Feeling Gassy: Exploring the Policy Factors and Political Drivers Behind the Natural Gas Dependency in Germany

Rojas, Mauricio

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Master's Thesis

Author – Mauricio Rojas

Leiden University – M.Sc. Public Administration: Economics and Governance

Master Capstone – New Forms of Industrial Policy in Europe

Supervisor – Dr. Fabio Bulfone

25.07.2023

22.000 Words

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Introduction

The Energy Transition Challenge

Climate change describes the natural process whereby heat is trapped in the earth's atmosphere by greenhouse gases (GHG). Over the course of the century, humans have interfered with this natural process by burning fossil energy sources that emit additional GHGs into the earth's atmosphere. The consequences are higher temperatures, a loss of biodiversity, and an increased risk of floods, droughts, and wildfires. Socioeconomic consequences include threats to productivity, employment, education, infrastructure, and most importantly human life itself (European Commission, n.d.).

Here, political attention has focused on to the role of fossil energy sources as the main contributor towards global warming. Fossil energy sources such as coal, oil, and natural gas contain large amounts of GHGs which are freed into the atmosphere when combusted. More importantly, fossil energy sources form the backbone of global energy systems as around 80% of the world's energy supply is generated by fossil energy sources (EESI, 2021). As a result, the phasing out of fossil energy sources from energy generation has emerged as one of the largest and most contentious political challenges, where policy-makers aim to balance the stability of the energy supply with the attainment of energy transition goals.

The Energy Transition in Germany

The German energy transition, also known as the *Energiewende* (energy turnaround), describes Germany's long-term policy strategy to shift its energy supply away from fossil and nuclear energy sources towards renewable energy sources. The aim of the energy transition is to become climate neutral by 2045, achieving net zero GHG emissions. In order to reach this goal two main strategies are identified, namely the expansion of renewable energy sources and the reduction of total energy consumption coupled with an increase in energy efficiency (BMWI, 2021, p. 15). The German government monitors its progress on these goals with a set of self-selected quantitative indicators and grading its progress on a five-point scale based on the relative deviation from its initial target (BMWI, 2021, pp. 16-17).

Within global transition efforts, Germany's energy transition is regularly singled out as a relative success in both academic studies and press coverage (Haas, 2020; Jänicke & Wurzel, 2019; Eckersley, 2004). The World Economic Forum (WEF) places Germany on the 18th rank out of 115 countries on its energy transition index, which determines a country's readiness for transition across macro-economic, political, and social dimensions (WEF, 2021). The World Energy Trilemma Index by the World Energy Council (WEC) places Germany on the 7th rank out of 133 countries, measuring its ability to balance trade-offs between energy security, energy equity, and environmental sustainability (WEC, 2022). More general assessments highlight the steady increase of renewable energy sources as a share of Germany's energy mix as well as the significant decline in GHG emissions (Pflugmann et al., 2019).

However, concerning the reduction of GHG emissions, the development of different fossil energy sources in Germany reveals a stark discrepancy. The development shows that GHG emissions in Germany from both coal and oil have steadily declined, while GHG emissions from natural gas have steadily increased. It therefore seems that the overall success in the reduction of total GHG emissions is primarily driven by the decline of emissions from coal and oil, while natural gas opposes this trend. A more comprehensive empirical assessment of Germany's energy transition and the divergence between fossil energy sources will be provided in the preliminary analysis.

In the political context, this divergent development reflects the inherently ambiguous role of natural gas in the energy transition ("Oil Supermajor's Mega-Bet", 2021; IEA, 2019; Scharf et al., 2021). The political debate on the role of natural gas in the energy transition revolves around the question whether natural gas should be viewed as part of the problem or the solution (IEA, 2020). Supporters of natural gas see it as a "bridging" fuel towards carbon neutralization, which can promote the phase-out of more emissions-intensive fuels like coal and oil, while ensuring a stable energy supply in the meantime ("Oil Supermajor's Mega-Bet", 2021; IEA, 2019). This is corroborated by a strand of empirical studies highlighting the potential benefit of fuel switching from coal and oil to natural gas as it can lead to a net reduction in GHG emissions (Ladage et al., 2021). Critics emphasize the negative environmental impact resulting from the extraction, liquefaction, and transport of natural gas, especially in the form of methane, which is 80 times more hazardous than common Co2 emissions ("Oil Supermajor's Mega-Bet", 2021; IEA, 2022). A related problem is the increased carbon-intensity of liquified natural gas (LNG) and the negative impact of environmentally harmful extraction methods like fracking ("Oil

Supermajor's Mega-Bet", 2021). These concerns are motivated by empirical studies, which argue that the continuous expansion of natural gas consumption does not allow for the attainment of climate targets set by the German energy transition, even with the reduction of other fossil fuel energy sources (Scharf et al., 2021; Kochems et al., 2018).

Research Question

Overall, the diverging development of natural gas emissions coupled with the political debate on its viability implies an uncertain role of natural gas in the German energy transition which seems to contradict energy transition goals. In order to better understand the role of natural gas in the German energy transition it is necessary to study the historical factors accounting for the increase in natural gas emissions. This paper will therefore ask the following question: **What policy factors can explain the steadily growing level of GHG emissions from the German natural gas sector?**

The research question will be answered by employing a public policy perspective, presented in the theoretical framework, which understands energy transition outcomes in terms of public policy changes. Here, the framework will follow a neo-pluralist logic which sees policies as the outcome of competing interests of political actors within and outside the public sphere (Hall, 1993). The relevant actors explored in this study are political parties, corporate actors, and civil society actors. To enable the historical study of the development of natural gas emissions over time, historical institutionalism will provide the conceptual tools to understand policy-change and contingency, namely path dependency and critical junctures. Historical institutionalism understands policy-change as a process driven by institutional rules and constraints that develop over the long term and shape the behaviour, interests, and power of political actors (Lockwood et al., 2017). Here, policy-change is seen as path-dependent and self-reinforcing because existing policies are difficult to change due to lock-ins of past policy decisions, which limits the space for policy action and stabilizes the existing policy trajectory (Seto et al. 2016; Unruh, 2000). The path-dependent policy trajectory can be altered by a sudden and discontinuous change, in the form of a critical juncture, which destabilizes the existing policy system and allows for a shift towards a new policy trajectory (Capoccia & Kelemen, 2007; Pierson, 2004, pp. 1-53). Instrumentalising these concepts, this paper will carry out a chronological single-case study using a process tracing method to investigate those moments where developments in the natural gas sector have departed from their original trajectory or stabilized the growth of

natural gas emissions across time. The results will show that the expansion of natural gas was driven by political parties, most prominently the SPD, and corporate actors from the up- and midstream segment of the natural gas sector.

Academic Relevance

Most academic studies on energy transitions have typically employed a technological and economic perspective, which conceptualize the energy transition as a process driven by technological innovation and market dynamics respectively. Thereby, the role of political actors in shaping the transition has been side-lined from the academic discourse. While many studies concentrate on the optimal design for energy policy and instruments, less attention has been devoted to the political circumstances and interests that facilitate the adoption of such policies (Meadowcroft, 2011, p. 73). This has led to calls by scholars to expand the existing frameworks towards the inclusion of a political perspective, which highlights the role of political interests in actively shaping the energy transition through public policy (Geels, 2014; Markard et al., 2012; Johnstone & Newell, 2018). This paper can therefore contribute towards closing the gap in the academic literature by applying a political perspective to the study of the German energy transition and exploring its political determinants.

Another gap in academic literature is the lack of sector-specific research on the natural gas sector in Germany. This is a problem because the technological and physical characteristics such as composition, exploration, processing, and transport are fundamentally different for every energy source (Schmid, 2021). These unique characteristics in turn impact the policy interests of political actors differently, which necessitates a separate and individual analysis of the respective sector. Most academic studies on the German energy transition have focused on the phase-out of nuclear energy and coal as well as the diffusion of renewable energies respectively (Hake et al., 2015; Geels et al., 2016; Ohlhorst, 2015; Brauers et al., 2020; Renn & Marshall, 2016). Despite these comprehensive academic studies on the different facets of the German energy transition, sector-specific on the German natural gas sector remain rare, creating interesting research opening for this paper.

More generally, this research can contribute towards the academic literature by increasing the understanding on the policy factors underlying stability in the energy system, rather than change. This is grounded in the scholarly criticism that the role of potential barriers to change

in energy transitions has been understudied (Geels, 2014, p. 23; Smink et al., 2015, p. 87). The literature criticizes the lack of attention on the factors underlying stability in the energy system, as most scholars have treated stability as the status quo free from deliberate political action. Therefore, this research aims to fill this gap in the literature by shifting the analytical focus to the stability and persistence of natural gas in Germany.

Societal Relevance

Germany is essential for the international pursuit of decarbonization, given its economic and political leadership role in the European Union (EU) and around the world. As the largest economy in Europe, Germany is often seen as the informal leader of the EU, which should use its power to lead the European policy agenda. More importantly, Germany is regarded as an environmental leader given its positive energy transition performance (Simon et al., 2023). Here, it is expected to spearhead the European energy transition, through consensus-based policy-making and by translating its domestic energy transition success onto the European level. This environmental leadership role was demonstrated by its crucial involvement in driving up ambitions and mobilising member states on the European Green Deal to secure its eventual passing (Könneke, 2021). Overall, Germany serves as a role model in the European and global energy transition project, providing policy-making guidance to other states (Pflugmann et al., 2019). Germany's inability to wean itself of natural gas therefore threatens its role as an environmental leader which is likely to have a negative impact on the pursuit of decarbonization across the EU.

In practice, this research can strengthen existing energy transition efforts by increasing the understanding of the political interests stabilizing the growth of natural gas. By shedding light on the policy actions underlying the political interests, this research can contribute towards the development of efficient policy instruments that can overcome existing barriers to change by directly targeting the relevant obstacles. As stated by Farla et al. (2012): "If we understand the struggles of actors with competing interests […] we will better be able to assess the conditions for sustainability transitions to materialize". Linking this to historical institutionalism, the strategies can help escape the existing path-dependent self-stabilizing trajectory in the natural gas sector and set the foundation for a new and lasting low-carbon trajectory.

The study is particularly relevant as the challenge of reducing the natural gas dependency has broad socio-economic implications for Germany that go beyond the transition effort itself. Natural gas is deeply embedded within the German socio-economic system as it is a crucial energy source for both households and industry (Statistisches Bundesamt, 2022). Therefore, the transition away from natural gas will involve significant structural adjustments in these high-consumption sectors, which will have to be guided by complementary policy-measures such as heating and industrial regulation. Here the energy crisis of 2022 demonstrated the socio-economic scope of this shift, as it led to an economic recession in Germany and significant policy-making efforts to adjust the energy supply. On a global scale, other countries are likely to face a similar challenge in the future as the share of natural gas in the global energy mix is steadily growing, suggesting an increasingly crucial role in the world economy (IEA, 2020).

Theoretical Framework

Structure of Framework

This section will begin by introducing the theoretical school of transition studies followed by the concept of socio-technical systems, which describes a network of actors and institutions and serves as the analytical focus of this analysis. Within this school the theory of historical institutionalism will provide an understanding of change and stability in energy systems by instrumentalising the concepts of lock-ins, path dependency, and critical junctures. Next, the framework will briefly discuss the most relevant disciplinary strands for studying energy transitions, namely technological, economic, and political perspectives. Here, the theoretical emphasis will lie on the political perspective which highlights the role of public policy in explaining energy transition outcomes. Employing a neo-pluralist perspective on political actors, the framework will discuss the role of political parties, corporate actors, and civil society actors in bringing about policy outcomes.

Transition Studies

The academic school of transition studies tries to understand the long-term processes of transformative change towards more sustainable societies (Markard et al., 2012). Here, sustainability transitions have often been understood through the lens of socio-technical systems. Socio-technical systems consist of an interdependent network of actors, institutions, material artefacts and knowledge (Markard et al., 2012). Relevant actors can include corporations, civil society organisations, and political parties while institutions reflect societal rules, regulations, and standards of practice. As part of a socio-technical system these elements interact with each other and provide a specific service to society. Socio-technical systems can therefore include different sectors like energy, transportation, agriculture, or water supply (Markard et al., 2012).

System Stabilization

Socio-technical systems are stabilized by strong path-dependencies (Unruh, 2000; Seto et al., 2016). The concept of path dependency is grounded in historical institutionalism and describes the process whereby a decision taken at an earlier point in time will affect the possible choices

at a later point in time (Pierson, 2004, pp. 17-53). Path dependency is driven by positive feedback mechanisms (or self-reinforcement), where every step in a certain direction becomes increasingly difficult to reverse as the costs of switching trajectories increase (Pierson, 2004, p. 21). This is because the relative benefit of the current activity increases over time compared with the alternative options. As a results social processes tend to follow "branching patterns of historical development" that stabilize themselves (Pierson, 2004, p. 21).

Applying the concept of path dependency to the energy transition, scholars argue that socio-technical systems are locked into a fossil-fuel based energy system known as the carbon lock-in (Unruh, 2000; Seto et al., 2016). One manifestation is the technological lock-in, where the lifespan of physical infrastructure locks societies into a carbon-intensive emissions path, that is hard to change due to the significant sunk-investments in the infrastructure. Another is the institutional lock-in, which describes the process where institutions, such as policies, end up on a carbon-supporting trajectory that creates costly and challenging barriers to institutional change (Unruh, 2000; Seto et al., 2016). This stabilizes the existing system and leads to suboptimal market outcomes and policy inertia that make it hard to move towards carbon-saving policies (Unruh, 2000). Here, the institutional lock-in is especially relevant for this analysis as it can explain the stability in the natural gas sector driven by policies and political interests.

System Transition

Given these lock-in effects, scholars have paid increasing attention to the role of system transitions. Following the historical institutionalist tradition, change occurs during so-called critical junctures, which are short periods of time during which significant change is possible allowing socio-technical systems to divert from their original trajectory (Capoccia & Kelemen, 2007, p. 348). In the transition literature, critical junctures can be brought about by a range of sudden events or exogenous shocks, that destabilize the existing system and leads to an opening for effective policy-change. Prominent examples in the German energy transition literature include the nuclear accident in Fukushima in 2011, which led to a critical juncture by allowing for a sudden shift in nuclear-policy in the form of the final phase-out (Johnstone & Stirling, 2020). Within this framework of system change there are a diverse set of theoretical approaches that can explain transition processes depending on the disciplinary focus, namely technological, economic, and political perspectives.

Technological Perspective

Traditional notions of the energy transition are grounded in the technological discipline, rather than in politics and public policy (Kuzemko et al., 2016). Classic technological perspectives on socio-technical transitions like the Multi-Level-Perspective (MLP) conceptualize the energy transition as a process driven by the dynamics between regimes and niches (Geels, 2002). Niches are "protected spaces" where actors can experiment and develop new technologies without being subject to the competitive pressure of the established market regime (Geels, 2002). Regimes represent the dominant technologies, practices, and institutions that constrain niche actors and the transition. Changes in the socio-technical system are therefore determined by interactions between niches and regimes and mostly driven by the diffusion of technologies. In the case of Germany, this perspective highlights the role of the technological niche in driving the transition through the diffusion of small-scale innovative technologies, mostly in the form of small onshore wind, solar-PV, and biogas (Geels et al., 2016, Hake et al., 2015).

Economic Perspective

Economic approaches have highlighted the role of market dynamics in steering the transition process, whereas the state as a policy-maker has received a limited role (Johnstone & Newell, 2018; Kuzemko et al., 2016; Cherp et al., 2018). Here, the state is seen as a passive actor that should only intervene in the face of environmental market failures, arising from an inefficient allocation of resources (Stern, 2007, p. 23). As a result, the market is seen as the driving force behind energy transitions, while the state facilitates the optimal conditions for a self-regulating market (Johnstone & Newell, 2018).

Political Perspective

The political perspective emphasizes the role of public policy in shaping the energy transition (Schmid, 2021; Cherp et al., 2018). It has been neglected in the academic literature compared to both technological and economic approaches, given the scholarly apathy on the role of state policies in energy transitions (Cherp et al., 2018; Markard et al., 2012). In order incorporate the political dimension into framework, the following section will shed light on the political determinants of energy transitions, as discussed in the academic literature. The political dimension focuses on the role of public policies in shaping the energy system and how policy

changes are driven by political actors from the public, private, and civil society sector embedded within a set of political institutions.

Public Policy

Public policy plays a crucial role in shaping the energy transition in the form of creative and destructive policies (Schmid, 2021). Creative policies promote the diffusion of renewable energy sources. A salient example is the feed-in-tariff (FiT), which incentivizes investment in renewable energy sources by guaranteeing above-market energy prices to renewable energy suppliers over a guaranteed time horizon (Johnstone & Newell, 2018). Destructive policies destabilize the existing dominance of fossil energy sources (Johnstone & Newell, 2018). They can include control policies like pollution taxes, structural reforms in legislation and a withdrawal of R&D support (Kivimaa & Kern, 2016). Combining both creative and destructive policies into a policy mix, policy-makers can set the trajectory for the energy transition (Kivimaa & Kern, 2016).

Political actors can also engage in a more informal and indirect form of policy-making to steer the energy transition. These policy instruments are especially relevant in liberalized energy markets, where direct policy-intervention is limited. They enable policy-makers to exert significant influence over market outcomes by favouring and strengthening certain firms (Thatcher, 2014). This includes a range of policy instruments spanning across the institutional fields of privatisation, merger control, regulation of competition, and medium-term planning. Examples include the control derived from the partial and indirect ownership of private companies through state holding companies or financial guarantees (Thatcher, 2014, p. 18).

However, the state as a policy-maker is not a unitary actor, nor does it act independently from other actors in the political arena. Employing a neo-pluralist perspective this paper sees the state as subject to societal pressure (Hall, 1993). According to this perspective, policies are the product of competing interests between political parties, corporate actors, and civil society actors (Cherp et al., 2018; Geels, 2014; Lockwood, 2015).

Political Parties

The academic literature argues that political parties have a powerful effect on the energy transition through the development of public policy (Dumas et al., 2016; Ohlendorf et al., 2022; Hess & Renner, 2019; Jacobsson & Lauber, 2006). Political parties are the key actors in the public policy realm and are therefore crucial for the creation and implementation of both formal and informal policy instruments (Schmid, 2021). The relevance of political parties is further corroborated by empirical studies, which show that their political interests are often reflected in policy outcomes (Brouard et al., 2018).

Within the government body, political parties can exercise their policy-making power through ministries. In Germany, the most important ministries in the energy sector are the Ministry for the Economy and Climate Protection, the Ministry of Finance, and the Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BPB, 2022; Newell, 2008; Ohlendorf et al., 2022). They all have varying competencies related to energy politics, which have regularly shifted across legislative periods through cabinet reshuffles (Lauber & Jacobsson, 2016). Even outside of government, political parties can also shape the transition trajectory in the opposition as they have political leverage in the form of legislative votes and vetoes, which they can use to extract policy concessions and shape policy outcomes.

Political parties can also exercise policy-making power on the federal, municipal, and regional level given Germany's federalist structure (Ohlhorst, 2015). In the energy sector, federal governments primarily have authority over the implementation and administration of policies. However, policies generally require the consent of federal governments if the laws impact the finances of the given state, giving political parties on the federal level significant power over national policy-making (Bundesrat, 2023).

Embedding political parties within historical institutionalist theory, the policy decisions by governing parties reflect the institutional path dependency of energy transition trajectories in the form of the institutional carbon lock-in (Dumas et al., 2016). On the other side, a critical juncture in the form of an election can open up an opportunity for change by bringing about significant shifts in political leadership, which leads to drastic energy policy changes (Kuzemko et al. 2016).

The political preferences of political parties on the energy transition exist on an ideological spectrum. Generally, left-leaning parties are associated with more resistance to energy transitions, whereas right-leaning parties are associated with more energy transition support (Chan & Faria, 2022; Clulow et al., 2021; Hess & Renner, 2019). Within this spectrum, green parties are often assigned a strong role, as they are associated with the largest transition effort since environmental concerns lie at the core of their political ideology (Lockwood, 2015; Jacobsson & Lauber, 2006).

Corporate Actors

The literature argues that corporate actors can influence energy policy outcomes by shaping the interests of policy-makers. In general, the literature has identified a range of strategies that corporate actors can pursue to influence policy-making (Geels, 2014; Hillman & Hitt, 1999; Hudson, 2020). In its broadest conceptualization, corporate actors can influence policy-making outcomes through the provision of information and incentives (Hillman & Hitt, 1999, p. 833). The former is grounded in the assumption of information asymmetry, where policy-makers do not have perfect information about the preferences of their principals. Therefore, the provision of information by corporate actors is a critical resource as it provides policy-makers with the information required to form their opinions on a particular policy issue. Another form of influence is the provision of direct incentives in the form of constituent or financial support. Constituent support is a critical resource for elected policy-makers as it is the core driver of electoral support. Direct financial support can include promises of future employment, speaking fees, and travel.

The interests of corporate actors vary across industry and firms and are typically determined by the distributional effect of a given policy based on economic self-interest (Downie, 2017). Employing the MLP, the corporate interests can be divided along the regime-niche spectrum. Corporate regime actors, who represent the dominant fossil energy sources in the energy system, are expected to resist the transition process as it threatens their historically dominant position (Lockwood, 2015; Geels et al., 2016). This includes business along the natural gas supply chain who benefit from the status quo including natural gas suppliers, transportation network providers, and business with a high natural consumption.

Civil Society Actors

Civil society actors are characterized by their collective activities based on shared values, identities, and interests. They have no direct recourse to market transactions or the state, which distinguishes them from both state and corporate actors (Keane, 1998; Smith, 2012). They include a diverse array of actors such as NGOs, grassroots movements, and associations.

Generally, civil society actors can engage in both niche promotion and regime destabilization (Geels, 2002). They can promote niches by strengthening the diffusion of renewable energies, for instance by engaging in community energy projects, where local groups develop sustainable energy solutions (Smith, 2012). The focus of this section, however, lies on regime destabilization as it targets fossil energy sectors, including the natural gas sector. Here, civil society actors are expected to be a destabilising force by engaging in formal and informal strategies to shape policy outcomes (Smith, 2012, p. 10). First, civil society actors can exert formal influence on policy-making processes in the form of lobbying campaigns, forming alliances with policy-makers, and the filing of legal cases in court (Smith, 2012). They can also pursue more informal practices like environmental protests whereby the influence of these actions lies less in the immediate act of disruption but rather in the legitimacy and cultural pressure generated, which increases the salience of policy issues (Smith, 2012; Geels & Verhees, 2011). Linking this section to historical institutionalism, civil society actors can help escape the carbon lock-in by destabilizing the existing path-dependency trough both formal and informal practices.

Institutions

All of these actors are embedded in a set of political institutions, which shape their interests and powers (Seto et al., 2016; Kuzemko et al., 2016). Institutions are understood as formal and informal structures, which shape societies in the form of policies, standards, and rules (Seto et al., 2016; Kuzemko et al., 2016). By structuring the political landscape, institutions mediate political power between different actors, which in turn shapes their interests in the energy transition. Here, the academic literature identifies a range of relevant institutions expected to shape energy transition outcomes such as state capacity (Cherp et al., 2018; Bättig & Bernauer, 2009), the welfare system (Kuzemko et al., 2016; Lockwood, 2015), the electoral system (Lockwood et al., 2017; Iversen & Soskice, 2006), the form of government (Schaffer &

Bernauer, 2014; Saurer & Monast, 2020), and capitalist institutions (Johnstone & Newell, 2018; Unruh, 2000). In this case for instance, the literature highlights how Germany as a coordinate market economy has a strong collaborative tradition which can accommodate a significant amount of corporate and civil society pressure, compared to other countries (Geels et al., 2016, p. 910). Another conditioning factor of political power between the relevant political actors is the salience of environmental issues. The theory argues that the dynamics of low salience political issues give rise to "quiet politics", where corporate interest groups dominate the policy process through political lobbying in an arena sheltered from public view (Culpepper, 2011).

Overview

Overall, the framework understands policy change as a process brought about by the interests of actors which are conditioned by political institutions. Actors pursue their interests in political arenas of power aiming to shape policy outcomes to their benefit. Political parties can shape the energy transition through the formulation and implementation of public policy. They can exercise their policy-making powers through government ministries and in the opposition, operating on both the federal and state level. Corporate actors can shape policy outcomes by engaging in a range of strategies including the supply of information and the provision of direct incentives. Civil society actors can destabilize the existing fossil fuel regime by engaging in lobbying and disruptive practices, such as protests. All of these actors are partially conditioned by a range of political institutions, which shape political interests and consequently energy transition outcomes.

Research Design

Presentation of Hypotheses

Political Parties

Based on the theoretical assumptions presented in the literature we assume that right-leaning parties drive the expansion of natural gas given their empirical association with a lack of energy transition support and fossil fuel support. On the other side we expect left-leaning parties are less likely to drive the expansion of natural gas consumption given their association with energy transition support and fossil fuel reduction. Based on the theoretical expectations on ideological preferences the following general hypotheses emerge:

H.1 – Right-leaning parties drive the expansion of natural gas consumption in Germany
H.2 – Left-leaning parties oppose the expansion of natural gas consumption in Germany

The analysis will include the most important political parties based on their relevance for policy-making. These are the Christian Democratic Union and the Christian Social Union (CDU/CSU), the Free Democratic Party (FDP), the Social Democratic Party of Germany (SPD), and the Alliance ’90/The Greens (The Greens). The CDU/CSU, the FDP, and the SPD were the three core governing parties in post-war Germany, suggesting strong impact on policy-making, making their inclusion crucial for this analysis. The Greens were founded in West Germany in 1980 (later merging with the East German Alliance ’90). They first entered parliament in 1983, participated in various state governments, and became part of a federal government in 1998 for the first time. The inclusion of the Green party is especially interesting since their party ideology suggests strong environmental efforts against fossil fuels. The Left party and the Alternative für Deutschland (AfD) will be excluded from this study as they were never part of a federal government, suggesting a weak policy-impact. Furthermore, the Left and the AfD were founded in 2007 and 2013 respectively, suggesting a small historical impact across the temporal scope of this analysis.

To apply the hypotheses to the German case, the relevant German political parties will be coded on the ideological left-right spectrum. This will be based on the Party Facts project, which aggregates information on political parties from various datasets, including ideological

affiliation (Döring & Regel, 2019). Here, political parties will be labelled as left, centre-left, centre, centre-right, and right. Based on this categorization we would expect the CDU/CSU and the FDP to drive the expansion of natural gas consumption as stated by H.1, while the SPD and the Greens would be expected to oppose the expansion as described by H.2 (see Table 1).

Table 1 – Political Parties in Germany

German Parties	*Political Spectrum*	*Expected Role*
AfD (excluded)	Right	Driving the expansion
CDU/CSU	Centre-Right	Driving the expansion
FDP	Centre-Right	Driving the expansion
SPD	Centre-Left	Opposing the expansion
The Greens	Centre-Left	Opposing the expansion
The Left (excluded)	Left	Opposing the expansion

Corporate Actors

Based on the theoretical framework we expect corporate regime actors to resist energy transition efforts (Geels & Schoot, 2007). In the natural gas sector, we would therefore expect corporations to stabilize and drive the expansion of natural gas. To structure the corporate actors within the natural gas sector, they can be divided by market segment, distinguishing between upstream, midstream, and downstream industries. Upstream industries refer to actors active in the exploration and production of natural gas. Given the focus on natural gas imports, this refers to gas utilities that import natural gas from abroad such as Ruhrgas and Thyssengas. Midstream actors are those that are involved in the transport and storage of natural gas. It therefore includes corporate actors involved in the creation and operation of natural gas pipelines like Mannesmann. Downstream actors are those involved in the consumption of natural gas for industrial, residential, and commercial uses and includes high consumption industry actors such as BASF in the chemicals industry. Combining the theoretical expectations with the corporate segmentation yields the following hypothesis:

H.3 – Corporate actors in the natural gas sector (upstream, midstream, and downstream) drive the expansion of natural gas consumption

Civil Society Actors

Based on the theoretical framework we expect civil society actors to drive the energy transition by engaging in a set of political strategies. Civil society actors can engage in formal strategies, using institutional channels and structures, in the form of lobbying strategies or the use of judicial channels. On the other side they can engage in informal strategies by engaging in disruptive practices like the staging of protests or consumer boycotts. The support for the energy transition is grounded in historical experience in Germany, where civil society actors have repeatedly driven the transition effort by promoting the diffusion of renewable energies through local energy projects, protesting against the expansion of nuclear energy in the 1980s, and more recently advocating for the phase-out of hard coal (Haas, 2019; Hake et al., 2015). Relevant civil society actors in Germany include the German Federation for the Environment and Nature Conservation (BUND), the Environmental Action Germany (DUH), Greenpeace, and the Nature and Biodiversity Conservation Union (NABU). Given these theoretical expectations on the role of civil society actors the following hypothesis is derived:

H.4 – Civil society actors resist the expansion of natural gas in Germany by employing formal and informal strategies to shape policy outcomes.

Research Setup

This paper will carry out a chronological case study to explore the effects of political interests on the expansion of natural gas consumption in Germany. This will be preceded by a short preliminary analysis, which will set the foundation for the main analysis by assessing the performance of Germany's energy transition and studying the striking development of natural gas emissions within the German energy sector. Overall, the study aims to explore the relevant interests that political actors hold in the German natural gas sector and that motivate their actions. Furthermore, it aims to shed light on the relevant actions through which these actors shape the policy outcomes.

Logic of Case Selection

The selection of the German natural gas sector is grounded in its role as a crucial case. Germany is crucial to the study of energy transitions, given its historical role as a pioneer and leader in

driving the energy transition both domestically and internationally, as discussed in the previous sections. More generally, its crucial role to the academic field is also evident in the high degree of academic attention within the field of energy studies (Lauber & Mez, 2004; Oei et al., 2020). Given the large body of research on the German energy transition, the theoretical predictions generated in the framework are firmly grounded in the German case. Therefore, the case is classified as crucial, as it is central to the confirmation or disconfirmation of the theory (Gerring, 2007, p. 231). The main aim of this study, resulting from the crucial case selection, is hypothesis testing (Levy, 2008, p. 3; Lijphart, 1971). Here, the German natural gas sector resembles a most-likely case, where the main goal is to disconfirm existing hypotheses. A most-likely case is defined as a case that "on all dimensions expected the dimension of theoretical interest, is predicted to achieve a certain outcome and yet does not" (Gerring, 2007, p, 232). This condition holds in this case as Germany reduced its emissions in all fossil energy sectors expect natural gas. As a result, the aim of this study is to disprove (parts of) the theory by aiming to falsify the hypotheses given the unexpected outcome in the natural gas sector, which cannot be explained by the theory.

The temporal scope of the chronological case study will be limited to the time period between 1959 and 2021. The year 1959 marks the beginning of the modern history of natural gas in Germany (and Europe) with the discovery of the Groningen natural gas field in the Netherlands, representing a natural beginning for this study. Before this period, natural gas was not part of the German energy mix as it did not operate any significant domestic reserves. Following the discovery, the Netherlands would become the first major European exporter of natural gas leading to the first German imports of natural gas thus marking the entry of natural gas into the German energy mix and the start of the self-reinforcing natural gas trajectory.

The year 2021 was selected as the end of this study, as it marked the end of the most recent grand coalition government under Angela Merkel as well as the completion of the most recent natural gas pipeline Nord Stream 2. While the political developments following 2021 such as the election of a novel coalition government under Olaf Scholz, the European energy crisis, and the natural gas supply stop from Russia suggest a path defining impact on Germany's energy transition, they lie outside of the temporal scope of this analysis, as the long-term effects are still uncertain.

Research Method

This paper will employ a process tracing method to reconstruct the actions of political actors in the German natural gas sector across time. This method involves the tracing of historical events in order to identify the causal mechanisms that link variables with the outcome (Collier, 2011). The academic literature has highlighted the methodological advantages of process tracing methods to study the impact of political interests on policy processes (Kay & Baker, 2015).

First of all, process tracing can accommodate for the inherent complexity of policy processes reflected by the theoretical pluralism of the field (Kay & Baker, 2015). It is based on the view that policy processes cannot be studied in isolation, but instead require the thorough study of the complex network of relationships between states, companies, and civil society organizations across the policy process as well as the study of their mutual influences (Collier, 2011). In this case, process tracing can accommodate for the different political interests and casual mechanisms predicted by a range of theoretical strands from policy studies, political science, technological studies, and social movement theory. Applying this methodological strength to the case, process tracing allows for an efficient study of political party, corporate, and civil society interests and how they have shaped the expansion of natural gas as well as influenced each other.

Process tracing is especially practical for the chronological study of policy processes over time as it instrumentalizes the logic of historical institutionalism. As stipulated by Hall (2008, p. 314) it allows for the analysis of "processes that are path dependent or rooted in strategic interaction". In the case of Germany, the continuous growth of natural gas consumption likely reflects a path dependent process where initial policy decisions by political actors limit the range future choices, thus setting the natural gas sector on a self-stabilizing trajectory towards increasing consumption. Furthermore, process tracing can show how the political and economic context during a certain period shaped the political interests and choices of political actors. Here, the role of critical junctures is especially interesting as they can bring about a shift in existing policy trajectories, in the form of an exogenous shock.

Given the historical nature of process tracing, it can also account for the temporal dynamics of variables, which is especially relevant for the interests of political actors. Given the study of political interests over the course of multiple decades, it is likely that the interests of political

actors change and evolve over time as the path-dependent policy processes and critical junctures shape the existing energy system.

Operationalization of Variables

The chronological case study requires a qualitative indicator to approximate the outcome variable conceptualized as the expansion of natural gas consumption. The outcome will therefore be operationalized as the realisation of supply contracts of natural gas imports entailing the construction of a natural gas pipeline. The analysis will focus on the import of foreign natural gas as its share in total consumption has steadily grown since the 1960s and now represents more than 95% of total consumption (Statistisches Bundesamt, 2022). It has therefore established itself as the main supply path, whereas domestic natural gas reserves have steadily declined in relevance. As a result, foreign imports represent the best measure of natural gas expansion over time. The decision to include the construction of a natural gas pipelines is grounded in the academic literature on carbon lock-ins, which argues that the infrastructure will lock Germany into the long-term supply of natural gas as natural gas pipelines are very costly and difficult to reuse for other purposes. (Seto et al., 2016, pp. 427-433).

The institutional factors discussed in the theoretical framework will be excluded from this analysis as they are expected to the be homogenous across the entire energy sector. Therefore, any institutional effect in the natural gas sector cannot explain the divergence between natural gas and the other fossil energy sources, rendering their assessment superfluous.

Data Collection

This analysis will employ a mix of primary and secondary qualitative data to carry out the chronological case study. To identify the interests of political actors the analysis will mainly rely on primary data from the relevant governments, companies, and civil society actors. The government data will be drawn from parliamentary plenary sessions on energy policy highlighting the interests of different political parties. This will be supported by parliamentary enquiries (*Anfragen*) by the opposition to specify the intentions and motivations of the acting governments. This will be complemented by newspaper coverage, containing position statements, interviews, and guest articles by the relevant actors. Here, the analysis will use the press archives of domestic newspapers such as *Der Spiegel*, *Die Zeit*, and the *Frankfurter*

Allgemeine Zeitung coupled with international press coverage including *the New York Times*, *the Financial Times*, and *the Washington Post*. Since the primary data is subject to the instrumentality of the actors who produces it, it will be triangulated with secondary data in the form of historical academic studies to minimize the misrepresentation of interests. Here, academic studies will be used to embed the interests and motivations of actors in the broader historical context, which is especially important for this chronological case study.

To identify the relevant policy actions and supply agreements the analysis will rely on a mix of formal legislation, historical accounts, independent reports, and once again newspaper coverage. First, the use of formal legislation, policies, and regulations is central to the study of certain policy actions. It provides the legal foundation of formal policy actions as it determines the powers and instruments that political actors have at their disposal. Here, the relevant legislation includes energy policy (*Energiewirtschaftsgesetz*) as well as competition policy (*Gesetz gegen den unlauteren Wettbewerb*). Independent reports and assessments by federal authorities and advisory bodies like the monopoly commission and the federal cartel office can help explain the dynamics underlying certain policy actions by providing insight into the regulatory environment and the relative power of corporate actors. In addition, the analysis will utilize company data on the corporate history of the relevant companies to uncover the details of the relevant supply agreements. This data includes corporate histories published by the company itself including Thyssengas and Mannesmann as well as company literature prepared by independent authors, such as Bleidick's (2017) comprehensive historical account of the Ruhrgas company. Here it is important to acknowledge that the details of supply agreements are usually not disclosed as they are part of a private agreement between corporate actors. Similarly, political actors might disguise their policy actions, making it hard to trace the formal involvement of the relevant actors. Therefore, the existing evidence will once again be triangulated with newspaper coverage and academic studies to uncover the informal policy actions that are not captured by legislative sources as they are not formally codified.

Validity and Reliability

A threat to validity is the availability bias, which arises from the use of information that is most readily available, rather than that which is most representative. This threat is prominent in the study of political interests, where the disclosure of information is often limited given the sensitivity of the issue and political actors might have an interest to misrepresent their true

preferences (Smink et al., 2015). To alleviate this threat, the evidence will always be considered in its relevant context and triangulated with secondary sources from international organisations, independent advisory bodies, and journalistic coverage.

Overall, process tracing has strong internal validity as it can thoroughly study policy change and stability in the German natural gas sector by tracing the interests and actions of political actions over time. The external validity of this study is naturally weak as it only includes one case with rather unique dynamics and political determinants (Toshkov, 2016, p. 304). However, as pointed out by Kay and Baker (2015) single process tracing study can still allow for the generalization of causal mechanisms across different temporal and spatial contexts while acknowledging the uniqueness of the particular policy process.

Preliminary Analysis

Indicators

This section will strengthen the empirical foundation of the research puzzle and set up the main analysis by studying the apparent success of the German energy transition and the divergent role of natural gas on a set of quantitative indicators. The first section will present an assessment of the German energy transition progress in international comparison. This will be followed by a similar assessment on the role of different fossil energy sources within the German energy mix. The quantitative indicators will be selected on the basis of two main criteria: First, the indicators are commonly used energy transition indicators employed by international organizations, scholars, and state institutions to assess the transition progress. This ensures the external validity and independence of each indicator especially considering the risk of selection bias by relying on Germany's self-selected set of indicators. The second criterium ensures the internal validity of the indicators by selecting measures that align with the broader goals formulated by the German government. This way the analysis can ensure that the indicators capture the actual processes reflected by the goals of the energy transition.

Renewable Energies – The first indicator measures renewable energy consumption as a share of the total final energy consumption (World Bank, 2023). It is a useful indicator as it measures the expansion of renewable energies while simultaneously controlling for differences in total consumption owed to country-specific differences in population, economic structure, etc. Furthermore, this indicator aligns with Germany's core strategy to increase the share of renewable energy sources. Renewable energy sources are here defined as the energy from hydro, geothermal, solar, wind, tide, and wave sources as well as biofuels and waste (World Bank, 2023).

Energy Consumption – The second indicator assesses the amount of energy consumed by the average citizen. It measures the energy consumption in terawatt-hours (tWh) per capita (Ritchie et al., 2022). The indicator is especially useful as it captures different forms of energy consumption (e.g., electricity, heating, and transport), which provides a more comprehensive picture of total energy consumption that the commonly used electricity consumption measure. In addition, the measure allows us to control for population size and account for differences in consumption that merely resemble differences in population size. This in turn makes the

measure more comparable on an international scale. Furthermore, this indicator measures the progress of Germany's goal to reduce energy consumption which is part of its second core strategy.

Energy Efficiency – The third indicator is a measure of energy efficiency that captures the amount of GDP required to produce a unit of energy. It is defined as the ratio of GDP to energy use, measured in USD per kilogram of oil equivalent of energy use (World Bank, 2023). Energy efficiency is a key measure in assessing energy transitions since energy efficiency is the second largest contributor towards emissions reductions after the expansion of renewable energy sources (IEA, 2023). Furthermore, this indicator measures the progress of Germany's goal to increase its energy efficiency, which is part of the second core strategy.

GHG Emissions – The final indicator assesses the average GHG emissions per person by studying the GHG emissions in tons of Co2 equivalent per capita (World Bank, 2023). It is generally regarded as one of the most important energy transition indicators as it captures the main goal of all energy transition efforts namely, the reduction GHG emissions (IEA, 2019; BMWI, 2021).

Table 2 – Overview of Indicators

Indicators	**Measurement**	**Logic for Inclusion**
Renewable Energies	Share in total energy consumption	Captures Germany's core strategy to increase the share of renewable energy sources
Energy Consumption	TWh per capita	Captures the progress of Germany's goal to reduce energy consumption which is part of its second core strategy
Energy Efficiency	USD per kg	Captures the progress of Germany's goal to increase its energy efficiency, which is part of the second core strategy.
GHG Emissions	Tons per capita	Captures the main goal of all energy transition efforts namely, the reduction GHG emissions

The analysis will proceed by comparing Germany's present baseline value on each measure and the progress over time with the international performance. The international comparison allows for the contextualization of Germany's progress by controlling for common factors that might affect countries on a global scale and are therefore not attributable to individual German efforts. For reasons of space and clarity the international comparison will mostly focus on different international averages of comparable international groups namely the global average, the OECD, and the EU. The comparison against the global average provides a general overview over Germany's performance in international comparison. The comparison with the EU and the OECD controls for additional economic and political factors that can potentially account for changes in energy transition trajectories. This includes factors often associated with industrialized economies like a high GDP, high productivity, free trade, democratic institutions, and political stability. By comparing Germany to these country groups, this analysis can hold constant their potential effect on the energy transition and isolate the effect of explanatory factors unique to Germany. The data was collected from a combination of sources including the World Bank and the BP Statistical Review of World Energy (World Bank, 2023; BP, 2022).

Results

Renewable Energies

On the first indicator, Germany has a 14.5% share of renewable energy sources in total final energy consumption in 2015, which is clearly below the global average of 17.5% and the EU average of 17.6% (World Bank, 2019). On the other side, Germany's share of renewable energies outperforms that of the average OECD member (12.6%) (World Bank, 2019). Germany share of renewable energies as part of the final energy consumption is therefore smaller than that of the average country and EU member, while it is higher than the OECD average. However, the assessment of progress over time reveals that between 1990 and 2015 Germany increased its share of renewables by 12.4 percentage points from 2.1% in 1990 to 14.5% in 2015 (World Bank, 2019). In contrast the average country increased its share by 0.47 percentage points while the OECD and the EU only increased by 5.3 and 10.73 percentage points respectively (World Bank, 2019). In total Germany was able to steadily increase its renewable capacities as a share of consumption, outperforming global, OECD, and EU averages.

Energy Consumption

Germany's primary energy consumption per capita lies at 42,101 kWh in 2021, which is more than double the global average of 20,902 kWh (Ritchie et al., 2022). The average German citizen therefore consumes more than twice the energy than the average citizen internationally. However, the EU average lies at 37,519 kWh, which clearly indicates that the average EU citizens consumes less energy than the German equivalent (Ritchie et al., 2022). The development over time shows that between 1990 and 2021 the energy consumption per capita in Germany has decreased by 20%. This stands in contrast to the international average which experienced an increase of 16% while the EU saw its energy consumption per capita fall by 10% (Ritchie et al., 2022). The results indicate that Germany experienced a significant decline in its energy consumption which goes against the global trend of increasing energy consumption while exceeding the average rate of energy consumption reduction in the EU. This finding, however, is partially weakened by the fact that Germany's absolute energy consumption per capita exceeds that of the EU average.

Energy Efficiency

The energy efficiency indicator shows a value of 13.4 GDP per unit of energy use in Germany compared to a global average of 8.3 in 2015. Furthermore, the average OECD country reaches a value of 10.4 GDP per unit of energy use, while the EU average is at 12.9 (World Bank, 2015). Germany therefore uses significantly less of its GDP for each consumed unit of energy, compared to the average country, the OECD, or the EU average. Between 1990 and 2015 Germany's energy efficiency has increased by 61% while the global average increased by only 27%, indicating an above average improvement for Germany in international comparison. In the same time period, the OECD increased its energy efficiency by 42%, while the EU increased its energy efficiency by 50% (World Bank, 2015). Overall, Germany's energy efficiency outperforms global, EU, and OECD averages both in terms of absolute values and improvement over time.

Carbon Emissions

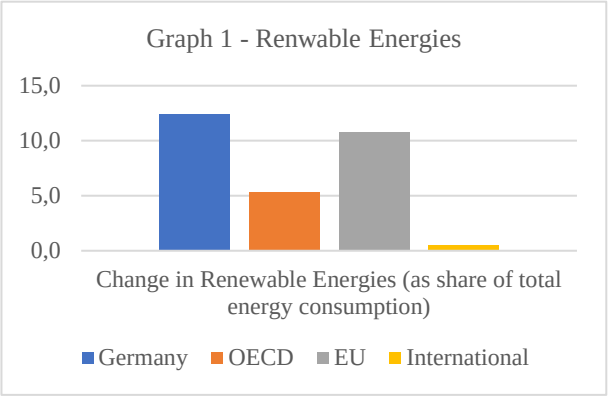
In 2019 Germany emitted 7.9 tons of Co2 per capita while the global average stands at 4.4 tons and the OECD average at 8.5 tons (World Bank, 2020). Germany's GHG emissions are

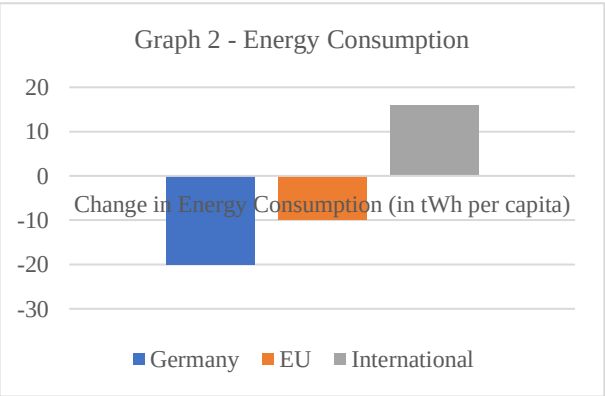
therefore significantly higher than that of the average country and marginally lower than that of the average OECD country. Between 1990 and 2021 Germany's Co2 emissions per capita have fallen by 34%, while the OECD and the EU average fell by 17.4% and 30.4% respectively (World Bank, 2020; EEA, 2023). In contrast the global average experienced an increase in per capita Co2 emissions of 12.8%. Overall, Germany has experienced a significant decline in its GHG emissions, reflected by a robust trend of emission reductions which exceeds both global and OECD averages.

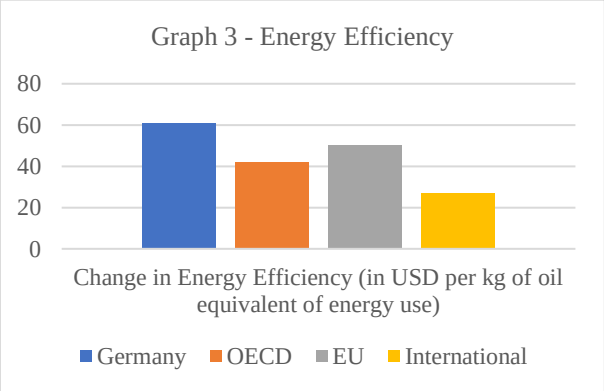
Table 3 – International Comparison of German Energy Transition Progress

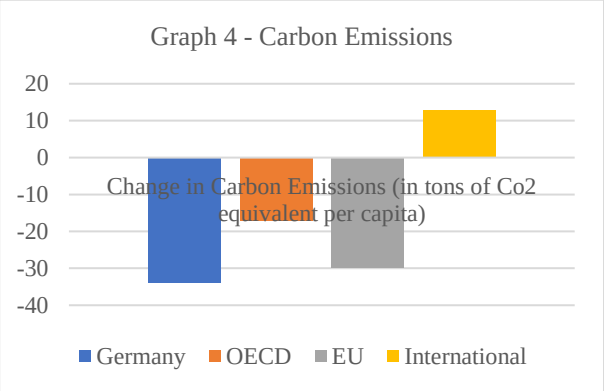
	Germany	OECD	EU	International
Renewable Energies*	+12.4 pp	+5.3 pp	+10.73 pp	+0.47 pp
Energy Consumption**	-20%	-	-10%	+16%
Energy Efficiency*	+61%	+42%	+50%	+27%
Carbon Emissions**	-34%	-17%	-30%	+12.8%

* 1990-2015, ** 1990-2021









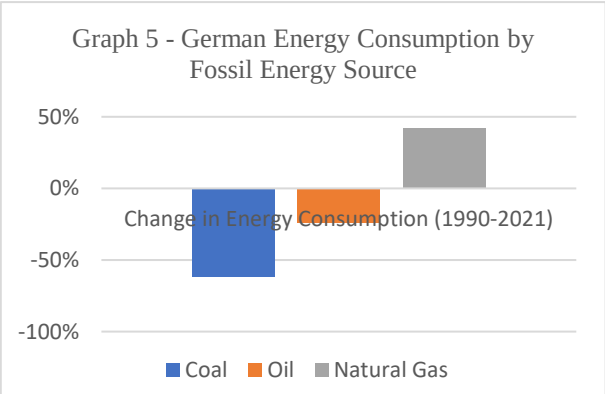
Overall, the comparison of the present baseline values reveals a mixed German performance on most measures, especially in comparison with industrialized economies. The assessment of Germany's progress over time, however, shows a more positive picture. Here, Germany has expanded its share of renewable energies, reduced its energy consumption, increased its energy efficiency, and reduced its GHG emissions at a rate that outperforms the global average on each measure. More importantly, Germany has also outperformed the EU and the OECD on most measures, reflecting a strong performance even in comparison to other industrialized economies with similar economic and political features. Given this positive long-term trend, the German energy transitions can be categorized as a moderate success. As already discussed, these results align with the academic consensus, framing the German energy transition as an overall success (Haas, 2020; Jänicke & Wurzel, 2019; Eckersley, 2004).

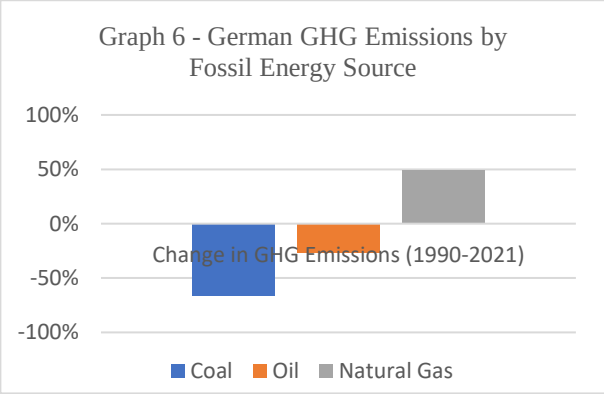
Decomposition by Fossil Energy Sources

The previous section found that, despite mixed results, the German energy transition is a moderate success in international comparison. However, these general results lack insight into the development of the German energy mix underlying this transition. More precisely, it is crucial to shed light on the role of fossil energy sources as they are the primary contributor towards GHG emissions. In order to assess which fossil energy sources are driving or hampering the transition, it is necessary to decompose and compare Germany's progress across these different sources. Therefore, this section will briefly assess the contribution of each fossil energy source towards the energy transition by comparing its share in Germany's total energy consumption and its resulting GHG emissions across time. The assessment of the development over time will look at the absolute changes in consumption and emissions rather than the changes in relative shares of the energy mix. This ensures the absence of a composition effect where observed changes in a given variable are brought about by changes in another variable (Rothe, 2012). The relevant fossil energy sources assessed in this section are coal, oil, and natural gas.

In the German energy sector 76% of energy comes from fossil energy sources. Here, oil accounts for 33% of German energy consumption in 2021, followed by natural gas with 26%, and coal with 17% (Ritchie et al., 2022). The development over time shows that between 1990 and 2021 the energy consumption from coal has decreased by 62%, while oil has seen a decrease of 24%. However, the consumption of energy from natural gas has increased by 42%, making

it the only fossil energy source to have experienced an increase in absolute energy consumption (Ritchie et al., 2022). The GHG emissions from fossil energy sources reflect these consumption patterns. The total GHG emissions in the German energy sector amount to 675 Mt of which oil accounts for 37%, followed by coal with 34%, natural gas with 26%, and the rest (cement and flaring) with 3%. The development of GHG emissions over time shows that the emissions from coal and oil have decreased by 66% and 27% respectively, while the emissions from natural gas have increased by 49% (Ritchie et al., 2020).





Taken together the results shows that the GHG emissions from natural gas in Germany have significantly increased along with its consumption, which is contrasted by a substantial decrease in emissions from both coal and oil. The empirical findings of this section are therefore in line with the broader academic literature and press coverage ("Oil Supermajor's Mega-Bet", 2021; IEA, 2019; Scharf et al., 2021). It is important to acknowledge that the preceding analysis was held intentionally brief to give a broad overview of the energy transition progress in Germany. Facing a trade-off between depth and breadth, this analysis highlighted the broad patters and developments of Germany's energy transition, while backgrounding some of real-world complexities underlying these developments. To gain greater insights into these nuances would require a larger quantitative analysis with additional indicators, which is beyond the scope of this paper. Overall, this preliminary analysis has strengthened the empirical foundation of the research puzzle, by thoroughly exploring the German energy transition and the divergence of GHG emissions between different fossil energy sources, using a set of carefully selected and comprehensive indicators.

Main Analysis

Coal Domination and the Emergence of Natural Gas

Historical Energy Policy Context

Until the 1970s Germany did not have a clearly defined comprehensive energy policy strategy for natural gas as energy policy was essentially coal policy (Oei et al., 2020). The priority of the German government in the post-war years was to reconstruct German energy infrastructure fuelled by hard coal, which formed the foundation of economic, social, and political reconstruction, accounting for 90% of primary energy consumption in 1950 (Oei et al., 2020). In the mid-50s, the dominance of hard coal was threatened by an inflow of cheap foreign oil from the Middle East (Monopolkommission, 1976, pp. 348-356). This was amplified by the inflow of cheap imported hard coal, which competed directly with the more expensive domestic hard coal. This ultimately spelled the decline of domestic hard coal in Germany starting in 1957 (Monopolkommission, 1976, p. 453). As a result, German energy policy was characterized by direct and indirect subsidies to shelter domestic coal production from foreign competition, which formed the economic backbone of the German industry and employed about 600.000 workers (Monopolkommission, 1976, pp. 356-359; Oei et al., 2020; Brauers et al., 2020).

Import of Dutch Natural Gas

The first major expansion of natural gas in Germany began with the discovery of natural gas reserves in the Netherlands by Groningen in 1959. The Dutch reserves were managed by the British-Dutch Bataafse Petroleum Maatschappij (Shell) and the American Standard Oil Company (Esso), which operated through the jointly owned Nederlandse Aardolie Maatschappij (NAM) (Bleidick, 2017, p. 224). The prospect of importing Dutch natural gas into Germany was especially contentiousness for German corporate actors, since NAM wanted to build and operate its own pipeline network in the German gas market (“Lange Leitung”, 1965). This would have enabled NAM to sell their natural gas directly to consumers, effectively locking out German natural gas suppliers from their own market.

As a result, the large German gas utilities, namely Ruhrgas and Thyssengas, were initially sceptical of the import offers as they wanted to protect their domestic market from foreign

competition. Ruhrgas had a further interest in delaying the import of natural gas as it was partially owned by coal interests, which were threatened by the import of natural gas. Ruhrgas was founded as a joint venture between mining companies, which generated a share of their income through the sale of coke oven gas generated from hard coal (Neuma, 1965). As a result, Ruhrgas had an interest to resist the initial import of natural gas to protect the sales of coke oven gas (Neuma, 1965; Bleidick, 2017, p. 244).

The government had a similar interest in avoiding foreign dominance on the domestic market as well as protecting the position of the hard coal industry. In a speech to parliament, the German economy minister Kurt Schmücker from the governing CDU argued that any deal must not only respect the interests of the natural gas industry but also that of the German hard coal industry (Deutscher Bundestag, 1964, p. 7253; Bleidick, 2017, p. 236). More importantly, he highlighted the importance of avoiding "hasty developments" in the integration of natural gas in the German market (Deutscher Bundestag, 1964, p. 7253). This was motivated by the detrimental opening of the German oil market, which led to a surge of cheap imported oil, the crowding out domestic hard coal, and foreign dominance in the domestic oil market (Bleidick, 2017, p. 235; Deutscher Bundestag, 1964, p. 7253). Schmücker even threatened direct government intervention should an adequate solution not be found by corporate actors (Deutscher Bundestag, 1964, p. 7253). This sentiment was also reflected by the economy minister of North-Rhine-Westphalia (NRW), Gerhard Kienbaum from the FDP who criticised NAM's intentions, stating that "they want to flail around freely on the German market" ("Lange Leitung", 1965).

The first import agreement of natural gas in German history was secured in 1965, when NAM acquired 50% of Thyssengas. Following the deal, a conflict erupted between corporate actors about the construction and ownership of the necessary pipeline. As already stated, NAM wanted to construct and operate the pipeline itself, while German political parties and corporate actors wanted to protect the domestic market from foreign influence. Here, Gerhard Kienbaum, the economy minister of NRW played a crucial role in defending corporate and national interests. Based on the German Energy Act of 1935 (Energiewirtschaftsgesetz, 1978), the construction of pipelines was subject to ministerial approval, giving Kienbaum significant power over the negotiations. On the one side, Kienbaum used this power to block applications by NAM to construct their own pipelines. On the other side, he used his ministerial power to pressure both Thyssengas and Ruhrgas into finding a compromise and building the pipeline together (Neuma,

1965; Thyssengas, n.d.). A more general source of influence for the state was the indirect ownership of natural gas companies through parent companies. The state was able to exert significant influence on Ruhrgas through its ownership in the mining companies Veba AG and Ruhrkohle AG, which in turn owned parts of Ruhrgas. The broader state influence over the natural gas market was also stressed by the monopoly commission, which argued that the state can influence decision-making of the Ruhrgas AG, through its ownership in mining companies (Monopolkommission, 1976, p. 341). Ultimately, government and corporate interests persevered, and the pipeline was built jointly by Ruhrgas and Thyssengas, securing partial domestic ownership over the new pipeline ("Lange Leitung", 1965). As part of the compromise Shell and Esso acquired a 25% stake in Ruhrgas, securing additional indirect control over the project, without full ownership over the transport network itself.

Linking the findings to the theoretical expectations, natural gas utilities actively drove the market entry of natural gas, through their crucial role as negotiators. Politically, the governing CDU/CSU and FDP acted as expected as they drove the realisation of the agreements through the instrumentalization of ministerial approval powers and the indirect ownership of natural gas utilities. Here, the parties were primarily driven by economic concerns, aiming to protect the economic interest of domestic corporate actors, rather than environmental considerations, which suggests a low salience of environmental policy goals. Finally, there was no relevant civil society involvement, which is unsurprising considering the low salience of environmental issues across all energy sources.

The deal represented a critical juncture in the expansion of natural gas consumption in Germany. First, the partial acquisition of Ruhrgas and Thyssengas by foreign oil interests caused a permanent shift in the internal energy priorities of the companies by crowding out existing coal interests and enabling companies to prioritise the expansion natural gas supplies (Bleidick, 2017, p. 261; Neuma, 1965). The importance of this shift was also highlighted by the monopoly commission, which stated that "the influence of oil companies in the West German natural gas economy […] is so strong, that […] no developments can be initiated that permanently and fundamentally oppose their corporate interests" (Monopolkommission, 1976, p. 341). As a result, the entry of foreign oil interests represents a critical juncture as it set the path for the corporate pursuit of natural gas agreements unhindered by conflicting corporate interests.

Rise of the SPD and Soviet-West German Pipeline Deals

Soviet-West German Pipeline Deals under Brandt

When the Soviet Union discovered significant natural gas fields in Siberia during the 1960s, an opportunity arose for Germany to satisfy its growing energy demand brought about by the ongoing industrialisation process. Unlike previous deals with the Netherlands, this deal was set in a difficult political context as the negotiating party was behind the iron curtain.

On the German side, the newly elected SPD government under Willy Brandt had a significant political interest in conducting trade with the Soviet Union. Willy Brandt became chancellor in 1969 pursuing a novel political approach towards the east known as *Ostpolitik* (East policy) (Weber, 2022). It included a process of rapprochement by expanding diplomatic and commercial relations towards the east to entangle markets and limiting the risk of potential conflicts through mutual losses. *Ostpolitk* therefore abandoned the Hallstein doctrine in foreign policy, applied by previous CSU/CSU governments, which forbade diplomatic relations with any state that recognizes the German Democratic Republic (GDR). The new SPD government therefore supported the import of Soviet natural gas as it was seen as a catalyst for political and economic rapprochement, while cheaply servicing the growing energy demand (Schattenberg, 2022).

Another relevant political actor on the federal level was Otto Schedl (CSU), the Bavarian economy minister. His interest for the import of Soviet natural gas was grounded in economic rather than political interests. Bavaria was in dire need of cheap energy as its economy was in the midst of transitioning its agricultural economy into an industrial state (Erker, 1991). Existing energy options were insufficient as the transport of coal from the Ruhr area as well as the transport of natural gas from the Netherlands was seen as too expensive (Schattenberg, 2022). Furthermore, Schedl wanted to avoid increasing the import dependence on the Dutch NAM, which was motivated by a broader interest in breaking up the existing global oil monopolies (called the “seven sisters”) including Esso and Shell (Schattenberg, 2022).

The relevant corporate actors were represented by a troika of natural gas suppliers, steel and machine manufacturers, and banks (“Salto am Trapez”, 1970). Ruhrgas headed the supply negotiations, as the most powerful actor in the German natural gas sector and the only

international company with sufficient international experience, capacity, and reserves to realise a deal of this dimension. Thyssen AG and Mannesmann AG, German steel manufacturers, would provide the 5.000 km of large-diameter steel pipes as the Soviet Union lacked the manufacturing ability and expertise. The Deutsche Bank led a consortium of German banks, which were responsible for providing the necessary credit to the Soviet Union to finance the large-diameter steel pipes.

The negotiations were initiated by political actors on both the national and the federal level. On the federal level, Schedl was crucial in driving the deal by seeking personal contacts with Russian officials and sounding out opportunities for Bavaria (Schattenberg, 2022). On the national level, Willy Brandt initiated the official political negotiations by meeting with Soviet leader Brezhnev and ambassadors both in Bonn and East Berlin (Schattenberg, 2022). Furthermore, Karl Schiller (SPD), the minister of economic affairs under Brandt met his Soviet counterpart Nikolai Patolichev, marking the first meeting between West-German and Soviet cabinet members since 1958 ("Öl auf Bonn", 1969). The corporate actors conducted the contractual negotiations and settled the details of the agreement. The Agreement was signed in 1970 by Ruhrgas, Thyssen, Mannesmann, Deutsche Bank, and Soyuzgazexport, the Soviet-owned natural gas supplier ("Salto am Trapez", 1970).

The first agreement was backed by government-issued export credit guarantees, where the state agreed to bear 50% of the financial risk (Stent, 1982, p. 167). These economic incentives by the SPD were further extended with the creation of the West German-Soviet Commission for Economic, Technological and Scientific Cooperation in 1972, which was composed of both government and industry representatives. It was designed to regulate West German-Soviet trade and ultimately secured the granting of full export credit guarantees to finance the Soviet-West German trade. This shift in export credit policy initiated by the SPD, marked a stark departure from the strict credit policy under the CDU, and promoted the future pursuit of natural gas agreements by German corporate actors (Stent, 1982, p. 167). Following the first pipeline deal, all subsequent deals with the Soviet Union were now backed by full credit guarantees.

Overall, the first Soviet-West German pipeline agreement was driven by the SPD under Brandt, who promoted the pipeline deal, aiming to open economic and diplomatic relations with the east as part of the novel *Ostpolitik*. Linking these developments to the theory, the election of the first SPD government under Willy Brandt marked a critical juncture in the expansion of

German natural gas consumption. The political shift away from the established Hallstein doctrine was underlined by the policy shift towards the use of credit export guarantees as a policy instrument to promote the expansion of natural gas trade with the Soviet Union. Another important driver was the CSU, as Schedl pursued economic interests by aiming to satisfy the growing energy demand and protect the competitiveness of German corporate actors, similar to the motivations underlying the Dutch import agreements.

Corporate actors on the other side conducted the negotiations on the contractual terms of the deal driven primarily by economic interests. Here, the policy-shift initiated by the SPD created a new path-dependent trajectory for German corporate actors characterized by increasing economic gains in the import of natural gas and the export of both steel and machinery. The positive economic feedback is demonstrated by the developments in the steel industry, where Mannesmann's export sales grew by 40% between 1969 and 1970, while Thyssen's exports increased by 20% (Carter, 2012a, p. 49). Moreover, large-diameter steel pipes soon represented the single most important Soviet import from West Germany. Together, the politically driven strengthening of economic relations with the Soviet Union and the increasing economic gains for German corporate actors created path-dependent process characterized by the realisation of additional natural gas deals with the Soviet Union. Finally, civil society actors remained marginal, which aligns with the supposed absence of societal environmental concerns.

The First Oil Crisis

The first oil crisis in 1973 was a crucial moment in German energy policy, which shaped political interests on the role of natural gas. The crisis occurred on the 19th of October 1973 and was caused by an oil embargo imposed by the Arab OPEC states on the US in retaliation for the US decision to support the Israeli military during the Yom Kippur war. The embargo nearly quadrupled the price of oil from 2.90$ per barrel to 11.65$ per barrel in January 1974 (Corbett, 2013). The effect of the price increase was also felt in Germany, which at this point drew 55% of its primary energy from oil (Deutscher Bundestag, 1973, p. 3). The shock represented a major turning point in the development of natural gas consumption as it led to the expansion of natural gas, to counterbalance the reduction of the existing oil supplies.

The main motivation of the federal government, following the crisis, was the need to diversify away from oil by expanding alternative energy sources to secure a stable energy supply

(Deutscher Bundestag, 1974, p. 3). Here, the government, headed by an SPD-FDP coalition, emphasised the crucial role of natural gas in facilitating the transition away from oil and towards a more secure and crisis-resistant energy supply (Deutscher Bundestag, 1974, p. 6). Consequently, the government emphasized its commitment to expand the existing share of natural gas supply by entering new contracts with foreign partners and pursuing further domestic exploratory drilling (Deutscher Bundestag, 1974, p. 11). It also highlighted the special role of the state to guarantee credit for gas deliveries, which it had recently secured for trade with the Soviet Union as discussed in the previous section (Deutscher Bundestag, 1973, p. 9). Another important rationale strengthened by the crisis was the preference for a more concentrated natural gas market. In the energy program, the government subtly expressed its wishes for more market concentration in the natural gas sector given the "high risks and extraordinary financial strain of large natural gas deals" (Deutscher Bundestag, 1973, p. 11).

Linking this to the theory, the first oil crisis represented another critical juncture in the expansion of natural gas, as it positioned natural gas as a crucial energy source in driving the diversification away from oil and thus secure the domestic energy supply. This shift was once again driven by the SPD as the governing party and the FDP as the coalition partner. Here, the oil crisis provided a new policy rationale for the expansion of natural gas in the form of energy security, which would be used to promote and justify future natural gas agreements, while complementing the existing foreign policy rationale provided by the SPD through its *Ostpolitik* (Deutscher Bundestag, 1977, 1981).

Finally, the oil crisis also strengthened the existing political preference of the government for more market concentration in the natural gas sector, which was already evident during the Dutch natural gas agreements. The crisis therefore reinforced the trajectory of natural gas expansion, by strengthening the preference for market concentration, which would ultimately motivate the critical merger between Ruhrgas and E.ON (discussed later) enabling larger natural gas deals.

Soviet-West German Pipeline Deals under Schmidt

In 1974 Willy Brandt stepped down from office following the Guillaume scandal, where Günter Guillaume, one of Brandt's closest associates, was exposed as a GDR spy. Brandt was superseded by Helmut Schmidt (SPD), who had previously served under Brandt as the West

German defence minister, finance minister, and economics minister (Carter, 2012a). Schmidt continued Brandt's *Ostpolitik*, by supporting the expansion of trade and diplomatic relations with the Soviet Union (Kieninger, 2020; Spohr, 2016, pp. 33-59). The continuation of Brandt's foreign policy course in the natural gas sector was evident in the conclusion of the third Soviet-West German pipeline deal in 1974.

More important, for this analysis is the fourth Soviet-West German contract concluded in 1981, as it clearly highlights the increasing resilience of the existing natural gas trajectory driven defended by the SPD. The fourth agreement was set right after the second oil crisis which arose in 1979 following the Iranian revolution which destabilized the international oil market and increased prices once again. As a reaction the governing coalition of SPD and FDP once again emphasised the effort to reduce the energy dependence on oil, pursued under the motto "weg vom Öl" (away from oil), by increasing alternative energy sources, including natural gas (Deutscher Bundestag, 1981, p. 10). The fourth pipeline agreement was therefore fully supported by the governing coalition as it continued its pledge to expand existing natural gas supplies to guarantee energy security (Deutscher Bundestag, 1981, p. 24). In a speech addressing the Bundestag Schmidt emphasized once more his support for the deal as it serves the "diversification of risks of energy supply" (Deutscher Bundestag, 1982, p. 6573). Another motivation was the economic recession that West Germany was experiencing since 1980 driven by high energy prices due to the second oil crisis and leading to falling productivity and growing unemployment (Heilemann, 2019).

On the German side, the agreement once again involved the usual troika of corporate actors, headed by Ruhrgas, Deutsche Bank, Mannesman and AEG Kanis (Carter, 2012b, p. 138). They all naturally supported the agreement for its economic benefits. The economic interests of corporate actors were further strengthened by the economic recession following the second oil crisis, which exerted significant economic pressure on the corporate sector (Heilemann, 2019). Here, corporate actors from the steel and machinery sector, such as AEG Kanis and Mannesmann were experiencing significant economic downturn. As a result, the agreement posed a lucrative opportunity for corporate actors, especially considering the growing importance of the Soviet market, which had become the most important market for lathes and pipes (Wörner, 1981)

Shortly after the deal was signed in November 1981, the pipeline construction was threatened, when US president Reagan imposed economic sanctions on high-tech pipeline technologies following the Soviet imposition of martial law in Poland to supress the nation's emerging trade union movement in December 1981 (Gross, 2016; Carter, 2012, p. 231). The sanctions targeted machinery needed for the pipeline construction, most importantly turbines, which pump the natural gas through the pipeline and regulate pressure.

As a reaction, Schmidt reaffirmed his commitment to the Soviet pipeline agreement (Bundestag, 1982, pp. 6573-6574). Similarly, the minister of foreign affairs, Hans-Dieter Genscher, from the FDP (coalition partner) expressed his continued support for the deal emphasizing the responsibility to fulfil the contractual obligations by German businesses (Deutscher Bundestag, 1982, p. 6612). Furthermore, the government directly addressed US concerns about energy dependency by emphasizing that no unilateral dependency emerges from this agreement (Deutscher Bundestag, 1981; Meyer-Larsen, 1982). In its revised energy program, the ministry of economy stated that "even a doubling of natural gas imports from the Soviet Union", from 15% to 30% of import share, would not lead to energy dependency (Deutscher Bundestag, 1981, p. 24).

The corporate sector represented a united front, supporting the deal in spite of the economic sanctions (Carter, 2012b, p. 140). Besides the continued economic interests, the participating businesses were already heavily invested in the Yamal project. Therefore, pulling out of the project would have meant significant risk of litigation and damages claims for corporate actors following a break of contractual obligations ("Sibirisches Erdgas", 1982, p. 19). Both the Association of German Machinery and Engineering (VDMA) and the Association of German Chambers of Industry and Commerce (DIHK) a group representing export-oriented manufacturers spoke out against the sanctions calling them a "violation of the foundations of trust and reliability" ("Sibirisches Erdgas", 1982, p. 19).

To save the deal, the Schmidt government engaged in negotiations with the Raegan administration, aiming to convince them of the mutual benefit of this deal. For instance, Schmidt emphasized that the Soviet Union would need the income generated by the natural gas exports to purchase grain from the US (Meyer-Larsen, 1982). Ultimately, the sanctions were dropped and the pipeline construction was finished. Once again, the deal was backed by the

state through credit export guarantees, showcasing the path-dependency of the initial shift in credit policy in 1972 (Gustafson, 1985, p. 21).

Linking the findings to theory, the period saw the continuation of Brandt's *Ostpolitik* by Schmidt, once again highlighting the crucial role of the SPD in driving the expansion and the path dependency of the established policy trajectory. This was once again complemented by the energy security rationale, which was strengthened by the second oil crisis and the subsequent economic crisis. The increasing resilience of the existing policy trajectory was demonstrated by the significant political and ultimately successful political resistance, following the imposition of US sanctions. As a result, the SPD remained a crucial driver the expansion of natural gas, aided by the FDP as its coalition partner. In the private sector, corporate actors acted as expected by actively supporting the realisation of additional supply deals with the Soviet Union. Here, the corporate trajectory, defined by self-reinforcing economic gains, was reinforced by the economic crisis, which increased the economic dependence on the Soviet market.

Nascent Civil Society and Concentrating the Market

Europipe I

The Europipe I project of 1995 entailed the import of Norwegian natural gas from the North Sea to Lower Saxony in Germany. On the corporate side, the project was driven by Ruhrgas, which negotiated the contract with the Norwegian Statoil. Politically, the project enjoyed support on the state level from the SPD-Green government headed by Gerhard Schröder, then premier of Lower Saxony (1990-1998). Schröder highlighted the importance of the increased gas supply to secure independence from nuclear energy in the midst of the nuclear phase out ("Erdgas aus Norwegen", 1993). The project was heavily resisted by environmental groups such as BUND, NABU, and WWF, which rejected the construction of the pipeline because of its potentially damaging impact on the Wadden Sea as the site of construction ("Erdgas für Norwegen", 1993; Wattenrat Ostfriesland, 2011). It therefore seems that following the anti-nuclear protests in the 1980s, there was now a growing salience of environmental issues in the natural gas sector. Here, it is interesting to highlight that the environmental motivation focused primarily on the immediate and localized effects of the pipeline construction, rather than the broader effects of the fossil fuel dependency. In fact, most environmental groups expressed

their general support for the import of natural gas stating that they welcomed the Europipe project as long as an environmentally considerate gas transport was secured ("Europipe dauert noch", 1992).

Local community resistance by residents, farmers, and local representatives was squelched by a set of compensatory measures provided by Statoil. These included the financing of sand nourishments, social housing facilities, and new salt marshes ("Warmer Geldregen", 1993). Corporate actors therefore acted in line with the expectation by buying out resistance and clearing the way for the realisation of natural gas projects. Environmental organizations such as NABU and BUND also acted in line with expectations by attempting to halt the construction via formal channels by preparing a lawsuit against the construction on environmental grounds. The right of judicial action was grounded in the recently passed environmental protection law (*Naturschutzgesetz*), which gave civil organizations the right to sue on environmental grounds (*Verbandsklagerecht*). Given the novelty of the law, the right would only come into force after a brief delay on the 1st of November 1993. However, the approval process of the pipeline construction was unexpectedly finalised only three days before the *Verbandsklagerecht* came into effect, preventing environmental organisations from taking any judicial action (Landtag Niedersachsen, 1993, pp. 8616-8622; "Im Sauseschritt", 1993) . Here, the governing SPD played a crucial role by putting significant pressure on the approval process, supposedly to avoid the blocking of the construction following an environmental lawsuit. Relevant actors within the SPD were Gerhard Schröder, then the premier of Lower Saxony, and Alfred Tacke, then secretary of state (Landtag Niedersachsen, 1993, pp. 8616-8622; "Im Sauseschritt", 1993). Linking this to theory, both the SPD and corporate actors continued to strengthen the existing natural gas trajectory. Here, the resilience of the existing trajectory was highlighted by the failed civil society resistance, which emerged for the first time.

The E.ON Ruhrgas Merger

The merger between Ruhrgas and E.ON in 2002 further aided the expansion of natural gas supply by fostering the creation of a national champion in the natural gas sector, which can pursue international natural gas deals on a larger scale. In 2001 E.ON, one of the four largest German utilities, proposed a merger with Ruhrgas. Initially, the merger was vetoed by the federal cartel office (*Bundeskartellamt*), on the grounds of avoiding a dominant market position in the trade of natural gas (Bundeskartellamt, 2002). Following the veto however, E.ON applied

for an exemption at the ministry of economy. The legal foundation for this exemption is the Law Against Competitive Restraints (*Gesetz gegen Wettbewerbsbeschränkung*), which empowers the federal economy minister to grant ministerial approval for a merger and override the veto, if the merger is in the broader public interest (BMJ, n.d.). The minister of economy, Werner Müller (independent), delegated this task to his secretary of state, Alfred Tacke (SPD), who was a close political ally and friend of Gerhard Schröder from their time in Lower Saxony (see previous section) ("Eon darf Ruhrgas übernehmen", 2002). Tacke granted the ministerial approval and justified the merger on the grounds of strengthening the competitive position of Ruhrgas on the international natural gas market and ensuring the security of supply. One of the merger conditions was the change-of-control clause, which protected E.ON from hostile takeovers, by requiring the approval of the German government (Mai & Parker, 2006). The deal was later challenged in court by nine energy companies, but an out of court settlement was reached following significant compensations by E.ON ("Path Cleared", 2003).

Linking this to the theory, the merger reflected another critical juncture, which greatly strengthened the competitive position of Ruhrgas (then E.ON Ruhrgas) in the natural gas market. It set the foundation for the continued expansion of natural gas supplies, through the concentration of market power, which would enable the pursuit of larger supply and pipeline deals, in the form of NS1 and NS2. This critical juncture was driven by the SPD government under Schröder, which used regulatory powers in the form of the ministerial approval as a policy instrument, to clear the path for the realisation of the merger. Furthermore, the government secured significant control over the company, through the change-of-control clause, enabling the state to protect the dominance of the new company by vetoing potentially threatening merger deals. Here, the political approval of the merger was driven by economic concerns aiming to create a national champion, which was grounded in the historical preference for a more concreated natural gas market. As a result, the crucial role of the SPD in driving the expansion of natural gas continues against theoretical expectations, once again highlighting the stability of the existing policy trajectory. Next, the behaviour of corporate actors matches the expectations as both Ruhrgas and E.ON had a clear interest in expanding their market power, while the other energy companies were persuaded to support the merger following a range of compensatory incentives.

The Nord Stream Projects and Increasing Dependence

Nord Stream 1

The NS1 project (formerly known as North European Gas Pipeline or NEGP) describes the 1.200 km dual natural gas pipeline connecting Vyborg in Russia with Greifswald in Germany through the Baltic Sea. The project was headed by a set of European gas utilities namely, E.ON, Wintershall, the Dutch Gasunie, the French Engie and Gazprom as the exporter of natural gas.

With this project, E.ON was hoping to set the foundation for future cooperation and projects with Gazprom (Bleidick, 2017, p. 540). One of those opportunities within the NS1 project was the financial participation in the exploration of Russian gas fields through direct ownership, a privilege usually denied to foreign firms (Beste & Dohmen, 2004, pp. 66-69; "Milliardendeal mit Gazprom", 2009). For instance, E.ON acquired a 25% stake in the Yuzhno-Russkoye gas field in 2009, which served as the main gas field for the supply through NS1 (Bundestag, 2010, p. 3). Here, the CEO of E.ON Wulf Bernotat emphasised that the partial ownership of the gas field will further contribute towards energy security in Germany, as European reserves are depleting (Beste & Dohmen, 2004, p. 68). A more general motivation was the ongoing gas transit conflict between Russia and Ukraine, which raised fears about the loss of natural gas supplies resulting from a Russian stop of gas supplies to Ukraine, a crucial transit country for German imports (Bleidick, 2017, p. 542; Dowling, 2006; Bennhold, 2022). Another important corporate stakeholder was once again the steelmaking industry represented by Mannesmann and Dillinger, which provided a share of the steel pipes for the project (Dillinger, 2010; Salzgitter AG, 2016).

Politically, the pipeline project was uncontroversial and enjoyed the general support of all parties (Bennhold, 2022). The SPD chancellor Gerhard Schröder repeatedly highlighted the role of the project in driving the "strategic partnership" in the energy sector lying at the core of German-Russo relations (Beste & Dohmen, 2004). Another prominent rationale used by the government was the long-term provision of energy security, especially in relation with the growing concerns over possible supply disruptions due to the Russo-Ukrainian transit conflict (Bennhold, 2022). Furthermore, the government emphasized the European dimension of the project, arguing that it will improve European energy security by adding capacity and additional transit routes ("Strategische Partnerschaft", 2005; Whist, 2008, p. 12). Even the subsequent

CDU/CSU government under Angela Merkel (CDU) elected in 2005 continued its support for the project calling it "strategically important for the whole of Europe", mirroring the previous government's stance. In a public statement, the federal government stated that it "supports the construction of the Baltic Sea Pipeline from a supply perspective" once again highlighting the energy security rationale (Deutscher Bundestag, 2010, p. 4). The only salient concern within political parties centred around the environmental impact of the pipeline construction. These questions focused on the potential effects on bird-life habitats, fishing stocks, a contaminated seabed as well as dumped munitions, but were alleviated following the execution of the legally mandated environmental assessment procedures (Friedrich & Neumüller, 2007, pp. 9-12).

Corporate actors drove the realisation of the NS1 project through multilateral negotiations based on mutual economic benefits. The project enjoyed political backing during the negotiation phase by the Schröder government who drove the project by facilitating diplomatic and political links. He drove the project by setting up specialised working groups between industry representatives and key ministries, which he joined regularly (Bennhold, 2022). One of the most important political actions was the proposal of a one billion euros government loan to Gazprom for the construction of the pipeline (Dowling, 2006). The loan was offered by an inter-ministerial committee within the Schröder government only days before losing the election and would have paid for a large share of Gazprom's debt in the event of a default. The state support continued through similar means under the new CDU/CSU-SPD coalition government led by Angela Merkel. Similar to Schröder, the new Merkel government offered Gazprom two credit guarantees worth 2.8 billion €, after Nord Stream – now chaired by Schröder himself – filed an application with the government ("Gazprom-Tochter", 2009; Deutscher Bundestag, 2010). The pipeline construction began in 2010 and was opened in 2011.

Overall, the NS1 project was driven by both the SPD and the CDU/CSU governments through the provision of political support and use of economic incentives in the form of credit export guarantees as a policy instrument. Corporate actors acted as expected since natural gas utilities headed the contract negotiations, while steelmakers provided the large-diameter steel pipes. Civil society resistance was virtually absent during this project, which seems surprising considering the emerging civil society resistance displayed during the Europipe I project. One potential explanation could be the low politicalization of the project, which did not allow for efficient resistance action due to a lack of information and transparency.

Employing the school of historical institutionalism, the realisation of the NS1 project represents the continuation of the existing policy trajectory in the natural gas sector driven by political support, most prominently from the SPD. Here, the existing energy security rationale, instrumentalized to justify the expansion of natural gas, was once again strengthened by the ongoing Russo-Ukraine transit conflict. In the private sector the continued deepening of economic ties, demonstrated by the direct ownership in Russian gas fields, highlights the self-reinforcing trajectory of the natural gas trade between corporate actors defined by increasing economic gains.

Nord Stream 2

The NS2 project began in 2015, with an agreement between Gazprom and five EU energy companies namely, Wintershall, Uniper (E.ON), Shell, OMV, and Engie. Just like NS1, the new pipeline was set to connect Russia and Germany directly through the Baltic Sea, doubling the existing capacity of NS1. The project was strongly supported by the grand coalition government (CDU/CSU and SPD) led by Angela Merkel. The government argued that the new pipeline served as an extension of existing gas supplies, which would be essential to secure the energy supply in the face of the ongoing nuclear and coal phase-out ("Wir müssen", 2018; Deutscher Bundestag, 2015). Moreover, the government also highlighted the role of the pipeline in diversifying transportation infrastructure (Deutscher Bundestag, 2015). The Greens, which were the smallest opposition party at that time, firmly opposed the NS2 project, pointing out that it directly contradicts the 2050 (later 2045) climate targets, given the long-term carbon lock-in of natural gas (Deutscher Bundestag, 2016).

A driving force behind NS2 was the political lobbying by Gerhard Schröder, who after his chancellorship took over the position as chairman of the recently created Nord Stream AG, the company responsible for the construction and operation of the NS2 pipeline. In his position as chairman of the Nord Stream AG, Schröder acted as a political driver in the realisation of the agreement (Bennhold, 2022). In his position as Nord Stream chair, Schröder retained close relationships with governing SPD politicians such as Sigmar Gabriel (then vice chancellor) and Frank Walter Steinmeier (then foreign minister) (Bennhold, 2022). The close links between the governing SPD and representatives of NS2 were outlined following request by the opposition. It showed that between January 2015 and October 2017 there were 62 meetings, including 20

with Gabriel and 10 with Steinmeier or his representatives (Deutscher Bundestag, 2017; Bennhold, 2022).

One significant action undertaken to protect the realisation of the NS2 project was the German government's role in shaping EU energy regulation. Following the EU-wide liberalisation of the natural gas market, the 2009 EU gas directive required the unbundling of network ownership, aiming to separate the supply of natural gas from the operation of pipeline networks thus increasing competition (Directive 2009/73/EC, 2009). Initially, Gazprom fell outside of this directive, despite owning supply and transport network, because the pipeline was physically located outside of the EU internal market (Russell, 2021). As a reaction, the EU Commission proposed an amended gas directive in November 2017 which extended the legal jurisdiction of the EU to territorial waters so that it applied to NS2 (Łoskot-Strachota, 2019). Here, the German government played a significant role on the EU-level in resisting and delaying the eventual passing of this amended directive as the revision remained stuck in the EU Council for several years due to Germany's opposition (Łoskot-Strachota, 2019; European Council & Council of the European Union, 2023).

Civil society organizations in Germany resisted the NS2 project on the grounds of environmental protection. They criticised that the pipeline goes through several offshore conservation areas, arguing that it destroys coastal wetlands, dunes, forests, and wildlife (NABU, 2018). The resistance culminated in a set of legal challenges against the pipeline construction, most prominently the lawsuit by NABU in 2018 filed with the highest constitutional court in Germany, which was ultimately unsuccessful in stopping the construction and opening of the pipeline ("German Environmentalists Sue", 2018; NABU, 2018).

In 2019 US President Donald Trump imposed economic sanctions on the companies constructing the pipeline, arguing that the pipeline is a tool to support Russian aggression against Ukraine. The sanctions were opposed by policy-makers in the SPD, most prominently Manuela Schwesig, the premier of the state Mecklenburg-Vorpommern (MV), which functioned as the landing site of the pipeline. Her state government launched the *Stiftung Klima-Umweltschutz MV* (Climate and Environmental Project Foundation) using state funds, which had the ability to "acquire, manage, and own land, tools and machines to drive the competition of the pipeline", effectively circumventing US sanctions (Escritt & Marsh, 2022). The initiative

was headed by Erwin Sellering former premier of MV and member of the SPD. The sanctions were partially lifted in 2021, as announced in a joint statement, following a visit by Merkel to Joe Biden and the realisation on the US side that it was too late to stop the construction (U.S. Department of State, 2021).

Overall, the NS2 project was once again driven by a set of natural gas utilities, namely E.ON (later Uniper) and Wintershall on the German side, aligning with the theoretical expectation. Here, the stability of the existing corporate actor coalition, throughout both Nord Stream projects, highlights the positive feedback of the initial economic gains, which favoured the continued trade with Gazprom in the form of a new pipeline project and strengthened the existing lock-in.

On the political side the project received significant political support from both the governing CDU and the SPD. The government used its regulatory power in the EU as an instrument to obstruct the amendment of the gas directive and protect the corporate interests of NS2. Apart from significant political lobbying, the SPD also created a government foundation on the state level to drive the construction process of the pipeline and circumvent the economic sanctions by the US. Linking this to the theory, the SPD continues its crucial role in the expansion of natural gas, by strengthening the existing policy trajectory, which is historically grounded in its *Ostpolitik* policy. Here, the repeated instrumentalization of the energy security rationale, highlights the strength and resilience of the rationale as it has persisted throughout various critical junctures in the expansion of natural gas under various governments since its emergence following the first energy crisis.

The project saw significant civil society resistance by environmental organizations as well as the Green party, criticising the negative environmental effects of the construction and the incompatibility with the energy transition goals. Here, similar to the Europipe I project, the stability of the existing policy trajectory was demonstrated by the failure of civil society actors and the Green party to stop the realisation of the project.

Conclusion

Findings and Analysis

Overall, the expansion of natural gas in Germany can be explained by a set of path dependent self-reinforcing processes that developed over time, driven primarily by a set of political parties and corporate actors. Before the oil crisis of 1973 there was no real energy policy strategy as all energy policy was essentially coal policy. Here, the conclusion of the first natural gas supply deal in 1965 with the Netherlands marks the first critical juncture in the expansion of natural gas. The agreement was crucial to the long-term expansion of natural gas supplies in Germany as it led to a significant reorientation in corporate interests away from the protection of coal interests towards the unhindered pursuit of natural gas, following the partial takeover of both Ruhrgas and Thyssengas by oil interests. This realignment of corporate interests within the natural gas sector set the foundation for the future corporate pursuit of natural gas supplies driven purely by economic interests. Here, the agreement received significant support from the acting CDU/CSU-FDP coalition, which was primarily driven by the goal to protect the dominance of domestic corporate actors while maintaining the stability of the coal sector. They steered the expansion of natural gas through the policy instrumentalization of ministerial approval powers.

The election of Willy Brandt as the first SPD chancellor marked another critical juncture, as it led to a significant foreign policy shift, which heavily promoted the expansion of natural gas trade with the Soviet Union. The natural gas deals with the Soviet Union were politically promoted as part of Brandt's *Ostpolitik*, marking a stark divergence from the previously established Hallstein doctrine. Here, the SPD used the provision of credit export guarantees as a policy instrument to promote the trade with the Soviet Union. The critical juncture in the form of the SPD driven *Ostpolitik* shift therefore set the path for the continuous pursuit of natural gas treaties, which would be continued by subsequent SPD leaders and party officials, making the SPD a crucial driver of natural gas expansion. This shift brought together a unique coalition of German corporate actors (utilities, steel, and banks), which functioned as the main negotiators and profiteers of the respective agreements. Here, the economic opening towards the Soviet Union initiated a self-reinforcing process, where German businesses from the steel and machinery industry saw their economic profits on the Soviet market steadily grow. Linking this to the literature, this represents a path-dependent feedback process, as discussed by Unruh

(2000), where every subsequent deal with the Soviet Union increased the relative economic gains for German corporate actors, locking corporate actors into the continuous pursuit of additional contracts.

The oil crisis marked another critical juncture, as it led to the political prioritization of natural gas as part of a comprehensive energy policy. The main goal identified by the SPD government was the diversification away from oil ("away from oil"), which should be driven by the expansion of alternative energy sources including natural gas. Here, the shift was primarily motivated by the highly salient energy security rational, which emphasised the crucial role of the state in providing a secure access to energy, instead of purely relying on market forces. As a result, the oil crisis launched a new developmental trajectory, defined by the central role of natural gas in future energy policy and its role in providing energy security.

The 1974 SPD government under Schmidt stayed on the existing foreign affairs trajectory, established by Brandt's *Ostpolitik*, and concluded two further Soviet-West German supply deals. The increasing stability of the SPD's path-dependent *Ostpolitik* trajectory was demonstrated by the active political resistance of the Schmidt government to defend the Soviet-West German natural gas treaty against US sanctions. Linking this to the literature, this highlights the strength and stability of the existing policy trajectory as it could not be interrupted by an exogenous shock in the form of economic sanctions (Pierson, 2004, p. 47). The second oil crisis in 1979 functioned as another critical juncture, following the first crisis, as it led to an economic crisis, which further increased the economic dependence of German corporate actors on the profitable soviet market, strengthening the existing lock-in. Furthermore, the second oil crisis strengthened the existing energy security rationale, which was once again used to justify the ongoing expansion.

The 1990s were shaped by the emergence of civil society resistance in the natural gas sector, targeting the construction of the Europipe pipeline to the Norwegian North Sea. The resistance strategies in the form of an attempted legal challenge was ultimately unsuccessful, as the SPD used its political power over the approval process to ensure the swift construction of the pipeline. Linking this with the literature, the failed civil society resistance once again highlights the stability of the path-dependent natural gas trajectory.

The SPD government under Gerhard Schröder, elected in 1998, continued the established *Ostpolitik* policy, by further promoting the natural gas trade with Russia. Here, the SPD facilitated the merger of Ruhrgas and E.ON, through the strategic use of its ministerial approval power as a policy instrument as discussed by Thatcher (2014). The political support for the merger can be traced back to the historical preference for more market concentration, expressed by the government during the early stages of the natural gas trade. The merger marked another critical juncture as it concentrated the corporate power in the natural gas sector thereby setting the foundation for the pursuit of larger natural gas projects, namely NS1 and NS2.

Considering the Nord Stream projects, both the SPD and the CDU/CSU actively reinforced the existing natural gas trajectory, by promoting the agreements through political lobbying and financial support in the form of credit guarantees. The project was once again justified on the grounds of energy security, which was strengthened by the Ukraine-Russia natural gas transit conflict. The stability of this SPD-driven trajectory was once again highlighted by the active and successful effort by the government to defend the NS2 project against a range of political obstacles in the form of US sanctions and EU regulatory obstacles. Most importantly, civil society resistance strategies through federal lawsuits targeted at the construction were ultimately unsuccessful, further highlighting the stability of the trajectory. In the private sector, the continuous deepening of economic ties of German corporate actors is demonstrated by the direct participation in the exploration of Russian gas fields, granted to E.ON and Wintershall. These investments further bound German corporate actors to the Russian market, lowering barriers for future cooperation.

Political Preferences

Another interesting finding regarding the political preferences of actors is that environmental concerns played a very limited role in the expansion of natural gas. In the case of the SPD, the pursuit of natural gas expansion was motivated by geopolitical goals, in the form of the *Ostpolitik* policy, which aimed to deepen the economic and diplomatic ties with the Soviet Union and later Russia. The actions of the CDU/CSU as well as the FDP were grounded in a pro-business ideology, aiming to protect the economic interests of domestic corporate actors. The Green party was generally driven by environmental goals, but their influence remained marginal for two reasons. First, they did not have a significant participation in federal governments, having been part of only one government as junior partner (1998-2005) and

leaving little room for policy action, as shown in the analysis. But more importantly, the salience of environmental issues within the natural gas sector was very low as most environmental attention was focused on nuclear energy and later coal. This low salience of environmental issues is further reflected by the late emergence of civil society resistance in the natural gas sector in the 1990s, which was initially limited to the impact of the pipeline construction, rather than the broader dependency on fossil energy sources.

Linking Culpepper's theory on "quiet politics" to the findings we can further argue that the low salience of environmental issues in the natural gas sector has made it easier for corporate actors to foster a close alliance with the government in support of corporate interests. This alliance was repeatedly displayed during the realisation of the natural gas pipeline deals, which were concluded by an established coalition of industry actors (e.g., utilities, banks, steel, and machinery) and political parties, namely the SPD, acting as one coordinated group. Furthermore, the absence of public attention predicted by theory is demonstrated by the lack of transparency and information surrounding the negotiations.

Answer to Hypotheses and Research Question

Based on preceding discussion on the role of political actors, their policy actions, and motivations, the hypotheses and research question can now be assessed. The first hypothesis (H.1), which expected right-leaning parties to drive the expansion of natural gas, will not be rejected. As discussed, both the CDU/CSU and the FDP have actively driven the expansion of natural gas consumption in Germany, motivated by economic interests aimed at protecting the dominance of domestic corporate actors. The second hypothesis (H.2), predicting left-leaning parties to oppose the expansion of natural gas consumption in Germany, is firmly rejected. This is grounded in the crucial role of the SPD in driving the expansion of natural gas through its *Ostpolitk* foreign policy, which provided special support to natural gas deals with the Soviet Union and later Russia. While the Green party eventually opposed the expansion of fossil energy sources, their actual resistance in the natural gas sector for most of the observed period was weak, given the low salience of environmental issues in the natural gas sector and their low governing capacity.

The third hypothesis (H.3), expecting a driving role for corporate actors in the natural gas sector, will not be rejected. This is because corporate actors from the upstream and midstream segment

of the natural gas sector, namely natural gas utilities and actors from the steel and machinery industry, played a crucial role in realising the negotiations for natural gas supply and pipeline deals, driven by economic interests.

Finally, the fourth hypothesis (H4), predicting the resistance of civil society actors in the expansion of natural gas, will not be rejected. While civil society resistance in the natural gas sector emerged late in the 1990s, it did play the expected role in resisting the expansion of natural gas, even though its role remained marginal. Here, the resistance was expressed primarily through formal channels, most prominently through legal challenges to stop the construction of pipelines.

Based on this discussion, the research question can now be answered. The research question asked: What policy factors can explain the steadily growing level of GHG emissions from the German natural gas sector? Using the insights from the analysis, the SPD was the core political driver of natural gas expansion in Germany. This was complemented by a similar yet less prominent driving role by both the CDU/CSU and the FDP. The parties have actively supported the expansion of natural gas through the strategic use of regulatory power including the power of ministerial approval, merger control, and the provision of economic incentives in the form of state guarantees (Thatcher, 2014). They have locked Germany into a state of natural gas dependency, following a set of critical junctures that have created an opening for a shift towards natural gas, driven primarily by political and economic motivations instead of environmental considerations. In the private sector, corporate actors from the up- and midstream segment of the natural gas sector drove the expansion of natural gas through their crucial role in realising the natural gas supply and pipeline agreements. Here, the existing natural gas lock-in was strengthened and stabilized through the steadily increasing economic gains derived from the supply agreements.

Tying these findings to the research goals, this study has shifted the analytical focus towards the political dynamics underlying the stability of policy trajectories and the relevant interests shaping it. Furthermore, it has scrutinized parts of the academic literature by showcasing that political ideologies are not the sole determinant of natural gas expansion.

Limitations of Research

Despite the internal validity of the case study, a range of limitations need to be addressed. First, one of the most prominent limitations of all single-case studies is the lack of external validity and generalisability. Therefore, the empirical results on the role of political actors in the German natural gas sector cannot be generalised to other countries. However, the findings on the policy strategies employed by these actors carry some external validity as we can expect political actors in other countries to employ similar policy strategies, provided a similar institutional context is present.

Another limitation of the study is the marginal attention paid to the developments in other energy sectors, such as coal and nuclear energy. Given the natural interconnectedness of energy sources within the energy system, the developments in other energy sectors impact the natural gas sector, as demonstrated by the takeover of oil interests in the 1960s for instance. As a result, the inclusion of developments in other sectors could have helped to better determine the interests and actions of the relevant stakeholders in the natural gas sector. Within the natural gas sector, the analysis did also neglect the impact of demand side policies, given the focus on supply side developments in the form of natural gas deals. The analysis therefore missed to investigate a potential policy channel shaping the expansion of natural gas consumption and potentially counteracting policies on the supply side. As a result, a study of demand side policy developments would have complemented this analysis.

Avenues for Future Research

As discussed, the established coalition of political actors was seemingly conditioned by the low salience of environmental issues. Here, future studies could investigate this claim by studying the effect of an increase in the salience of environmental concerns on the existing natural gas trajectory. This is especially relevant considering the growing societal attention that natural gas policy and projects are receiving in Germany, especially following the recent energy crisis which put natural gas at the centre of societal attention. Here, the study could be embedded within historical institutionalism by studying the effect of the energy crisis as an exogenous shock.

Future research could also deepen the study of the natural gas sector from other disciplinary perspectives. A chronological study of the natural gas sector from both an economic and a technological perspective could provide further insight into additional path-dependencies and critical junctures, which interact with policy factors yet were not captured by the political perspective. For instance, the historical development underlying the natural gas sector, such as the emergence of LNG, are likely to have an impact on the viability of future pipeline projects.

Another avenue for future research emerges from the previous discussion on the lack of academic study on the demand-side of the natural gas sector. A historical policy study on the demand side of the natural gas sector would complement the supply-side focus of this analysis and together provide an overview over the policy developments across the entire supply chain of the natural gas sector. For instance, such a study could focus on the political actors shaping the policies on the consumption of natural gas, such as policies on heating. A prominent example includes the discussion over a novel heating law (*Heizungsgesetz*), which could greatly shape the development of natural gas consumption.

Practical Policy Recommendations

One important policy recommendation to overcome the current natural gas lock-in would be to broaden the involvement of political actors beyond the established coalition of government and corporate actors. Here, the German coal commission of 2018 serves as a useful example. The coal commission, which included representatives from corporations, unions, research institutes, and environmental organisations was responsible for drafting a comprehensive and unanimous policy recommendation on how to structure the coal phase-out (Bundesministerium für Wirtschaft und Energie, 2019). A similar commission in the natural gas sector, mirroring the diversity in membership, could promote a sustainable shift away from natural gas, by finding a balance between environmental considerations and socio-economic consequences.

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Appendix

Chronological Timeline

1959	Natural gas reserves discovered in the Netherlands
1965	First natural gas import agreement in German history
1969	Willy Brandt (SPD) becomes chancellor of West Germany employing novel *Ostpolitik* policy
1970	First Soviet-West German Pipeline Agreement
1972	Second Soviet-West German Pipeline Agreement
	West German-Soviet Commission for Economic, Technological, and Scientific Cooperation secures the granting of full export guarantees by the state for trade with the Soviet Union
1973	First Oil Crisis
	First Norwegian natural gas and pipeline deal
1974	Helmut Schmidt (SPD) becomes chancellor of West Germany
	Third Soviet-West German Pipeline Agreement
1979	Second Oil Crisis
1981	Fourth Soviet-West German Pipeline Agreement
	Imposition of US sanctions on pipeline technologies
1995	Europipe I agreement with Norway
1998	Gerhard Schröder (SPD) becomes chancellor of Germany
2002	E.ON-Ruhrgas merger is approved following ministerial approval
2005	Nord Stream 1 contract is signed
2011	Nord Stream 1 pipeline is opened
2015	Nord Stream 2 pipeline is signed
2018	Amended EU gas directive (to include NS2) passed
2019	Imposition of US sanctions on companies involved in pipeline construction
2021	Nord Stream 2 pipeline is opened