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Protest, pandemic, and war: the political discourse reshaping Germany's Energiewende

Sandra Venghaus^{1,2*} , Ali Torkayesh^{1,2}, Katharina Böhm¹, Katrin Arning³ and Christopher Wood²

Abstract

Background The ongoing threat of climate change necessitates a comprehensive restructuring of national energy systems, shifting them from a fossil-fuel basis toward low-carbon pathways to achieve substantial reductions in greenhouse gas emissions. In this context, this work examines the effects of national and global events on climate change mitigation policy, taking the German energy transition, also known as “Energiewende” as a case study. By tracing shifts in political discourse, this study examines changing prioritizations among energy policy targets and explores the circumstances that shaped discourse developments during periods of crisis and transformation, as well as the role of key triggers or pre-existing “windows of opportunity” presented by political and social events. The analysis places particular emphasis on specific systemic factors, including the *Fridays For Future* demonstrations, the 2021 government change, the COVID-19 Pandemic, and the war in Ukraine.

Results Using a mixed qualitative/semi-quantitative discourse analysis of Bundestag plenary sessions from 2017 to 2022, the study evaluates the ongoing relevance of the energy triangle approach's qualitative targets. The energy triangle retained its focus on the three primary energy policy objectives despite the occurrence of various significant systemic events. However, the relative prominence of these targets changed over time and temporally coincided with major systemic developments. Within the energy triangle approach, security of supply in particular assumed a distinctive role within the evolving discourse framework.

Conclusions Examining Germany's political discourse provides insight into the dynamics of energy policy debates during periods of crisis and transformation. Furthermore, the study demonstrates how analyzing parliamentary debates can inform comparative assessments of energy policy developments in various European countries and beyond.

Keywords Energy transition, Political discourse, Systemic events, Governance, Energy policy, Germany

*Correspondence:

Sandra Venghaus
venghaus@sustainability.rwth-aachen.de

¹Economics of Sustainability, School of Business and Economics, RWTH Aachen University, 52072 Aachen, Germany

²Forschungszentrum Jülich GmbH, Institute of Climate and Energy Systems, Jülich Systems Analysis (ICE-2), 52425 Jülich, Germany

³Risk Perception and Communication Teaching and Research Unit, RWTH Aachen University, 52074 Aachen, Germany



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Background

The ongoing threat of climate change necessitates a profound overhaul of national energy systems away from a fossil fuel basis to reduce carbon emissions. In Germany, this process is referred to as the energy transition, or *Energiewende*, which has its origins in the late 1980s but gained momentum with the government's 2010 energy concept [1, 2]. Many other countries, including member states of the European Union (EU), are implementing similar policy packages with shared environmental, economic, and social goals. However, Germany's approach is considered particularly ambitious, as the *Energiewende* combines the phase-out of nuclear and fossil-fuel-based energy systems with the expansion of renewable energy sources (RES), while aiming to support a more efficient, secure, environmentally sustainable, and affordable energy system [3]. Hence, the successful implementation of the *Energiewende* would serve as a model or a benchmark from which best practices, as well as potential miscalculations to be avoided, can be learnt. Moreover, the effects of systemic shocks (internal or external) on Germany's implementation of the *Energiewende*, which is the main topic of this study, will serve to highlight some of the potential weak points of ambitious, environmentally-focused policy agendas, from which insights into their inherent complexities can be drawn to inform policy-making going forward.

Germany is often seen as a pioneer in climate change mitigation, given its ambitious climate policies, progressive climate instruments, and large, export-oriented manufacturing industry [4–6]. Therefore, an examination of Germany's progress on pivoting to an energy supply based entirely on RES is also of particular interest to other countries [6]. At the same time, however, Germany's leading position in climate policy has increasingly been questioned in recent years. According to the Climate Change Performance Index of 2023, Germany ranked 16th, behind several other European countries [6, 7]. The uptake of renewables in the electricity sector has been significant, with the share of renewable electricity consumed growing from 17% in 2010 to 51.8% in 2023 (Federal Environment Agency). However, this progress has lagged in other sectors, notably transport, with renewable energy accounting for 7.3% in 2023 (largely in the form of biofuels and battery–electric vehicles), up from less than 1% in 2000 (*ibid.*). Nevertheless, Germany's target is also highly ambitious in this sector, at 28% by 2030, twice the EU's goal of 14% within the same period. Therefore, a careful analysis of the dynamics and recent developments of German energy policy and the degree to which political stakeholders are engaging with it is of strong interest and relevance.

German energy policy has undergone several changes in recent years, as illustrated by the evolution of its

nuclear and coal phase-out policies. These changes are often driven by external events, such as crises, wars, or changes in domestic policy [8]. Phasing out of nuclear power in Germany follows this trend, with the accidents at the Fukushima Daiichi and nuclear plants in Chernobyl having played a decisive role in the country's political and cultural aversion to it. Over the past few years, several other developments occurred that had a direct or indirect relationship with energy policy, most notably the *Fridays for Future (FFF)* demonstrations, the COVID-19 pandemic, the change of the German government following the 2021 election, and the Russian invasion of Ukraine.

While policy shifts are motivated by a variety of factors, the true influence of these can be difficult to isolate and measure. In addition, policymakers tend to be ineffably captured by the prevailing circumstances of the time, be they political, ideological, or economic. Cases in which major policy changes are directly linked to unanticipated events that compel policymakers to act are highly illuminating with respect to the key mechanisms at play. These cases enable us to trace and evaluate a line of causation more clearly. Therefore, this study concerns itself with an 'outside in'-focused examination of the influence of these key events between 2017 and 2022 on energy policy and governance in Germany.

This period was chosen because it had a path-finding character with respect to the further course of the energy transition, as it includes the years shortly before the planned phase-out of both nuclear energy and coal, and therefore addresses how Germany will cover the energy capacities that will be lost due to these phase-outs. This period is of additional interest as it was also characterized by unforeseeable events, e.g., the COVID-19 crisis and the war in Ukraine, which had an enormous influence on energy policy. These events were selected based on their quantifiable prominence, in terms of political and societal relevance, within political and public discourse, their propensity to generate substantive policy responses, and their relevance to energy transition debates. An initial literature assessment and media analysis of significant energy-related discussions during the stated time period served as the basis for this selection. In light of the aforementioned information, the four cited events that had major impacts on energy policy and governance were identified and scrutinized.

We aim to investigate the extent to which systemic events influenced recent political discourse on energy policy and underlying energy policy targets, while also examining the continued relevance of the traditional energy triangle framework and the emergence of possible new priorities during periods of crisis and transformation. Therefore, we examine whether there is a temporal connection between the occurrence of systemic (internal

or external) events and the long- and short-term development of energy-related debates in the Bundestag (the federal parliament in Germany), which can be considered a useful proxy for gauging the political implications of the aforementioned events. The Bundestag was chosen as the main data source because parliamentary debates offer direct insight into how political figures interpret, frame, prioritize, and respond to energy-related developments over time. Unlike policy documents, which primarily reflect finalized institutional outcomes, Bundestag debates capture the dynamic political discourse preceding and surrounding policy formulation. This discourse includes disagreements, emerging concerns, competing priorities, and shifts in political attention. Moreover, these debates are a temporally consistent, publicly accessible source that allows for the longitudinal analysis of political reactions to systemic events across legislative periods. As a formal institutional arena where policy priorities are debated and articulated, the Bundestag plenary provides an appropriate starting point for examining the influence of systemic events on energy policy discourse in other arenas, such as social media. Another aim of our analysis is to answer the question of the extent to which the traditional qualitative targets of the German energy transition are still relevant today, which targets have been added, and which have gained or lost importance over time.

In the next section, we continue with an introduction to the conceptual approach of the energy triangle and its qualitative targets, then explain its conceptualization of windows of opportunity, and finally introduce political discourse. In the subsequent section, the methodological approach is explained, followed by the results of the discourse analysis. It is then supplemented by an analysis of additional energy policy targets beyond those of the triangle. In the following discussion and conclusions sections, the findings are considered, and policy implications for the future energy system, as well as limitations and policy recommendations, are provided.

Theoretical framework

This study draws on selected concepts from the Multiple Streams Framework (MSF), particularly the notion of “windows of opportunity” as originally formulated by Kingdon [9]. Within this perspective, systemic events and crises may increase political attention to specific issues and thereby influence political discourse and agenda-setting dynamics. In this study, the concept of windows of opportunity is therefore used as an interpretive lens for examining how major systemic events may have affected the thematic development of Bundestag energy debates during the analyzed period.

While the full MSF, including the systematic analysis of problem, policy, and political streams, is not

operationalized in this work, the framework provides a useful conceptual basis for understanding how external and internal events may shape political attention and discourse priorities. Although other frameworks, such as Punctuated Equilibrium Theory [10] and Policy Feedback Theory [8, 11] could also provide valuable insights into abrupt political and policy developments, this study focuses specifically on the discourse-related implications of systemic events and windows of opportunity.

Targets of the *Energiewende*: the energy triangle as a framework

The setting of targets plays a fundamental role in the policymaking process. Independent of the research field, a distinction is typically made between quantitative and qualitative ones, with the latter usually expressing the underlying political sentiments. According to Eyer and Haussmann [12], qualitative targets are often more vaguely defined, and an objective assessment of their achievement is usually difficult. If political targets are unclear or even contradictory, the outcome may be negatively influenced, leading to inefficient or opposing results [13]. A useful analytical schema that lays out the fundamental, potentially conflicting qualitative targets that every country must address is the *energy trilemma*, depicted as a triangle whose points refer to energy security, sustainability, and affordability. Progress in one of these areas is likely to entail trade-offs in at least one of the other two. This study's use of the energy triangle as an analytical lens through which to evaluate the effects of systemic shocks on policymaking marks its novel contribution to the policy analysis literature.

Several different approaches of the German government have defined qualitative targets for the *Energiewende*. One central approach is presented in the annually published monitoring report, “Energy of the Future.” According to the Federal Ministry for Economic Affairs and Energy [14], it is not possible to quantify targets for some topics, which leads to the requirement of qualitative target setting, the so-called “Further targets and framework conditions”. The qualitative targets and their definitions, as presented in the eighth monitoring report, are listed in Table 1.

Against this list of targets in Table 1, the latest version of the German Energy Industry Act (EnWG) (*Energiewirtschaftsgesetz*), originally published in 1935, defines the purposes and targets of German electricity and gas supply, which overlap in many aspects (Section 1(1), EnWG). The first important change was made in 1998, when the first section, defining the law's purposes, was added (Section 1 of the EnWG, April 1998). It demands that the German energy and gas supply be secure, affordable, and environmentally sustainable.

Table 1 Qualitative targets and framework conditions in the eighth monitoring report (BMWi [14])

Targets	Definition
Security of supply	Always meet energy demand efficiently in Germany
Nuclear phase-out	Shut down the last Nuclear Power Plants (NPPs) at the end of 2022
Coal phase-out	End coal power generation in Germany by 2038 at the latest in a socially-balanced, planned, and economically-reasonable manner
Affordability and competitiveness	Maintain energy affordability and secure Germany's competitiveness
Environmental sustainability	Design the energy supply in an environmentally-, climate-, and nature-friendly way, taking into account the entire lifecycle
Grid expansion	Expand and modernize networks in line with demand
Sector integration and digitalization	Exploit the potential of efficient sector integration and digitization for the success of the energy transition
Research and innovation	Drive forward-looking innovations for the transformation of energy supply
Investment, growth, and employment	Preserve and expand jobs in Germany and lay the foundations for lasting prosperity and quality of life

Even though the first section of the EnWG has been edited several times, the original targets, namely security of supply, affordability, and environmental sustainability, have become popular in the literature under the term *energy triangle* (*Energiepolitisches Zieldreieck*), as well as in governmental publications [e.g., BMWi & BMU, 13, 15–17]. The goal of affordability is often extended to include the target of competitiveness. As this work follows the monitoring reports in terms of the wording of the targets, “affordability and competitiveness” will also be subsequently integrated into the theoretical framework in this work.

In screening the monitoring reports, it became evident that the concept of the energy triangle was employed in all of them, but in different dimensions [18–29]. A shift in focus was observed towards a greater variety of targets in the reports over time; however, regardless of the focus shift and the added targets in the first section of the EnWG over time, the energy triangle targets have developed into a relevant guiding framework for German energy policy. Accordingly, this work will explain how and to what extent the targets and the energy triangle approach have evolved within political discourse.

Political discourse

Political discourse in the context of the energy transition encapsulates the complex interactions between actors, institutions, and narratives shaping policies and decisions

[30, 31]. The analysis of political debates offers crucial insights into how systemic events, such as socio-political movements, energy crises, and geopolitical shifts the national energy policy discourse [32, 33]. Rather than being passive reflections of systemic developments, political discourses actively construct and frame energy policy debates. The presaging events, in turn, become incorporated into the political discourse at the time of their occurrence.

The term “discourse” has been defined in multiple ways. For the objectives of this work, the most appropriate definitions are provided by Hajer and Versteeg [34] and Dryzek [35]. Hajer and Versteeg [34] define it as “an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices”. Similarly, according to Dryzek [35], a “discourse is a shared way of apprehending the world. [...] Discourses construct meanings and relationships, helping to define common sense and legitimate knowledge [and rest] on assumptions, judgements, and contentions [...]”.

In political science research, the term *political discourse* was initially defined by Van Dijk [36] as being “identified by its actors or authors, viz., politicians.” The prefixed word “political” thus refers not only to the identity of the authors but also to the structures of power, legitimacy, and authority embedded in discourse. Leipold, et al. [37] expanded upon this and noted that energy-related discourse frameworks have increasingly shaped policy narratives and public debates since the end of the last decade. They argue that, in particular, the confluence of discourse analysis, the environment, and politics has emerged as an interesting domain.

Building upon this theoretical foundation, discourse is understood in this study as both a medium and a tool of political power. The way in which actors frame and interpret crises, energy challenges, and policy objectives influences governance responses and institutional decision-making. As per Van Dijk’s perspective, power in discourse is not merely about who speaks but how narratives shape political realities and structure legitimacy in energy policy debates [36]. This conceptualization allows for a systematic investigation of how different actors strategically use discourse to navigate policy conflicts, justify decisions, and contest governance priorities.

Corresponding to the research objective underlying this paper, Schmidt, et al. [38] conducted a discourse network analysis to examine German plenary protocols from 1983 to 2013 in terms of the development of argumentation patterns on energy policy, and in particular on RES. The authors examine the relative importance of energy

policy targets and the associated levels of partisanship, building upon the energy triangle framework with an additional emphasis upon the principle of social acceptance. They find that the competitiveness of the German energy industry became an additional target, undergirded by energy cost, energy security, and environmental concerns. Leipprand, et al. [1] carried out a content analysis to analyze the evolving storyline of energy policy discourses in German plenary protocols from the 1980s to 2011.

There are also several other studies [39–41] that examined energy policy discourse, underlining that this is a common method in this field of research. However, the role of crises and events as catalysts of political discourse, as well as for discursive shifts, has not been investigated, making an assessment of their influence in this regard increasingly important. Therefore, in an effort to address this highly significant and topical issue, with the goal of generating actionable insights for both researchers and policymakers, our analysis pursues the following research goals: a) challenging the actuality of the traditional concept of the energy triangle and identifying possible new energy political targets in turbulent times; b) investigating the influence of systemic events on the discourse and the discussed targets; and c) providing recommendations to policymakers by increasing awareness of the influence of systemic events on governance dynamics and other countries encountering similar transformations.

Windows of opportunity and systemic shocks

As we seek to explain shifts in energy policy targets, we examine whether there is a point in time at which policy changes are more likely to occur. Research has shown that timing is critical for successfully implementing policy changes to prevent the kinds of inefficiencies that lead to higher costs or time delays [42]. There are several circumstances under which successful policy changes are particularly likely to occur (e.g., a crisis, disaster, or a change in domestic political conditions). These circumstances are often referred to as “windows of opportunity” [8, 43, 44]. The possible effect of a window of opportunity on the political process will be important when analyzing systemic events with respect to their impact on topical shifts in the debates of the German Bundestag. Over the course of the considered time period from 2017 to 2022, four notable events occurred, which were highly objectively significant with respect to their influence on the political discourse and policy, namely:

- FFF Movement: After Greta Thunberg’s demonstration in front of the Swedish Parliament in August of 2018 to raise awareness for climate

protection [45], FFF demonstrations became widespread, robust, and frequent, also in Germany, at the end of 2018 [46–48]. This moved the topic of climate change, as well as sustainable energy consumption, to a central focus of media and public debates. Policymakers often wait for appropriate opportunities to put an issue on the political agenda [9]. According to the advocacy coalition framework of Jenkins-Smith and Sabatier [49], it can thus be assumed that the pressure exerted through the FFF demonstrations led parties with a focus on green policies to place climate protection more prominently on the political agenda, e.g., through motions in the debates of the German Bundestag. Such shifts in public opinion have been shown to make policy changes more likely [50].

- The FFF movement was selected due to its unprecedented global influence and direct impact on political discourse, particularly with respect to European climate policy agendas. The movement found fertile ground for support in Germany due to great historical public concern for environmental degradation, dissatisfaction with government action to mitigate this, and the country’s long-standing democratic openness to protest and demonstrations, making it a key outlet for climate activism.
- Almost at the same time, coal protests were also ongoing from 2015 to 2022. While these protests were important, their impact on energy policy discussions was primarily sector-specific. Instead of promoting broad governance changes, they focused on particular coal mining projects and power plant operations. Although these demonstrations influenced Germany’s coal phase-out discussions, they mostly had an impact on national context and sectoral policy discussions rather than on EU governance frameworks more broadly.
- Change of government in 2021: On September 26, 2021, the twentieth German Bundestag was elected. The change in governing parties from the grand coalition of the Christian Democratic Union (CDU)/Christian Social Union of Bavaria (CSU) and Social Democratic Party of Germany (SPD) to the so-called “traffic light coalition” (*Ampelkoalition*) of the SPD, Free Democratic Party (FDP), and Greens (Bündnis 90/die Grünen) makes this election especially interesting in terms of its shifting of political targets or topics. Although periodic changes of government are a central institutional feature of democratic states, for the purposes of our analysis, it marked a significant break in the norm of the previous 16 years

(four legislative periods (LPs)) of Angela Merkel as chancellor and resulted in a variety of policy shifts. According to Doeser and Eidenfalk [44], such a change in domestic political circumstances creates an opportunity for decision-makers to implement policy change. For a more detailed description of the different parties and their viewpoints related to the *Energiewende*, please also refer to Hake et al. [4].

- The COVID-19 Pandemic: In periods of unexpected crises, rapid governmental responses are required [10]. The feeling of urgency may lead to agreements on reform proposals being reached more rapidly [51]. According to Boin, et al. [52], “crises are transitional phases, during which the normal ways of operating no longer work.” The COVID crisis began in Europe in the early months of 2020. It affected all areas of society, forcing policymakers to implement response measures against extremely short time horizons. Analyzing past crises and how they were addressed by policymakers can produce meaningful insight for the future [53]. Although the COVID-19 pandemic was not initially an energy-specific crisis, its broad economic and political consequences substantially influenced energy-related political debates, particularly regarding affordability, competitiveness, economic stability, and governance priorities. Therefore, the upcoming discussion will investigate whether the COVID crisis pushed energy-related issues off the agenda and which energy policy issues it may have brought into focus.
- War in Ukraine: In February 2022, the Russian invasion of Ukraine escalated the Russian–Ukrainian conflict that had begun in 2014. As a result, Europe and especially Germany experienced a gas and oil crisis, which has forced policymakers into short-term decision-making [54, 55]. In 2020, natural gas accounted for 26% of Germany’s primary energy consumption, with 56% of gas imports coming from Russia [56, 57]. This represents an immense degree of dependence on Russia, especially for industry and private households. Similarly, 35% of German oil consumption was provided by oil imports from Russia [BMWK, 58]. As a result of the crisis, gas shortages were expected for the winter of 2022 [BMWK, 59]. It will therefore be of special interest to examine how the German Bundestag’s fossil fuel strategy changed over the considered period, especially in direct response to the war.

Different events shaped energy and climate policy discussions between 2017 and 2022, including sector-specific protests, extreme weather events (e.g., the Ahrtal flood

and heat waves), scientific reports (e.g., those of the Intergovernmental Panel on Climate Change), and geopolitical crises (e.g., the US–China trade war, Middle East tensions, and Brexit). While large-scale protests against fossil fuel infrastructure and environmental injustices have influenced national debates, their impact has often been localized or industry-focused rather than driving major governance shifts. Extreme weather events, such as floods and heatwaves, have heightened public awareness but have not always led to immediate or direct policy responses within the study period. Similarly, major scientific reports and climate agreements reinforced long-term climate commitments but function as continuous inputs to policy debates rather than discrete moments of political change. Other factors, such as shifts in global energy markets and geopolitical tensions, also affected energy policy trajectories but fell outside this study’s scope. This paper prioritizes the events that demonstrably acted as windows of opportunity, which directly shaped governance decisions rather than broadly influenced climate discourse.

Analytical approach

Discourse analysis investigates linguistics, storylines, and argumentative approaches on a primarily qualitative level [1, 36, 60]. However, especially recently, quantitative approaches have also become more common [61–63]. These typically rest on a system of codes to categorize texts, which helps to structure them and identify specific dynamics in the discourse. Accordingly, a ‘qualitative semi-quantitative’ approach was chosen based on a coding framework implemented in the software suite MAXQDA.

Data collection

The data source for our research was transcripts of political discussions in the German Federal Parliament (Bundestag). The Bundestag is an institution comprised of all members of parliament (MPs) who are directly elected by the people. The parties represented in the Bundestag during the LPs covered in this work are, from ideological left to right, according to the position of their seats in the Bundestag: The Left Party, SPD, Alliance 90/Greens, the FDP, CDU/CSU, and the Alternative für Deutschland (AfD).

The Bundestag regularly discusses topics related to the German *Energiewende* in so-called plenary sittings. These are discussion sessions led by the federal president or his or her representative, which are open to the public. Every member of the Bundestag is allowed to request a new item to be placed on the agenda of these sittings. The agenda items are called motions.

The minutes of the plenary proceedings of the German Bundestag were chosen as the basis of the analysis and were downloaded from the Bundestag's website (www.bundestag.de). These debates reflect socially-relevant issues, their importance, and development over time, and also enable the observer to draw conclusions regarding the societal view on certain issues [64]. Therefore, the actual plan of the government is observable, as the inputs are chosen by the parties themselves and represent their initial positions [65].

The minutes of the plenary proceedings used for the analysis cover the last LP of Angela Merkel, from October 2017 to December 2021 (LP 19), as well as the government led by Olaf Scholz since December 2021 (LP 20). The first relevant protocol for this analysis is dated November 21, 2017. The last document of LP 20 that is covered in this study is dated May 31, 2022. The multi-step process undertaken to choose thematically-relevant documents is explained in the following.

First, the items of the agendas of the protocols in LPs 19 and 20 were scanned for motions related to energy, energy-related laws, and climate-relevant topics. In a second step, a keyword search was conducted for the remaining documents so that no discussion was overlooked. The keyword search aimed to cover thematic topics and concepts that are defined in the previous section on the theoretical background. In this context, the keyword strings were designed to capture all relevant discussions on energy, energy-related laws, and climate-relevant topics. Keywords included “Energie” (energy), “Energiewende” (energy transition), “Erneuerbare” (renewables), “Kohle” (coal), “Gas” (gas), “Wasserstoff” (hydrogen), “Atom” (nuclear), “CO₂-Preis” (CO₂-price), and “Versorgungssicherheit” (security of supply). In a

third step, the documents were imported into the software MAXQDA, and an analysis of their discourses was conducted.

The exact number of documents chosen in accordance with the process outlined above are presented in Fig. 1. After choosing the documents, relevant motions within the minutes were identified.

Data analysis and coding scheme

In the first step, the documents were carefully analyzed by systematically searching for topics explicitly linked to energy policy, the energy transition, and climate change. This process was conducted by an individual (one of the co-authors), which was later checked and validated by a second individual (one of the co-authors). Additionally, several important quotes in the speeches were elaborated to complement the analysis. Throughout the data analysis process, several quantitative characteristics were considered. Occurrences of topics or considerations in the documents made their developments and thematic shifts visible over time [66].

For the coding scheme, a mixed deductive–inductive approach was chosen. As defined by Rädiker and Kuckartz [67], a deductive approach involves developing the code system before analysis, meaning that the scheme is based on existing literature. In contrast, an inductive approach is data-driven, with the code system evolving in multiple steps throughout the document analysis process. In this study, the initial development of the coding system represents the deductive component, while the inductive aspect emerges as additional codes are introduced in response to frequently occurring themes, and subcodes are removed when a different categorization proves more suitable. This approach ensures both

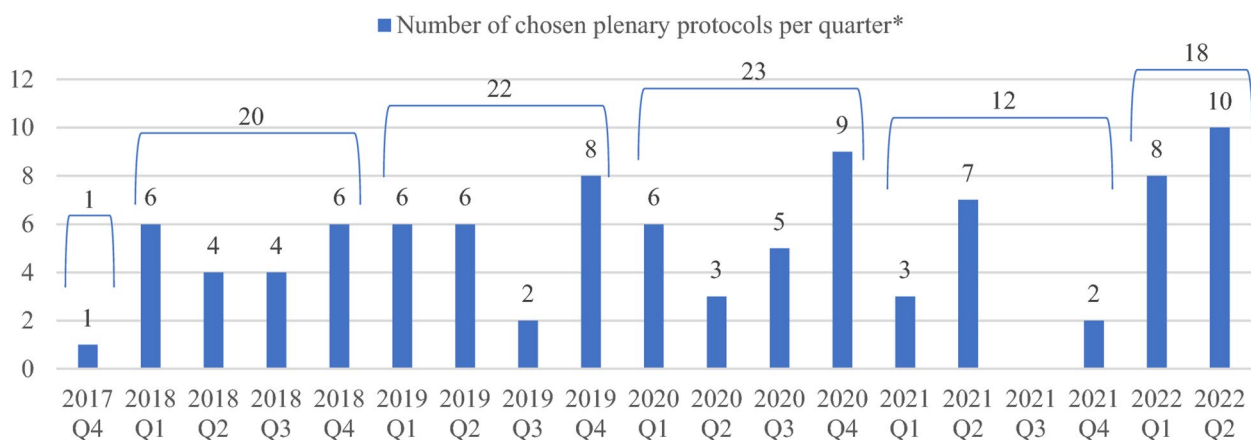


Fig. 1 The number of plenary protocols chosen that refer to the energy transition. *The only corresponding document at the start of LP 19 in 2017 will be placed in the first quarter of 2018, in order to avoid distortions in the graphics. In the years 2018 to 2020, the number of chosen documents was relatively constant, but there were significantly fewer documents in 2021. This was due to an extension of the annually scheduled summer break (July–August) and the federal elections

theoretical grounding and flexibility, allowing the analysis to capture emerging themes inductively while maintaining coherence with the pre-established code system.

In the first step, the selected documents were qualitatively scanned to attain an overview of the politically relevant topics and to identify recurring themes and narratives related to energy policy and climate change. Then, the findings were compared with the existing literature. Here, in particular, the monitoring report on the energy transition for the years 2018 and 2019 was considered especially relevant, as it directly reflects political priorities in the field of energy policy. Subsequently, the findings of this two-step process were then used quantitatively as the overarching categories of the coding scheme. The sub-codes were also developed directly and indirectly from the respective chapters of the monitoring report. The scanning process, the development of codes, and assigning them to relevant parts of the collected documents were completed by an individual (one of the co-authors) over approximately two months.

To ensure intercoder reliability in the final coding, consistency in coding was ensured by individually coding a randomly selected test set of data by three of the co-authors and jointly discussing uncertainties and ambiguities. The coding guidelines were then further discussed and refined. Following the final coding, which for consistency reasons was done by one co-author, the coding was validated by another coder (a second co-author).

The structure of the hierarchical coding framework consists of two levels. The first contains “speech topic” codes; the second comprises sub-codes that further specify the topic, in addition to a “general topic” code that was used whenever a statement could not be assigned to a more specific sub-code. In addition, “energy triangle” codes were introduced to trace the explicit mentioning of the targets of the energy transition. Moreover, codes for all relevant fossil fuels and RES were introduced. “Subject area” codes were also added and used when a discussion did not originate from a motion but rather from discussions dealing with a specific business area in a ministry. Accordingly, the protocols were analyzed at multiple levels (parties, motions, speech topic, general topics, and sub-topics).

In the second step, in the course of analyzing the documents, several codes were added due to a high occurrence of a given topic, with other sub-codes being deleted whenever a different code was considered more appropriate. Documents had already been re-analyzed for the new codes with the help of the *lexical search* tool, which represents the inductive part of the process. The final coding scheme is presented in Appendix 1.

For analyzing the extent to which the triangle targets have remained relevant and to trace how far energy-related topics gained or lost importance over time, the development of the appearance of codes in the discussions from the Bundestag was considered. The aim of this was to obtain an overview of debates related to all energy-related topics dealt with by the Bundestag, as well as to identify focal points and, in particular, shifts in focal points, within the topics. These shifts will then be compared to the systemic events introduced above with respect to their potential for inducing changes in parties’ priorities and to reflect how fast and to what extent the daily discourses adapt to systemic circumstances.

Following the qualitative assessment, a quantitative analysis was applied to the coding framework using MAXQDA to systematically track the frequency and evolution of energy policy topics over time, enabling a semi-quantitative assessment of discourse trends.

Results

When analyzing the simple occurrence n_{occ} of the term “Energiewende” within the chosen plenary discussions over the years under review, a declining trend was observed. In total, “Energiewende” was used 963 times: $n_{occ, 2018} = 327$; $n_{occ, 2019} = 233$; $n_{occ, 2020} = 236$; $n_{occ, 2021} = 43$; $n_{occ, 2022} = 124$.¹ Usage of the term in 2018 was significantly higher than in the other years.

Topics and motions

The analysis distinguished between topics that occurred within the discussions and those that were brought up as motions. The latter (Fig. 2) serves as the starting point for our analysis. Motions generally frame the course of the discussions and set their thematic direction. To delineate the five most requested topics, the lines in the figure are highlighted. These include affordability and competitiveness (orange), climate protection (dark blue), coal phase-out (gray), nuclear energy phase-out (light blue), and expansion of RES (yellow).

In the first step, motions related to the energy triangle were examined more closely. Although shifts have occurred over time, the most important topic each year has encompassed the triangle’s targets.

In 2018 and 2019, the topic of climate protection clearly dominated the motions, with over a third referring to it. The FFF demonstrations first took place at the end of 2018 in Germany, and the timing of the analyzed debates

¹It is important to keep in mind that in 2021, the number of documents and motions was lower due to a longer summer break and the elections. For 2022, attention should be paid to the fact that the analysis only covers the first five months of the year.

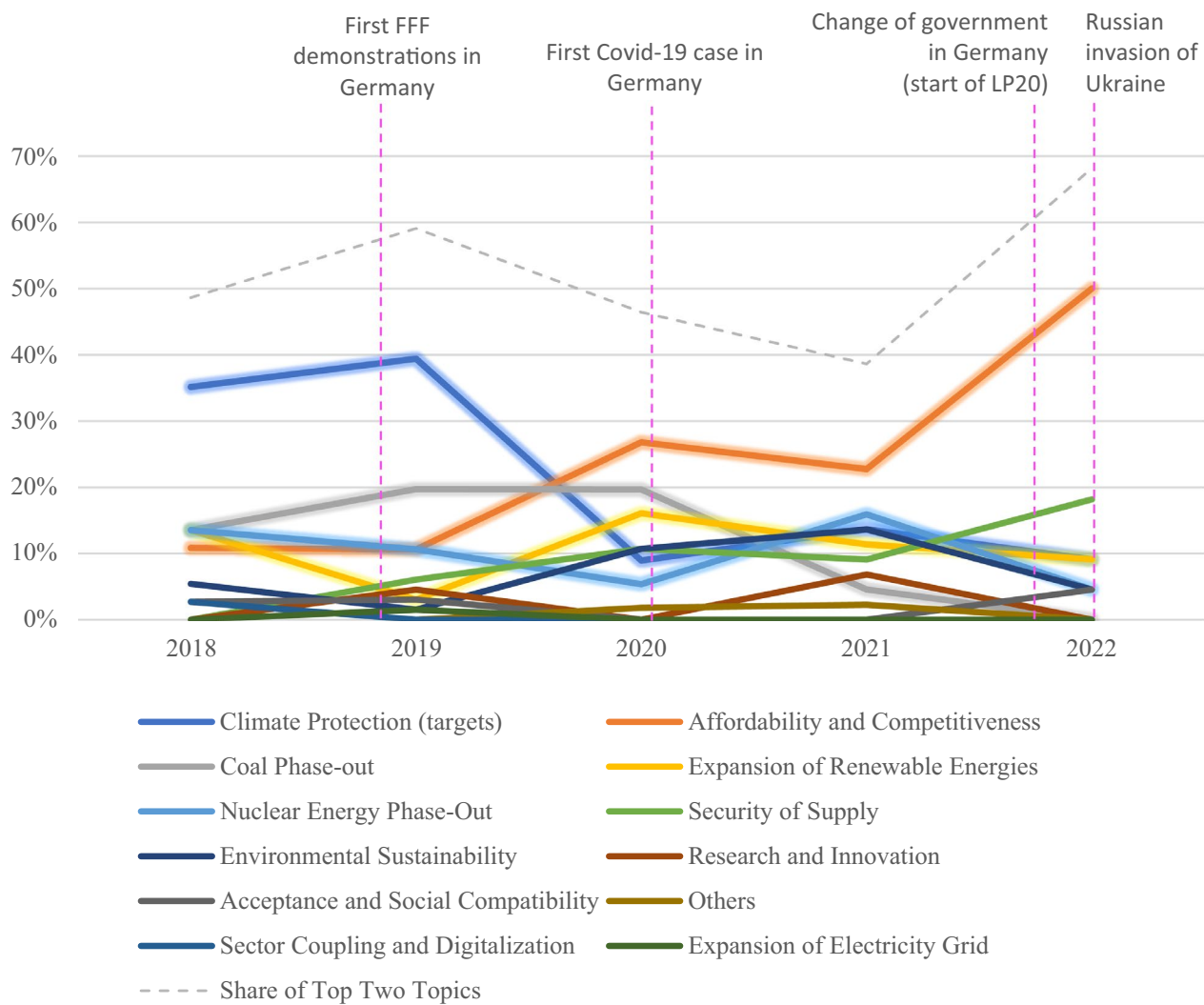


Fig. 2 Share of the topics in the motions

suggests that they contributed to increasing the visibility of climate-related topics within energy-related debates in the Bundestag. With the beginning of the COVID-19 crisis, this topic lost some of its prominence. In contrast, since 2020, the topics of affordability and competitiveness have been increasingly discussed and have become the issues most frequently mentioned in the motions. The share of mentions of these suggests a robust association between the two, likely stemming from the fact that creating a secure energy supply is closely linked to keeping prices affordable and maintaining economic competitiveness, making them strongly connected to energy security in terms of policymaking.

As shown in Fig. 2, this shift temporally coincided with the onset of the COVID-19 pandemic. The accompanying lockdowns led to a significant economic crisis [68],

which was further intensified by the war in Ukraine, which in turn prompted an immense increase in natural gas prices. These developments likely contributed to the increasing prominence of affordability and competitiveness within the political discourse. In 2022, the target accounted for over 50% of energy transition-related topics in the motions, and so it has not only grown in importance over the years but has also pushed other topics into the background. With respect to the development of security of supply, as the third target of the triangle, a steady increase is visible, with a small dip in 2021. It was the second most frequently tabled motion in 2022, with a share of about 18%. Its high share that year coincided with growing instability in gas supplies from Russia, which increased the political relevance of discussions surrounding a stable and secure energy supply.

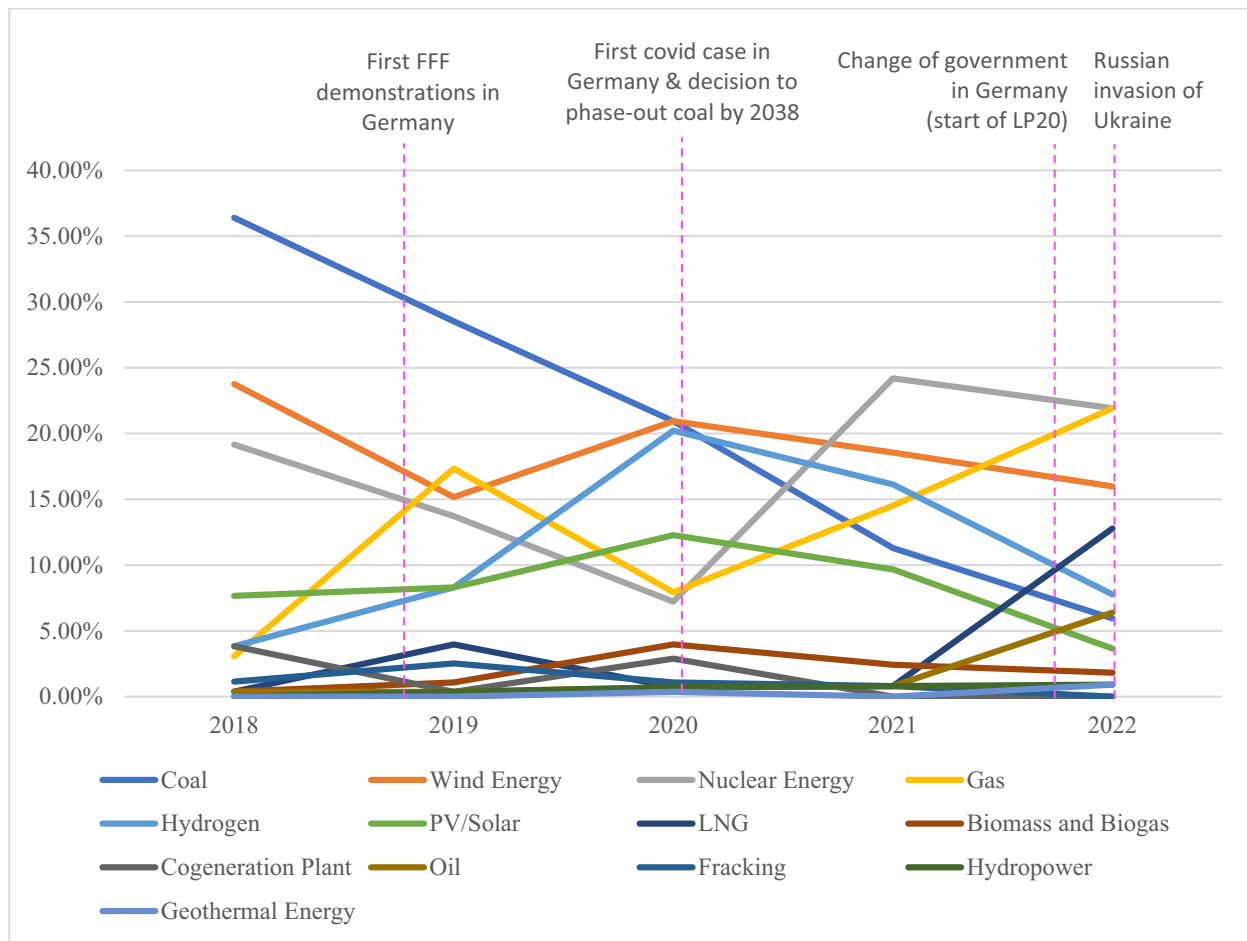


Fig. 3 Share of fossil, non-renewable, and renewable fuels in the political debate

Furthermore, in 2021, the top two topics of affordability and competitiveness and security of supply together accounted for the lowest share across the years (benchmark-line top two), reflecting the greater diversity among the topics covered by the motions that year. In contrast, one year later, in 2022, the exact same topics dominated the motions to this extent throughout the analyzed period, which indicates their particular relevance within the broader context of the health crisis, economic disruptions, and the war in Ukraine.

Energy sources

Energy political targets and topics are usually connected to certain energy resources. Therefore, in the following, the focus will be shifted to the development of debates regarding different energy sources over the years.

From 2019 to 2021, the three main fossil and non-renewable fuels discussed by politicians were coal, nuclear energy, and gas, with a total share(s) of

$s_{\text{coal,nuclear,gas}, 2019} = 59\%$, $s_{\text{coal,nuclear,gas}, 2020} = 35\%$, and $s_{\text{coal,nuclear,gas}, 2021} = 53\%$ (Fig. 3). Coal featured an especially high share of 36.4% in 2018. This is when the German government established the Commission on Growth, Structural Change and Employment to prepare the phase-out of coal and develop strategies for implementing structural changes in the lignite mining regions. The establishment of the Commission is an internal political event that intensified discussions about coal in Germany, as it was created to address the country's dependence on coal while taking economic and job loss concerns into account, particularly in coal-producing regions. This move was largely driven by political pressure to meet climate targets and phase out coal, while ensuring a fair transition for workers affected by these changes. At the same time, external factors also influenced its formation, most notably the 2015 Paris Agreement, which pushed for accelerated decarbonization, along with the burgeoning FFF protests and EU climate

policies, also making the issue more prominent. In 2019, the Commission recommended coal's phase-out by 2038.

In 2020, the German government officially decided on phasing out coal power by the recommended date. Following this decision, the expected decline in the share of coal in the debates could be observed. While discussions may have declined somewhat after the 2020 phase-out decision, debates may have intensified in the short term due to implementation challenges and political reactions. In 2022, coal only accounted for a share of $s_{\text{coal}, 2022} = 5.94\%$. Similarly, nuclear energy experienced a declining trend from 2018 ($s_{\text{nuclear}, 2018} = 19.16\%$) until 2020 ($s_{\text{nuclear}, 2020} = 7.22\%$). However, although the nuclear phase-out was decided even before that of coal, with rising gas and oil prices following the pandemic and especially the Russian invasion of Ukraine, the topic re-entered the debate in 2021 and 2022. The share of natural gas in the debate experienced an increasing trend. In line with the onset of the natural gas crisis, in 2022, it reached its peak in the discussion with a share of 12.79%, representing the highest share of all fossils, together with nuclear energy. The development of the share of gas will be particularly interesting when addressing the triangle targets, as it has an influence on all three, having long been considered a bridging technology by policymakers.

As noted above, the start of the war in Ukraine at the beginning of 2022 and the resulting European conflict with Russia posed a threat to the European gas supply. Due to the continent's high dependence on Russian gas supply, the resulting gas crisis forced the German government into discourse. This also explains the high diversity among the discussed energy resources in 2022. In comparison to previous years, in 2022, resources were mentioned that had not been part of the main discourse previously: there are no longer three dominating fossil fuels but rather four, now, including liquefied natural gas (LNG). LNG is of particular interest, as it immediately accounts for a comparatively high share of 12.79%, driven by the urgency of finding alternatives to Russian gas. A comparable trend towards higher diversity was also observed for RES. The sum of the share of wind energy, hydrogen, and PV/solar was the lowest in 2022. However, they still dominate the discourse ($s_{\text{wind energy, hydrogen, PV/Solar}, 2022} = 27.39\%$).

It is also observed that long-standing plans, such as the use of natural gas as a bridging technology have been overturned, thus opening up room for new perspectives. A bridging technology could be seen to ensure the transition between fossil fuels and RES, while reducing CO₂ emissions [69]. A variety of energy resources are considered bridging technologies. However, from 2019 until 2022, the discussions on bridging technologies centered

primarily around gas ($s_{\text{gas}, 2019} = 17.3\%$, $s_{\text{gas}, 2020} = 7.9\%$, $s_{\text{gas}, 2021} = 14.5\%$, $s_{\text{gas}, 2022} = 21.9\%$). This relative one-sidedness reduced the options for overcoming the gas crisis and dependency on Russia. In particular, since the last NPP went off the grid in April 2023 and the phase-out of coal is scheduled for 2035, the need for bridging technologies is particularly relevant in 2022. As natural gas no longer seems to be the preferred option, new solutions are being sought. As expected, in the analyzed discussions, an increased number of the discussed potential bridging technologies were noted in 2022, namely: LNG, nuclear energy, and hydrogen. Given its negligible role in previous years, the role of LNG in particular is noteworthy.

Targets of the German Energiewende

The German energy triangle has been an important cornerstone of German energy policy. Therefore, changes in the relative importance of the energy triangle's targets, and especially in response to external events or internal shifts, are indicative of changes in policy priorities. For example, supply disruptions caused by the war in Ukraine led to a greater political focus on supply security. The economic downturn caused by the pandemic and other factors made affordability a more pressing concern. Finally, the growing urgency of the climate crisis made sustainability a high priority. The priorities of Germany's political parties with respect to the energy triangle could also differ somewhat on the basis of their ideological makeup, although there has been significant overlap. Figure 4 confirms that the triangle's targets, namely security of supply, affordability, and environmental sustainability, dominate the discourse over the period under consideration. However, the order (from highest to lowest share) of the targets changes over time.

Security of supply

Ensuring a safe and secure energy supply is of high importance, especially during times of crisis. Politicians, therefore, seek a robust mix of energy resources, e.g., via trade contracts. Figure 4 shows that the target of security of supply makes up the highest share over time. The gas crisis posed an immediate threat to energy security, keeping the number of debates frequent on this topic. To elaborate on which topics drive the development, the sub-codes were considered (see Appendix A2). Here, the topic of energy dependence in particular stands out. Prior to 2022, this topic depicted a relatively consistent progression. In 2022, however, its presence in the debate significantly increased, surpassing other sub-topic shares such as reserves/storage or bridging technologies. As discussed above, in 2022, the overarching topic

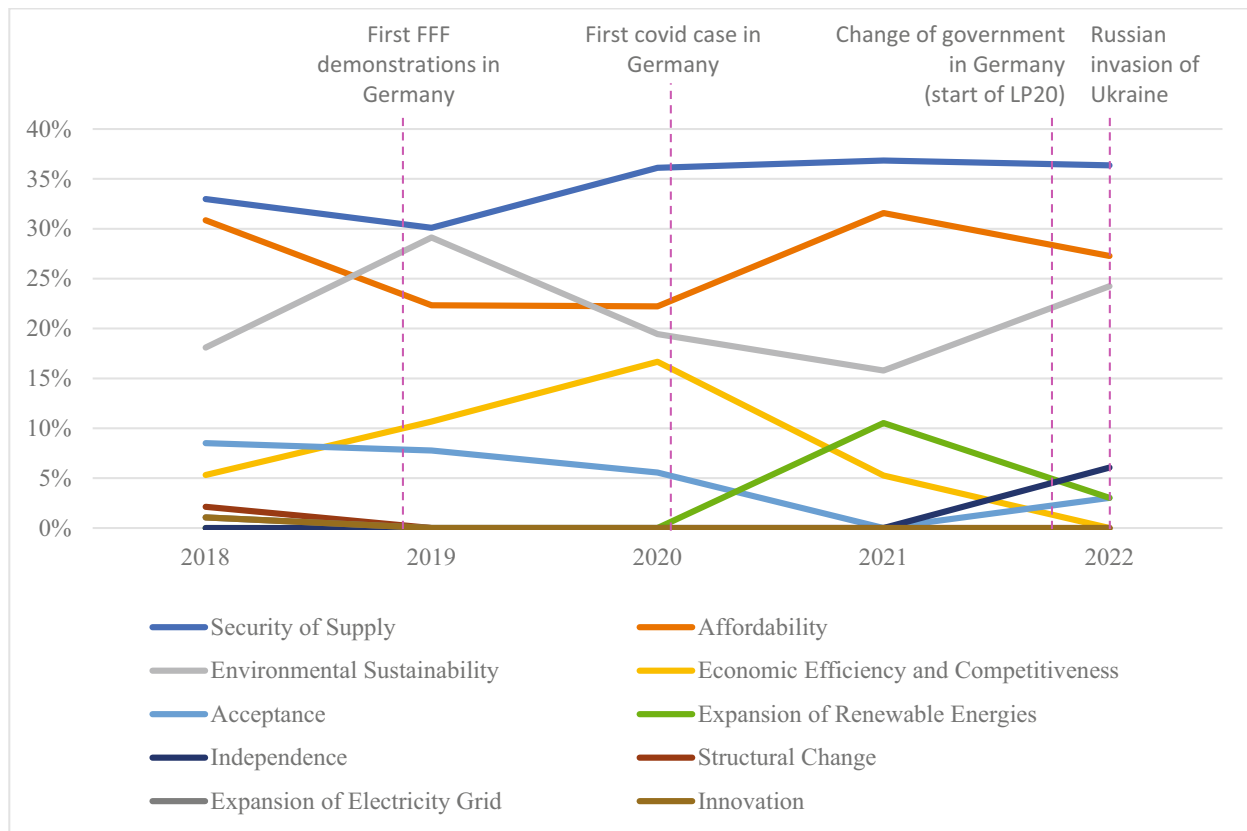


Fig. 4 Occurrence of topics named as targets

of security of supply (Fig. 2) exhibited a similar increase, and the topic of natural gas (Fig. 3) also peaked that year. The gas crisis following the war in Ukraine united these issues, thus explaining the significant change in discourse dynamics that year. Relatedly, the topic of energy diversification also reached its highest share, with 9.1% in 2022, the third highest share that year.

Affordability and competitiveness

Energy affordability and competitiveness are two aspects that centrally address socio-economic sustainability. In our analysis, affordability holds the second-highest share of all targets in total over time (Fig. 4). In 2018, the share was almost as high as the share of security of supply. This suggests that affordability and competitiveness are not only important topics in the discussions but also a common target of the energy transition.

Regarding the subtopics of affordability and competitiveness and their development over time (see Appendix A2), three topics are especially important, namely affordability, CO₂ price, and emissions trading. It was observed that, similar to the occurrence of targets related to that topic, the share of the topic of affordability is significantly

higher than that of the topic of competitiveness. Moreover, the topic's share has exhibited a strong and continuous increase since 2020, reaching a peak in 2022 with a dominant share of 56.1%. The outbreak of the COVID-19 crisis in Europe in 2020, which led to a decrease in demand for goods and services, precipitated a global economic crisis, which is consistent with the increased prevalence of the topic of affordability in the plenary protocols [70]. Moreover, the reduced supply of Russian energy led to an even greater increase in inflation, which has been increasing significantly since 2021, contributing to the continued prominence and peak relevance of affordability and competitiveness within subsequent political discussions [71].

The topic of the Renewable Energy Sources Act (EEG) reached a maximum share in 2020 ($s_{\text{EEG}, 2020} = 38\%$). The renewables levy (*EEG-Umlage*), meanwhile, was identified as the most controversial issue regarding the EEG in the plenary sessions. This law had been in force for 20 years by 2020, which led to politicians requesting motions to place it on the agenda. Specifically, a discourse on the abolition of the levy has been identified since the beginning of 2020. A second increase was recognized in

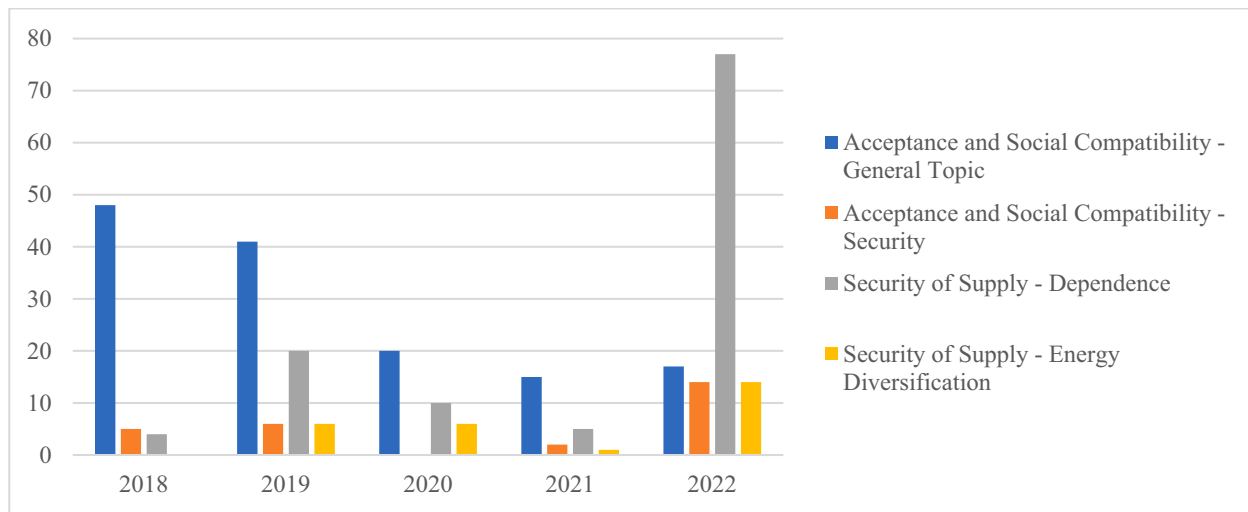


Fig. 5 Possible new energy policy goals addressed in plenary discussions

2022. After the government announced in LP 20 the abolition of the renewables levy in their coalition agreement, the EEG's abolition was announced in July 2022 to relieve households and make energy more affordable (Sect. 60 (1a) of the EEG 2021) [72, BMWK, 73].

Environmental sustainability

Environmental sustainability was identified as the third dominant target (Fig. 4). Given the divergent development of motions and targets observed in 2019, in contrast to the thematic distribution in other years, we closely examine this specific year. Especially noteworthy is the development of the sub-code “general topic” (Appendix A2), which is used whenever a statement cannot be assigned to a more specific sub-code. The frequency of this category increased to a share of 71.8% that year. The following year, its share decreased again, as the share of climate protection (targets) increased. The promotion of awareness regarding the topic in 2019, facilitated by both motions and comprehensive discussions in plenary sessions, potentially acted as a catalyst for more substantive conversations and increased prominence of the topic in subsequent overall discussions. The reason for the striking development of several curves in the context of environmental sustainability can be traced to the *FFF* demonstrations, which first took place in Germany at the end of 2018.

New energy targets

The analysis further showed the emergence of additional targets driven by current socio-economic developments.

First, the discourse on Germany's energy transition strongly emphasizes the importance of acceptance and social compatibility, particularly concerning

consumer-friendly energy supply. This topic is closely linked to the success of the energy transition. Over time, however, the prominence of this topic decreases (Fig. 5), although it remains significant, particularly regarding the acceptance of different energy resources. As the need for energy diversity grows and traditional bridging technologies face challenges, the topic of acceptance and social compatibility is expected to regain importance in the near future.

Second, the discourse places a strong emphasis on geopolitically driven questions of energy security, primarily focusing on ensuring a secure energy supply. This topic also gains prominence due to concerns about energy shortages, exacerbated by the Russian invasion of Ukraine. It is highlighted that climate policy is intertwined with security policy (20/21²), and internal security is at risk if the energy transition does not facilitate an independent energy supply (20/39).

Figure 5 illustrates the frequency of mentions of different energy policy topics between 2018 and 2022, demonstrating how the discussions shifted over time. For instance, mentions of “Acceptance and Social Compatibility” (blue) as a general topic were highest in 2018 and 2019 but notably declined after 2020, suggesting that debates around the social acceptability of energy policy were formerly more prominent. On the other hand, “Security of Supply—Dependence” (gray) dramatically spiked in 2022, likely in response to the Ukraine war. Mentions of “Acceptance and Social Compatibility—Security” (orange) and “Security of Supply—Energy

²References in the format “(20/21)” refer to the respective legislative period (“Legislaturperiode”, first number) and the plenary session number (“Plenarsitzung”, second number) of the German Bundestag debates.

Diversification" (yellow) remained fairly low but saw slight increases in 2021 and 2022, suggesting a growing emphasis on the need for energy diversification to enhance security. These trends suggest a wider shift in focus from social acceptance to energy security, reflecting the external and internal crises that arose.

One topic of frequent recurrence in the discussion is that of dependence, in conjunction with independence. As was shown by the analysis of the sub-topics of security of supply, a sharp increase in the topic's importance in the discourse was observed in 2022. Additionally, energy independence emerged as an explicit new target in 2022, accounting for the fourth-highest share that year (see Fig. 4). Upon analyzing the topic's development over time, it becomes clear that it emerged alongside the intensifying conflict between Russia and Ukraine in February 2022. Political speeches from the beginning of the observed period showed that dependence was already a concern, though certainly not to the same extent. Dependence on foreign countries is mostly framed as a challenge inherent to the expansion of RES in Germany, given their fluctuation, and is thus 'unreliable' in character. Increasingly, relations with Russia and dependence on it are mentioned throughout the protocols. The discourse initially rested on the assumption that Russia was more dependent on Europe than Europe was on Russia, given the revenue stream created by selling gas to Europe (19/79; 19/192) and that Germany could always rely on Russian gas, even during the Cold War era (19/192). In 2022, however, this discourse changed, and the independence of energy supply moved to the core of the debates. In speeches, reducing the dependence of the German energy system is referred to as a "central target" (20/23) and "urgent task" (20/25) of the new coalition in LP 20.

A topic often closely associated with dependence is the topic of energy diversification, i.e., the mix of different energy sources to minimize dependency on a single energy supplier or source [74]. The topic is often considered a solution strategy for reducing dependence rather than a target itself for the energy transition (e.g., 19/124; 20/2).

Electoral programs and coalition agreements

To contextualize observed discourse developments and identify changes in political priorities associated with the Bundestag, this section supplements the analysis with electoral programs and coalition agreements relevant to the two LPs. Therefore, this section concentrates on the appearance of the energy triangle concept and the development of the triangle topics. Moreover, the electoral programs were analyzed using MAXQDA's *Code Coverage* tool, which measures the extent to which individual

codes are represented within each document, thereby enabling systematic comparisons across political parties and electoral programs.

As this study investigates the *Energiewende's* targets and the role of the energy triangle framework, electoral programs and coalition agreements provide an important complementary source for assessing how energy-transition priorities are translated into party programs and governing commitments. The coding results indicate a clear increase in the prominence of energy-transition-related content, with coded passages accounting for 3.8% of the 2018 coalition agreement and 5.1% of the 2021 agreement. This finding suggests that the energy transition occupied a more central role in political agenda-setting and coalition-building by 2021.

The traditional triangle was explicitly mentioned in the 2017 electoral programs of the FDP and SPD and the 2018 coalition agreement (CDU/CSU and SPD). The SPD program explicitly mentions "three equally important targets," whereas the FDP program introduces the traditional triangle targets together and uses the term "target," but not "Zieldreieck."

The LP 19's coalition agreement uses the term twice, combining it with a mention of the three traditional targets as the basis for a successful energy transition. The LP 20 does not mention the concept. A similar trend can be observed when comparing this to the plenary sessions. As mentioned above, the traditional concept played a role in the LP 20 as well, but 84.6% of the "Energy Triangle" code was used in the LP 19. This aligns with the fact that 61% of the code co-occurred with the CDU/CSU, which was not part of the 2021 coalition agreement. Examining the explicitly mentioned targets in the coalition agreements more closely, the targets of the triangle were mentioned 16 times in 2018 and eight times in 2021. In 2018, the targets were distributed relatively evenly, with a slight focus on security of supply and environmental sustainability.

In contrast, a strong focus on security of supply emerged in 2021, accounting for 75% of the topics. The distribution of topics confirms that LP 19 is more diverse, while LP 20 focuses on the security of supply. Additionally, a general focus on security of supply is evident when examining the targets mentioned in the discussions. This focus is smaller at the beginning of the analyzed period and greater towards the end.

In addition, the electoral programs of both LPs prioritize the triangle topics of affordability, competitiveness, environmental sustainability, and security of supply in order from highest to lowest. This distribution was analyzed using MAXQDA's *Code Coverage* tool, rather than according to occurrence, which is helpful for this type of document due to the small amount of text (see Table

A3 in the Appendix). In LP 20, security of supply has the second-highest share, close to affordability and competitiveness, the top topic. As previously demonstrated, the significant increase in the security of supply topic is largely influenced by the Russian invasion of Ukraine. This extent of escalation was not foreseeable in 2021, but the tension in Eastern Europe had been apparent for a long time. Therefore, the comparatively low share of the security of supply topic in the electoral programs may be surprising. Additionally, dependence, the most important subtopic of security of supply, is missing from the 2018 coalition agreement and only appears in a subclause in the 2021 agreement, as well as in the 2017 and 2021 CDU/CSU and SPD electoral programs.

Discussion

The results show that the energy triangle as a concept continues to encompass the topics most pressingly discussed in the political discourse, which in turn is heavily informed by the implementation of the *Energiewende*. By analyzing the effects of systemic shocks on this discourse and the corresponding shifts in political prioritization and debate dynamics within the Bundestag, the study highlights potential vulnerabilities in ambitious sustainability transitions. It remains to be determined, however, whether the conceptual approach of the energy triangle remains sufficient in light of the conditions that developed and systemic events that occurred in the considered time period, namely FFF, the change of government in 2021, the COVID-19 pandemic, and the Russian invasion of Ukraine, or whether new targets have emerged as a result that expand upon or replace the concept.

Topicality and relevance of the energy triangle

The triangle topics have been shown not only to be relevant as thematic components of the discourse but also as explicitly addressed targets in political debates. The three targets occurred both as an enumeration and in combination with each other, throughout the analyzed period. Nevertheless, when analyzing the occurrence of the explicit term “Zieldreieck” and the energy triangle approach in general, it was noticeable that it was used more often at the beginning of the analyzed period than at the end, reaching its peak in 2019.

Security of supply was a key topic, both in terms of its presence in the discussion and as a frequently mentioned goal of the energy transition. It represents the highest target share over the entire period under review. Within the plenary discussions, policymakers often emphasize the importance of this topic (19/92) and demand its prioritization (19/144). During the period until 2021, politicians typically discussed security in relation to the

phase-out of coal and the adoption of RES. Towards the end of 2021, the focus of the topic shifted to energy security in terms of import dependence. Overall, the discussion asserts that affordable energy prices and a positive environmental effect only make sense if there is security of supply, as without a secure energy supply, both from the political and technical points of view, the other two targets seem superfluous (20/23). This realization, driven mainly by the tense situation of the European gas and oil market and worsening relations with Russia, appears to result in an uneven weighting of the three targets in the triangle approach. A politician from the CDU/CSU acknowledged this, stating that security of supply must be prioritized due to the war and resulting tensions in the energy market (20/34).

Influence of windows of opportunity on the political discourse

As presented in the “Political discourse” section, research has shown that there are times when political changes are more likely to occur, so-called ‘windows of opportunity’. In the following section, we will therefore focus on whether the events identified as possible such windows have shifted the topics discussed in the Bundestag and thus changed the course of political action.

The FFF demonstrations were the first identified systemic event in the observed period. As the demonstrations have occurred since August 2018, the years 2018 and 2019 in particular should be discussed. Nonetheless, it may be crucial to observe the subsequent years in order to determine the extent of possible impacts. A politician of the Greens said in 2021 that the demonstrations created awareness in the general public about the climate crisis (19/236). According to Kingdon [9], such situations may serve as an impulse to place referring topics on the agenda, especially for parties that already supported the topic previously. Therefore, the motions of the Greens can be seen as an indicator. The results indicate that motions regarding the topic of climate protection (targets) clearly dominate in 2018 and 2019. Reflecting the fact that opposition parties typically initiate the most motions, 38.5% of climate protection (targets) motions in 2018 and 2019 were brought forth by the Greens, thus accounting for a significant share. Moreover, from 2019 to 2020, the share of the topic of RES for the motions increased from 3 to 16%. The coded segments thus indicate that there is a connection to the decision to phase out coal in 2020. Within that year, several politicians emphasized that the coal phase-out would go hand-in-hand with an accelerated expansion of RES (e.g., 19/144; 19/150; 19/187). Nevertheless, it is also possible that the increase in motions regarding the topic of climate

protection in previous years increased awareness of environmental topics and, therefore, RES. Consequently, even if the higher number of motions was not exclusively due to the activity of the Greens, analysis of the motions in 2018 and 2019 reveals a framing of the discourse (in terms of motions) by the FFF demonstrations.

The second internal, systemic event was the change of government in 2021. The newly elected chancellor in LP 20, Olaf Scholz, and his coalition were expected to place a stronger emphasis on climate change [75]. It is difficult to assess the development of their energy and environmental policies, as this work covers only five months of the four-year government term. Nevertheless, some political changes can be observed: they committed to an earlier coal phase-out by 2030 in their coalition agreement, and Chancellor Scholz renamed the Federal Ministry for Economic Affairs and Energy the Federal Ministry for Economic Affairs and Climate Action, reflecting the government's commitment to prioritizing environmental issues [76]. Looking at environmental sustainability targets, thematic shares, and motions, there is no discernible pattern in LP 20. However, the start of the war in Ukraine may have led to a shift in focus away from environmental issues.

The COVID-19 crisis was identified as the third systemic shock. As noted above, crises require quick governmental responses and, as such, often prompt faster decisions [10, 51]. It can therefore be assumed that the shares of topics in the discussions would change. In early 2021, politicians mostly agreed that combating the COVID crisis was a top priority. Nevertheless, the Annual Economic Report was criticized for the federal government's loss of sight on the climate crisis and other energy policy issues (19/206). Additionally, when analyzing the subject area "economic affairs and energy," several new topics related to the COVID crisis emerged, such as, for example, economic stimulus packages, financial aid for the economy, or vaccinations (19/171; 19/180; 19/197). The mass vaccination campaigns, for instance, could have indirectly affected the affordability of energy and economic competitiveness by helping facilitate faster economic recovery, as they enabled lockdown measures to be reduced, allowing some economic activity to resume and so preventing further economic collapse. This, in turn, reinvigorated global supply chains and reduced energy market and price volatility. Considering these additional topics and the fact that the country faces a global economic crisis, the increase in the share of the topic of affordability and competitiveness was confirmed. This is also supported by the rising number of motions on this topic, amounting to 11% in 2018, 27% in 2020, and 50% in 2022.

The war in Ukraine was the fourth external systemic shock. The Russian invasion of the country has led to a focus on security of supply ($s_{\text{security of supply, 2022}}=36.36\%$) and more scrutiny on a new dimension of security, namely security policy and the country's internal security (20/21; 20/39). It has also led to a more diverse discussion regarding energy resources, as new resources enter the discourse that have not been part of the main discourse previously: LNG had a share of 18.5% in 2022, having made up no more than 1% in other years of the period under consideration. The war in Ukraine, therefore, had a very strong influence on the thematic development of the political discourse. Additionally, results indicate that the Russian war led to faster decisions being made in the Bundestag. The EEG Act from April 2022 serves as an example. The timing of the abolition of the renewables levy was discussed for a long time, and although a date had already been agreed upon, the end of the renewables levy was brought forward at short notice. While external shocks can certainly influence policy decisions, they do not always drive the decision-making process. The earlier-than-initially-planned repeal of the renewables levy, despite the date having been set before the Ukraine war, further supports the argument. The timing of its repeal had been debated for some time, and while it was ultimately brought forward, the decision was not a direct response to the war but part of a previously established policy trajectory. This illustrates how some policy changes, although appearing to be a reaction to crises, may already have been in motion due to previous considerations. As another example, the *Law to accelerate the use of liquefied natural gas (LNGG)*, which was published in May 2022, two months after the start of the invasion, was assessed by an FDP politician as being "the fastest bill to pass the house in this LP and probably in all of the last few years" (20/36; LNGG-Beschleunigungsgesetz (LNGG)) [77]. These two political decisions support the assumption that crises, as windows of opportunity, accelerate decision-making.

To conclude, particularities in the results can often be traced back to systemic events or circumstances. This could, in turn, be considered through the lens of agenda-setting theory, highlighting media coverage of them, the public reaction to this, and, in turn, how this interplays with the motivations of policymakers. Therefore, discussions in the Bundestag are very much guided by the world in which they take place, which is especially significant for how motions are developed. Thus, their function as an instrument of political control can also be confirmed. Moreover, the notion that windows of opportunity accelerate the decision-making process is supported.

Future trajectories of the German energy system

As discussed, natural gas had been debated as the central technology for bridging the gap until the energy system could entirely rest on RES. Other resources have rarely been mentioned in this context. This observation is confirmed by the 2021 coalition agreement, as well as other governmental publications (e.g., the Climate Action Plan 2050) [72, Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety [BMUM], 78]. As Germany heavily relies on the energy from Russia, policymakers are linking the issue of bridging technologies with the need for increased diversity of fossil energy resources [79]. Additionally, not only the resources that co-occur with bridging technologies but also the general discourse regarding energy resources were more diverse in 2022 (Fig. 3). The significant increase in the presence of LNG in the discourse is noteworthy, with a growth in share from 1.5% in 2021 to 18.5% in 2022. Brauers, et al. [80] perceived LNG to be the fastest-growing fossil fuel in 2020 and added that it is receiving state support. In addition, in the 2018 coalition agreement, it is stated that LNG infrastructure should be actively promoted in Germany. Although the 2021 coalition agreement omits any mention of LNG, it appears that the proportion of discussion devoted to LNG is greater than that reflected in the findings. When examining the high share in 2022, it is worth elaborating on the details in order to understand how the construction and expansion of an LNG infrastructure can serve as a bridging technology (e.g., 20/28; 20/37). Although the LNG infrastructure may be used for climate-neutral energy production in the future, it is important to consider its negative impact on the climate and lower energy efficiency compared to pipeline gas [20/37; 81]. Therefore, a possible slowdown of the energy transition is criticized, as the expansion of the LNG infrastructure seems to facilitate fossil fuels (20/34).

This slowdown cannot only be observed for the expansion of LNG but also for the consequences of the gas crisis in general. For illustration, based on the plenary minutes, the discussion on nuclear energy and, in particular, the position of the CDU/CSU is symbolic. Before 2022, there was consensus on the nuclear phase-out by the end of 2022, and the discussion mainly focused on the exit itself and nuclear waste disposal. Then, in 2022, along with the escalating situation with Russia, policymakers started to doubt an exit by the end of the year (e.g., 20/20; 20/21; 20/25; 20/34; 20/39). At the same time, the gas crisis may also facilitate the energy transition, as a stronger focus on energy efficiency by the government was observed.

In conclusion, German and European policymakers should prioritize the development of a resilient energy system that seeks to decrease energy imports, particularly from politically precarious nations. Therefore, an increased emphasis on energy diversification is imperative to avoid setbacks to the energy transition. Although LNG appears to provide a solution for immediate energy shortages, it must be viewed with caution as a transitional technology.

Lessons learnt and their implications

The debates around the *Energiewende* in the German Federal Parliament provide valuable insights, particularly given Germany's long experience and the associated successes and challenges encountered during the energy transition. In light of recent policy developments in the EU aiming at a net reduction of 90% in emissions based on 1990 levels, the importance of ambitious and advanced decarbonization plans becomes evident. For this purpose, the identified discourse dynamics and their implications provide valuable insight for the governance of necessary energy transitions across Europe.

Security of supply: The war in Ukraine has caused severe disruptions to the global energy market, reintroducing energy as a tool of warfare. The EU and Germany's reactions to the resulting energy crisis have marked a notable change in the discourse on energy policy. Given the urgency of the situation, Germany established necessary limits on energy dependence in an effort to enhance its security of supply. This led to the acceleration of renewable energy targets through the revision of existing policies and increasing the quantitative goals for their adoption and use across various sectors. An example in this regard is the expansion of LNG infrastructure in response to the energy crisis, which demonstrates the tension between immediate security concerns and long-term decarbonization goals. While ensuring short-term energy stability, these measures also raise concerns regarding the reinforcement of fossil fuel dependencies. This highlights the need for strategic planning to ensure that flexibility with respect to crisis response does not undermine climate targets. Policy reforms and long-term strategies supporting energy solidarity have therefore been prioritized in Germany.

Affordability and competitiveness: Following the crisis, Germany was dramatically affected by a sharp increase in energy prices. Almost coinciding with the end of the pandemic, the issues of energy pricing, affordability, reliability, and competitiveness became central topics of discussion in the Bundestag. Adjustments to national energy pricing and the EEG, new funding models for

RES technologies, and changes in international energy partnerships all played a significant role in stabilizing the crisis.

Environmental sustainability: Throughout the considered time period, debates in the Bundestag have underscored the steadfast objective of the German government to meet the target of climate-neutrality, although the series of external and internal events, including the FFF demonstrations and the following double crisis of the COVID-19 pandemic and the ongoing war in Ukraine, have led to a reevaluation of the relative importance of the topic of environmental sustainability. On the European level, the EU Green Deal and the Fit for 55 package have further manifested the strong political commitment to addressing environmental sustainability beyond climate change. Germany's experience reveals the challenges of maintaining ambitious climate policies in the course of systemic disruptions. While the emphasis on adaptability and resilience in energy policy is necessary, these must be embedded within a long-term decarbonization strategy to avoid structural reliance on fossil fuels. A crucial lesson can be learned from the German case: policy flexibility must be accompanied by mechanisms that prevent short-term decisions from locking in high-carbon pathways. This is especially relevant to global energy governance, where striking a balance between affordability, security, and sustainability continues to be a major challenge.

Limitations and future directions

While this study provides valuable insights into the role of systemic events in shaping parliamentary discourse on energy policy, certain limitations should be acknowledged. The analysis is based on Bundestag debates, which, while offering a rich source of policy discourse, do not fully capture informal negotiations, bureaucratic decision-making, or stakeholder influences outside parliamentary settings. Therefore, one may consider secondary data sources, such as government records, plenary debates in the German Bundesrat, newspaper articles, public speeches, and public opinion polls.

In this context, digital social media discourse (e.g., X/Twitter) is one of the key secondary datasets for extending the findings of this study. The present analysis focused on parliamentary debates to understand how systemic events shape energy-transition discourse within formal political institutions. Future research could expand on these findings by examining whether the identified discourse dynamics, shifts in target prioritization, and political framings in the Bundestag are also present in online public debates. This would be particularly relevant, given

the growing role of digital platforms, polarization entrepreneurs, and online agenda-setting processes in shaping public perceptions of energy and climate policy. Therefore, comparing parliamentary and social media discourse could provide valuable insights into the interaction between institutional and public debates during periods of crisis and transformation.

Next, the current study focuses on discourse rather than direct policy outcomes, necessitating caution in drawing causal inferences between shifts in debate topics and concrete legislative changes. Future research could expand on these findings by incorporating additional data sources, applying mixed-method approaches, or examining similar dynamics in other national contexts to further refine our understanding of energy policy governance in times of crisis. Similarly, in future research, further analysis should determine whether systemic events' short-term influence on political debates also has a long-term impact on policymaking and whether debated topics that arise in response to these events are reflected in subsequent political implementation. Moreover, an in-depth analysis could be made to understand the impacts and interrelationships between different political parties. To conduct a more rigorous analysis of this topic, a future objective could be to investigate how debates within the developed framework translate into governance adaptation over time.

Additionally, although this paper focuses on analyzing the political discourse in the Bundestag based on the energy triangle during major events, no further analysis is made to investigate the role and impact of political parties within the Bundestag. Thus, an important future task would be to dive deeper into the collected data in order to extend the coding based on the role of political parties and their decisions with respect to the identified targets. Discourse network analysis (DNA) is a useful tool that can be used for this purpose. DNA also enables understanding and exploring the negativity and positivity of coded discourses in a complex network of stakeholders (parties or even parliament members). Using DNA, one may re-develop the coding framework not only based on the energy triangle but also based on various sustainability challenges in different sectors, such as transport and building.

Conclusions and political implications

The German *Energiewende* has been a well-known project in the field of energy policy for a long time. Over the last two LPs, multiple events occurred, some of which have been examined in more detail in this work, namely the FFF demonstrations, the COVID-19 crisis, the change of the

German government, and the Russian invasion of Ukraine, which all placed energy policy at the center of debates. As the German *Energiewende* is often considered a role model for other countries, it is of interest to analyze the topics and targets discussed in German energy policy to extrapolate potential implications of the policies of other countries. Moreover, the development of the connection between systemic events and political discourse can help illuminate the connection between daily events and political development, as these so-called windows of opportunity can accelerate political decision-making processes.

To analyze the addressed areas of interest, a qualitative semi-quantitative discourse analysis was conducted on the plenary minutes of the last two LPs of the German Bundestag. The analysis of the political discourse in Germany regarding its energy transition can serve as a case study for understanding the complexities and dynamics of energy policy development in broader European and global contexts.

The analysis clearly showed that the analyzed systemic events had an influence on the political debate. For instance, the period characterized by the FFF demonstrations mainly dealt with the topic of environmental sustainability, whereas the topic of climate protection (targets) dominated the motions in 2018 and 2019. In the wake of the COVID-19 crisis and the accompanying economic fall-out, a shift in the political discourse towards the topic of affordability and competitiveness became apparent. After the change of government in 2021, the Russian invasion of Ukraine quickly changed the political agenda, with the focus of the debates shifting towards the topic of security of supply. Dependence and independence were identified as featuring a strong increase and a share of 50% in 2022. Moreover, the development of the topic of natural gas, which was initially identified as a bridging technology, emerged simultaneously with the topic of security of supply, as well as that of dependence. Towards the end of the analyzed period, LNG significantly increased its share, particularly after the Russian invasion. Following the realization that Germany's energy system could no longer depend on gas from Russia, discussions around LNG began to emerge in 2022. As a result, there was a strong intention to expand German LNG infrastructure. However, in line with the search for a new bridging technology, the discourse regarding fossil fuels became more diverse

towards the end of the analyzed period. It appears that LNG is not the sole alternative under consideration, which reflects a broader global trend in energy policy.

The energy triangle's focus on the three main energy policy targets remained unchanged despite the various significant systemic events that occurred. The persistence of the energy triangle, focusing on sustainability, affordability, and security of supply, despite these systemic events underscores the resilience and adaptability of energy policy frameworks. However, the concept's significance in policy debates and publications decreased over time, which suggests a need for continuous monitoring of and adaptation to external influences. Security of supply played a crucial role within the triangle during the Russian invasion of Ukraine and the European gas crisis.

Moreover, it was also confirmed that external extreme events, such as a crisis or war, accelerate political decision-making. Hence, as political developments dynamically change with external circumstances and events, it is necessary to regularly track their progress, as is done, for example, with the monitoring report to be able to react to external influences at an early stage. In addition, not only may the political direction change but recent and emergent topics might push other topics off the agenda. This was evident during the initial months of the COVID-19 pandemic, when the issues of affordability and competitiveness suddenly dominated debates in the Bundestag. These topics, which had not been among the top three discussed previously, gained prominence due to the urgent and immediate impacts of the pandemic.

In conclusion, analyzing Germany's political discourse serves as a case study of a microcosm for understanding the dynamics of energy policy discourse in a globalized world. We have shown that the energy triangle persists even in crises, but that a strong change in the discourse due to current events opens windows of opportunity that are often not ideally used to efficiently achieve stable, long-term targets.

The lessons learned from Germany's experience can inform broader EU and global energy strategies, emphasizing the importance of flexibility, resilience, and the ability to rapidly adapt to systemic events in energy policymaking. Future research should further explore the long-term impacts of these dynamic shifts in political discourse on actual policy implementation, both within Germany and in a wider international context.

Appendix A1

See Table 2.

Table 2 Final coding framework

I. Supportive codes	II. Energy triangle topics	III. Energy sources	IV. Others
- Parties • CDU/CSU • SPD • FDP • Alliance 90/The Greens • AfD • The Left Party • Non-Attached Member • Coalition Legislative Period 19 • Coalition Legislative Period 20 • Federal Government - Motions • Motion—Security of Supply • Motion—Affordability and Competitiveness • Motion—Environmental Sustainability • Motion—Climate Protection (targets) • Motion—Renewable Energies General Topic • Motion—Expansion of Renewable Energies • Motion—Coal Phase-Out • Motion—Nuclear Energy Phase-Out • Motion—Acceptance and Social Compatibility • Motion—Investment, Growth and Employment • Motion—Research and Innovation • Motion—Sector Coupling and Digitalization • Motion—Expansion of Electricity Grid • Motion—Others - Subject Areas • Subject Area—Economic Affairs and Climate Action • Subject Area—Environment, Nature Conservation & Nuclear Safety • Subject Area—Economic Affairs and Energy	- Energy Triangle • “Energy Triangle” • Energy Triangle—Security of Supply • Energy Triangle—Affordability • Energy Triangle—Economic Efficiency and Competitiveness • Energy Triangle—Economic Sustainability • Energy Triangle—Acceptance • Energy Triangle—Expansion of Renewable Energies • Energy Triangle—Independence • Energy Triangle—Structural Change • Energy Triangle—Innovation • Energy Triangle—Expansion of Electricity Grid - Environmental Sustainability ○ Environmental Sustainability—Speech Topic ○ Climate Change/Environmental Protection—Speech Topic ■ Environmental Sustainability—General Topic • Climate Protection (targets) • Environmental Sustainability—Human Health • Environmental Sustainability—Nature and Landscape • Environmental Sustainability—Use of Raw Materials and Land • Environmental Sustainability—Water, Soil, Air - Affordability and competitiveness ○ Affordability and Competitiveness – Speech Topic • Affordability • CO2-Price and Emissions Trading • Renewables Sources Act • Competitiveness • Economic Efficiency • Community Energy - Security of supply ○ Security of Supply—Speech Topic ■ Security of Supply—General Topic • Dependence • Reserves/Storage • Bridging Technology • Energy Diversification • Monitoring	- Renewable energy sources ■ Renewable Energy Sources—General Topic • Wind Energy • Hydrogen • PV/Solar • Biomass and Biogas • Hydropower • Geothermal Energy - Fossil fuels ■ Fossil Fuels—General Topic • Coal • Nuclear Energy • Gas • LNG • Fracking • Cogeneration Plant • Oil - Expansion of renewable energy technologies ○ Expansion of Renewables—Speech Topic • Accelerate Renewable Energy Technologies • Pro Renewables • Contra Renewables - Coal phase-out ○ Coal Phase-Out—Speech Topic ■ Coal Phase-Out—General Topic • Pro Coal Phase-Out • Contra Coal Phase-Out - Nuclear phase-out ○ Nuclear Energy Phase-Out—Speech Topic ■ Nuclear Energy Phase-Out—General Topic • Pro Nuclear Energy Phase-Out • Contra Nuclear Energy Phase-Out • Nuclear Waste Disposal	- Expansion of Electricity Grid ○ Expansion of Electricity Grid—Speech Topic ■ Expansion of Electricity Grid—General Topic - Sector Coupling and Digitalization ○ Sector Coupling and Digitalization—Speech Topic ■ Sector Coupling and Digitalization—General Topic - Research and Innovation ○ Research and Innovation—Speech Topic ■ Research and Innovation—General Topic • Energy Efficiency • Energy-Focused Building Refurbishment - Investment, Growth and Employment ○ Investment, Growth and Employment—Speech Topic ■ Investment, Growth and Employment - General Topic • Planning and Investment Security • Structural Change • Employment/Jobs - Acceptance and Social Compatibility ○ Acceptance and Social Compatibility—Speech Topic ■ Acceptance and Social Compatibility - General Topic • Security

• Sub-codes ○: Speech topic codes ■: General topic codes

Appendix A2

See Fig. 6.

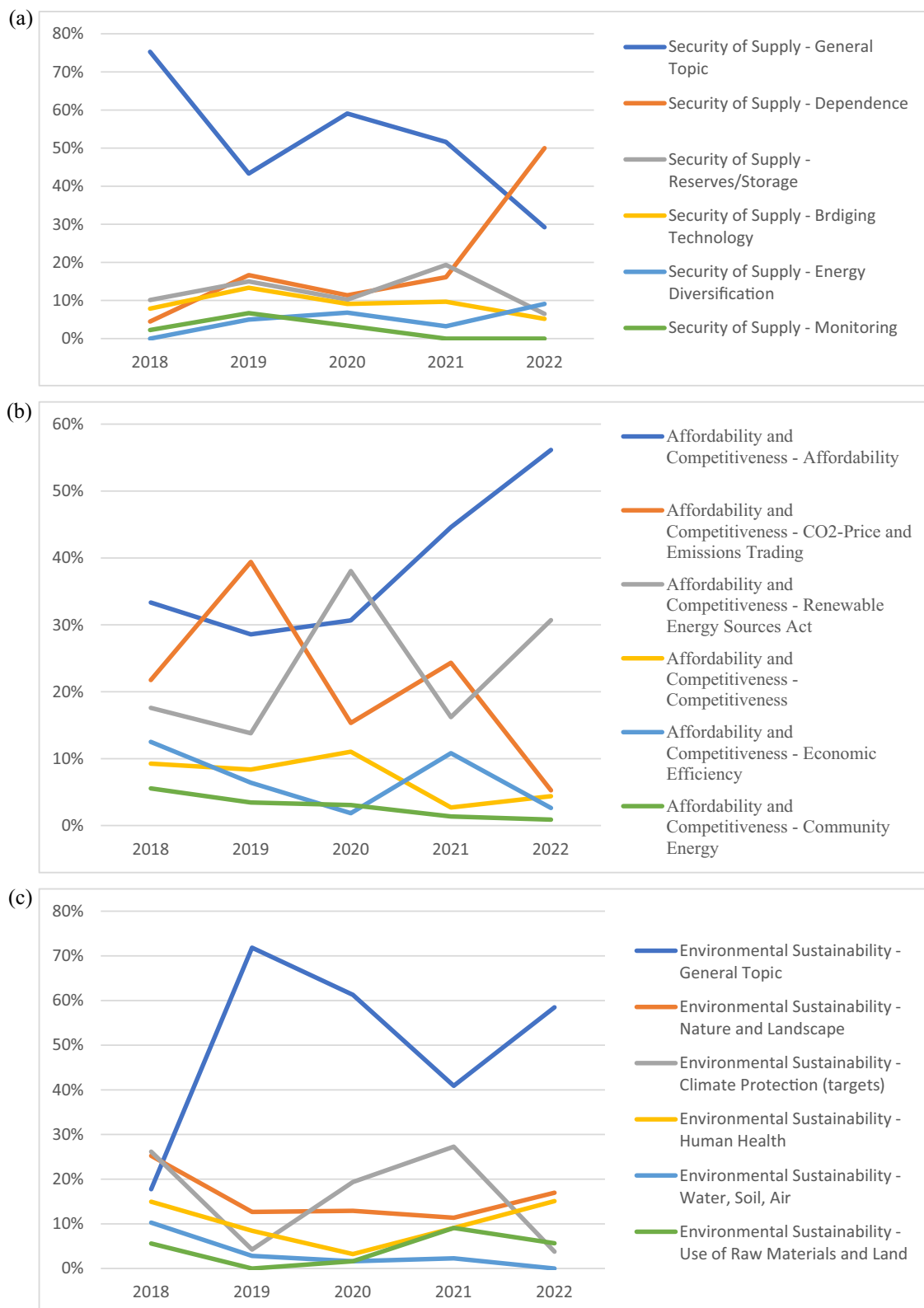


Fig. 6 Share of subtopics of: **a** security of supply; **b** affordability and competitiveness; and **c** environmental sustainability over the years

Appendix A3

See Table 3.

Table 3 Percentage of a topic's code coverage in the coded segments per party in the electoral programs 2017 and 2021

	The left party	SPD	Alliance 90/the greens	FDP	CDU/CSU	AfD
<i>2017</i>						
Environmental Sustainability	2.40%	2.30%	9.60%	3.10%	21.80%	60.80%
Affordability and Competitiveness	59.50%	21.00%	11.90%	44.30%	14.30%	7.90%
Security of Supply	1.50%	10.30%	0.00%	20.40%	13.10%	4.00%
Renewable Energy Sources	0.30%	1.40%	3.40%	18.90%	2.10%	16.70%
Fossil Fuels	5.80%	18.60%	1.70%	0.00%	0.00%	0.80%
Expansion of Renewable Energies	0.30%	8.60%	5.10%	1.30%	2.00%	3.40%
Coal Phase-Out	20.10%	5.60%	13.80%	0.00%	0.00%	0.00%
Nuclear Phase-Out	10.90%	26.00%	27.20%	0.00%	24.80%	9.40%
Expansion of Electricity Grid	1.70%	3.00%	4.10%	21.90%	4.50%	0.50%
Sector Coupling and Digitalization	0.00%	7.70%	0.80%	3.40%	22.00%	0.00%
Research and Innovation	6.80%	9.20%	10.80%	2.70%	0.00%	6.50%
Investment, Growth and Employment	3.40%	11.20%	29.20%	0.40%	1.20%	0.00%
Acceptance and Social Compatibility	0.50%	0.00%	1.80%	22.50%	0.00%	10.40%
<i>2021</i>						
Environmental Sustainability	10.30%	15.90%	2.90%	14.50%	8.50%	21.00%
Affordability and Competitiveness	28.00%	26.20%	10.10%	33.60%	24.90%	1.70%
Security of Supply	1.90%	0.30%	2.50%	6.40%	13.40%	3.00%
Renewable Energy Sources	10.50%	25.80%	45.80%	31.80%	48.60%	17.90%
Fossil Fuels	4.70%	0.00%	4.60%	0.00%	0.00%	10.80%
Expansion of Renewable Energies	4.00%	5.90%	0.80%	1.60%	1.60%	3.50%
Coal Phase-Out	31.60%	2.90%	2.30%	0.00%	1.30%	6.00%
Nuclear Phase-Out	5.70%	3.80%	20.50%	0.00%	0.00%	59.90%
Expansion of Electricity Grid	2.20%	7.60%	14.30%	0.00%	6.30%	0.00%
Sector Coupling and Digitalization	0.00%	0.00%	0.30%	7.60%	0.00%	0.00%
Research and Innovation	0.00%	4.10%	7.50%	2.20%	6.40%	0.00%
Investment, Growth and Employment	9.00%	11.90%	0.20%	0.00%	1.70%	0.00%
Acceptance and Social Compatibility	8.00%	0.00%	0.50%	6.10%	1.60%	1.50%

Author contributions

The design and conceptualization of the research behind this article was performed by SV, AT, KB, and KA. The methodology and validation were conducted by KB, AT, and SV. The software was implemented by KB. Figures and tables were prepared by KB. Writing the original draft and reviewing the article were performed by SV, KB, KA, AT, CW. All authors read and approved the final manuscript.

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Data availability

The data source for our research was transcripts of political discussions in the German Federal Parliament (Bundestag). It is available through the official website of the German Federal Parliament (Bundestag).

Declarations

Ethics approval and consent to participate

The authors declare that they have adhered to the ethical standards of research.

Consent for publication

The authors declare their consent for publication.

Competing interests

The authors declare no competing interests.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used DeepL to improve the language and readability of the manuscript. After using these tools, the authors carefully reviewed and edited the content as necessary and take full responsibility for the content of this publication.

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