementation of national policies including its address of Russian dependence (Barigazzi, 2024) and its persistent challenge with a centralized energy system (Sina et al., 2024). This factor builds on existing research that the importance of political will, strategic leadership and situational opportunities in advancing environmental goals is important (Jänicke, 2005; Liefferink & Wurzel, 2017) and that the successful implementation of environmental policies is closely linked to a state's institutional and administrative capacity (Knill et al., 2012). The example of Germany shows how a robust policy capacity can enable ambitious and targeted implementation of national policies. My research shows that Germany's policy capacity was specifically designed to address the combination of Russian gas dependency, accelerating the deployment of renewables and simultaneously advancing environmental goals, a strategic combination that is clearly absent from Austria's example. This difference is further reflected in EU infringement proceedings, where Austria's lower ambition, focus and effectiveness are evident.

Furthermore, infrastructure readiness shaped outcomes during the economic crisis. Germany's legal framework already was well in aligning with energy transitioning goals (Sina et al., 2024), while furthermore during the crisis concrete adjustments were done by the government to effectively accelerate energy transition. In contrast, Austria struggled to meet its energy transition targets due to its centralised energy system and a lack of uptake during the crisis (ibid). This supports the argument of Jänicke (2005) and Knill et al. (2012) that issue specific factors, such as the availability of appropriate framework conditions, are critical for effective environmental policymaking. My findings in this study further show, that Austria's challenges have been exacerbated by ongoing environmental and energy infringement proceedings throughout the crisis, which have exposed the country's unprepared infrastructure to effectively transition its energy system. This is further consistent with the dynamics of EU policymaking, where a top-down perspective emphasises that responses of member states to EU directives, often face compliance challenges due to domestic pressures, limited

administrative capacity and the costs of adapting to EU policies (Börzel, 2002; Jänicke, 2005). Germany's infrastructure was better prepared during the economic crisis to actually accelerate progress in its energy transition, while Austria's higher number of infringements in the energy and climate sectors underscores that its lack of infrastructure readiness exposed Austria's vulnerability to lead in environmental policy during the crisis. Germany's infrastructure readiness consolidated its position as a leader compared to Austria's example.

My findings also show that energy resilience in this current economic crisis emerges as a critical factor that influences very differently the environmental leadership of Germany and Austria. Germany effectively balanced energy security with long-term climate goals by combining to rapidly reduce its reliance on Russian imports and simultaneously diversify its energy sources. Austria, on the other hand, was still heavily dependent on Russian gas (Barigazzi, 2024) a challenge that was exposed during the economic crisis and which it had difficulty addressing in concrete terms due to a lack of being resilient in its energy system to amend concrete steps and accelerate the clean energy transition. Energy resilience was central to Germany's ability to maintain its environmental leadership. This builds on Jänicke (2005), who argues that situational factors such as external shocks can serve as drivers of policy motivation. While Germany used an opportunity to advance its environmental goals, Austria focused on reducing Russian imports but faced clear challenges regarding the effectiveness and impact of its efforts.

Taken together, the factors policy capacity, infrastructure readiness and energy resilience shaped Germany's and Austria's leadership responses during this economic crisis. At the same time, they build on previous literature that is vast in describing environmental leadership. Within my study I focus on the factors that drive the development of leaders during the economic crisis to narrow the understanding on this matter besides its relevance for further practical implications in future. The comparative case analysis highlights how two similar countries were influenced differently by the found factors.

5. Discussion

To test the robustness of the factors I have identified, I will measure policy capacity and energy resilience differently. Specifically, I examine response time by looking at how quickly Germany and Austria implemented their initial environmental policies, relevant to addressing Russian dependence and renewable energy acceleration since Russia's war in Ukraine, and the average timing of delays in implementing the EU regulatory framework. So far, I have assessed policy capacity by evaluating the content and concrete effectiveness of national policies and infrastructure readiness by looking at how prepared both countries have been for a clean energy transition. Looking at the number and concrete cases of infringement proceedings further helped me to find these two factors. The introduction of new measures allows me to validate the consistency of my findings and ensure that they are robust, rather than relying on my chosen measurement approach previously in the analysis.

I begin by analysing when the policies discussed in my study were adopted, as they represent the first concrete responses during the economic crisis, relevant to environmental governance. Germany adopted the Easter Package on 6 April 2022, just 42 days after the onset of the crisis (Federal Ministry for Economic Affairs and Climate Action, 2022). In contrast, Austria's Gas Diversification Act, aimed at reducing dependence on Russian natural gas, did not come into force until July 2022, approximately five months after the onset of the crisis (Food and Agriculture of the United Nations, 2022). Here a significant difference in response time is seen which highlights Germany's stronger policy capacity, as evidenced by a faster responsiveness and ambition to adapt during the crisis. Now I look at the average delays in implementing EU regulatory framework. Specifically, Germany experienced delays of 8 months for Articles 11, 15 and 17 of the DIR and up to 14 months for Article 16 of the RED (Sina et al., 2024). In comparison, Austria's delays were significantly longer: 2.5 years for Article 11 DIR, while Article 32 DIR remains not transposed (Sina et al., 2024). While Germany fully transposed Article 19 DIR and Article 17 RED, Austria faced delays of up to 18 months for Article 16 RED due to inefficient administrative procedures (Sina et al., 2024). Germany clearly outperforms Austria, with shorter delays in transposing key provisions for the clean energy transition. These differences underline Germany's greater Policy capacity and infrastructure readiness. Germany's ability to implement regulations critical to the clean energy transition more effectively with lesser delays, underscores its readiness in this area. Finally, my results

remain consistent when applying these selected alternative measures, reinforcing the robustness of my conclusions regarding political capacity and infrastructure readiness.

I acknowledge the limitations of assessing the robustness of energy resilience as it is closely linked to dynamic geopolitical developments, such as Russia's recent decision to cut gas supplies to Austria, which continue to reshape the energy landscape. With new policies, supply shifts and unforeseen developments still unfolding, a comprehensive assessment remains premature. This study focuses on the factors that shape environmental leadership during the crisis. The comparative analysis shows that environmental leadership in crises depends on the interplay of political capacity, energy resilience and infrastructure readiness - factors that can influence how leadership develops in such times. Countries with stronger performance on these factors are likely to be better equipped to maintain environmental leadership during crises. In contrast, countries with limited political capacity, underdeveloped infrastructure and weak energy resilience may struggle to maintain this role. At the same time, while my inductive case study approach identifies concrete factors driving Germany's and Austria's responses during the crisis, there are inherent limitations to this research design. Due to its inductive nature, the conclusions cannot be fully proven, but they do provide valuable insights into the factors influencing environmental leadership during crises. Future research could refine or challenge these findings. In addition, this study focuses primarily on policies enacted during the crisis. However, future changes in national policies or different research contexts may affect the findings. The long-term effects of the measures taken, as well as additional factors influencing Austria's and Germany's environmental leadership, could be explored in future research. Overall, a critical approach to conceptualising environmental leadership remains helpful in understanding its development during crises.

6. Conclusion

Why do actors with a shared status of environmental leadership respond differently to an economic crisis? Existing literature identifies factors that influence environmental leadership however these could not fully explain why two countries with a shared history of environmental leadership and a similar starting point responded differently to the economic crisis. To fill this gap, my study examined additional factors influencing environmental leadership beyond the economic crisis to gain a more nuanced understanding of the dynamics of environmental leadership during crises and to provide insights into what drives Germany and Austria to maintain or struggle to maintain their environmental leadership while overcoming the

challenges posed by the crisis. Their responses are driven by different factors that influence environmental leadership through policy capacity, infrastructure readiness and energy resilience. The nature of the crisis is also crucial, as it can expose systemic strengths and weaknesses, while forcing countries to adapt under pressure - or fail in the attempt.

To find the answer to my research question, I used an inductive approach and applied the Most Similar System Design (MSSD) to compare Germany and Austria. I analysed three key dimensions: the implementation of national policies, the alignment with EU regulatory frameworks that are critical for a clean energy transition, and ongoing infringement proceedings in the environment, energy and climate sectors to explain their divergent responses to environmental leadership during the economic crisis triggered by the war in Ukraine. Incorporating elements of process tracing, I examined the crisis over time, starting from its onset on 24 February 2022. Controlling for the main independent variable, the economic crisis, as well as other similar independent factors - such as both countries being EU member states and in both countries the Greens being governing in - these variables alone could not explain the observed divergence. My findings show that three critical factors shape environmental leadership and determine whether countries are able to sustain their leadership during the crisis or struggle to do so: policy capacity, infrastructure readiness, and energy resilience.

In following ways performed Germany and Austria differently: Austria set ambitious targets but struggled to implement targeted, effective national policies to address its existing challenges and effectively diversify energy sources, reduce dependence on Russian gas or accelerate clean energy transition. Particularly evident were Austria's higher number of infringement cases and its unprepared infrastructure for the clean energy transition, which limited its ability to respond decisively and effectively to Russia’s war in Ukraine and the following economic crisis. In contrast, Germany showed beyond ambition, a targeted approach in its implementation of national policies and responsiveness. One following discovery has been crucial: Germany managed to combine successfully cutting its dependence on Russian gas, accelerating its clean energy transition coordinated policies and amending its challenges in infrastructure where needed. Besides, its performance style shows fewer infringement cases compared to Austria and an ability to maintain its focus on environmental policy under pressure. Germany's proactive measures and adaptability consolidated its environmental leadership, while Austria's delayed and fragmented approach exposed systemic weaknesses. Given the link between environmental leadership and the clean energy transition, Austria's limited progress in policy capacity, infrastructure readiness and energy resilience, yet raise concerns about its ability to maintain leadership amid economic austerity.

This paper highlights the complexity of sustaining environmental leadership during acute crises. While the existing literature discusses environmental leadership extensively, a focus on economic crises is essential to identify the factors that allow leaders to maintain their role in the face of persistent challenges. At the same time, this study highlights the interrelated nature of these factors, which can either strengthen a country's leadership or expose its vulnerability. Thus, a nuanced understanding of the dynamics of environmental leadership requires an examination of the interplay between factors during crises. Taken together, my findings provide a perspective on both opportunities as well as obstacles for environmental leadership, particularly with competing challenges and priorities to be set. However, there is a clear practical need for leaders to prioritise the transition to clean energy, as it will simultaneously reduce external energy dependence and facilitate the achievement of environmental goals more efficiently. These two efforts go hand in hand and are essential and environmental leaders need to be prepared for converging crises. In conclusion, this study provides insights into why environmental leadership diverges in times of crisis. It shows that leadership depends on the alignment policy capacity, a prepared infrastructure and energy resilience, which together determine a country's ability to maintain its leadership under pressure.

This lesson has broader global relevance as the ongoing climate crisis persists and governments need to strengthen their political capacity, invest in resilient energy infrastructure and accelerate the clean energy transition to mitigate vulnerabilities and effectively lead in environmental policy. Just as importantly is that environmental policies remain adaptive and reflect evolving definitions and priorities. Countries that lag behind in the clean energy transition will face increasing challenges in maintaining environmental leadership, especially in the face of overlapping crises. My study contributes to the broader discussion on the development of environmental leadership, which remains critical for countries to meet their climate goals and to address the challenges posed by multiple crises that require urgent action on environmental policy by governments.

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