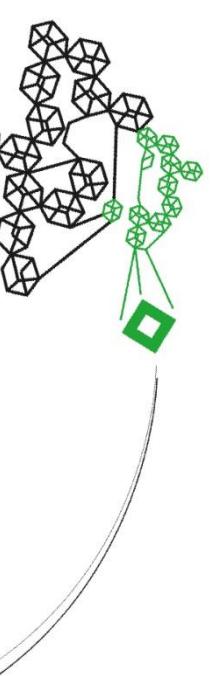


UNIVERSITY OF TWENTE.



# Staying nuclear? A historical analysis of stability and change in the German Nuclear Energy Strategy



Jana Linneweber  
s2167875  
[j.linneweber@student.utwente.nl](mailto:j.linneweber@student.utwente.nl)  
Comparative Public Governance  
1<sup>st</sup> Supervisor: Le Anh Long  
2<sup>nd</sup> Supervisor: Antje Vetterlein  
23.09.2022

## Table of Contents

Introduction .....	1
On Stability and Change.....	7
Stability.....	8
Change.....	10
Research Design.....	16
Materials.....	18
Methods.....	22
Analysis.....	25
Path dependencies in the EU.....	27
Influence on Germany.....	31
Path dependencies in Germany.....	33
Stability and Change Stimuli in the German Strategy.....	36
Discussion and Conclusions.....	44
References.....	49
Appendix .....	58

## List of Tables and Figures

Table 1 [Number of Articles used] .....,,,	18
Table 2 [Policy Documents used] .....	20
Table 3 [Interviews].....	21
Table 4 [Simplified Overview of the Codebook] .....	22
Figure 1 [Nuclear Power Generation] .....	01
Figure 2 [Simplified Overview of Codes and Correlating Themes] .....	23

## Summary

This thesis focuses on periods of stability and change within the nuclear energy strategy of Germany. It examines German policy evolution against the backdrop of a multi-level governance system wherein the EU might be expected to influence policy making on nuclear energy in Germany. However, while the EU relies on nuclear energy as a firm share of its energy generation, Germany has decided to shut-down its nuclear power plants until the end of 2022 after the Fukushima accident. This change runs opposed to the stability observed in the EU. This thesis combines insights on stability and change from three theoretical perspectives - Historical Institutionalism, the Multiple Streams Approach and Punctuated Equilibrium theory - when examining policy evolution in the German energy subsystem. In three sub-questions, the strategies are presented and examined for path-dependencies, forces of stability and forces of change. The questions are answered using a mixed-methods approach of data gathered through key informant interviews, literature review, and policy documents. This data, in combination with the theoretical framework, points towards the institutional structures and policy history as key points of interest. These findings are relevant for theoretical insights on stability and change, but also for practical insights on policy evolution in the EU.

## Introduction

Nuclear power is currently being produced as an energy source in 13 out of 27 EU member states (World Nuclear Association, 2022). The EU has decided to use coal, nuclear, and renewable energy in their energy mix (Bruninx et al., 2013). It has classified nuclear energy as a “bridge technology” to support decarbonization and thereby fight climate change (European Commission, 2022b). Figure one shows the distribution of several nuclear power plants in Europe. This map, created by Landgeist using data from the IAEA, visualizes the share of nuclear energy in total electricity generation as well as nuclear power plants. Strategies for the use of nuclear energy vary widely between the EU member states. Choices regarding energy, especially nuclear energy policy, fall within each member state’s jurisdiction, giving member states decision-making power regarding their energy mix (Fouquet, 2019). Therefore, member states, such as Germany, may deviate from the EU strategy. The EU itself is pursuing a mixed approach of nuclear, coal and renewables, while Germany has shut-down the majority of its nuclear plants and aims at using just renewables for electricity generation (Landgeist, 2020; Bruninx et al., 2013).

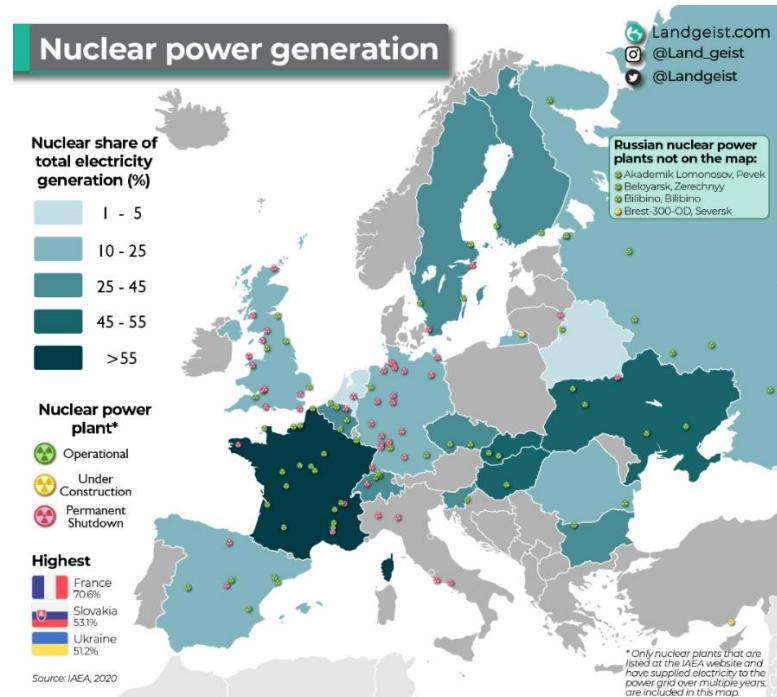


Figure 1: Nuclear Power generation (Landgeist, 2020)

In Germany, the energy supply is steering towards a purely renewable energy mix<sup>1</sup>. Germany has completely abandoned nuclear energy production, pursuing a plan to shut-down nuclear power plants until the end of 2022. This is part of the “Energiewende” strategy: Like the EU, Germany has ambitious climate goals to meet, especially in the energy sector. These include reducing greenhouse gas emissions by 80-95% compared to 1990 by 2050. The decarbonization of the German economy, especially of the energy sector under the “Energiewende” plan, is an important part of that (Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit, 2016). The decision to abandon nuclear energy seems to have been made after the 2011 Fukushima nuclear accident. Before that, the shut-down was still a controversial discussion. After Fukushima, both institutions and the general population show a wide-reaching mistrust of nuclear power (von Hirschhausen, 2018; Sonnenberger et al., 2021). At present, Germany plans to abandon nuclear energy by 2022 with the shutdown of its last three nuclear power plants being planned for the end of the year. In sum, there is misalignment between European and German approaches to nuclear energy.

There are important implications of this lack of harmonization on Germany and her European neighbors, especially on climate change mitigation, markets, and on public trust. Regarding climate change, a more harmonized EU strategy would be more effective in reaching climate change mitigation targets. There is a controversial discussion around nuclear energy and its sustainability at the EU level, but it is undisputed that it is a low CO<sub>2</sub> technology. The lack of harmonization of the strategies may therefore hurt climate change mitigation in the EU. This effect may be eased by Germany expanding renewable energy instead of high CO<sub>2</sub> energy sources, but the expansion is slow. This affects climate targets as well as energy markets. The implications for the EU energy markets are mainly focused on the interconnected EU energy grid. A harmonized EU strategy would mean regulating the interconnected grid in a more centralized way. This could help the EU reach its goal of supply security and independence. Lastly, public trust seems to benefit from the lack of harmonization of the EU strategies. As there is variation across countries in terms of public opinion towards nuclear energy due to historical roots, the EU’s middle-of-the-road approach serves all views. A more harmonized strategy would have to shift either in the direction of pro- or anti-nuclear, alienating voters in one country or the other. While some authors (e.g. Becker, 1989; Handrlica, 2010) stress the advantages and call for harmonization of energy

---

<sup>1</sup> The German energy mix for the first quarter of 2022 consisted of 47,1% renewables, 31,5% coal, 13% gas, 6% nuclear energy, and 2,4% other conventional (non-renewable) energy sources (Destatis, 2022).

policy, others see large obstacles that stand in the way of a unified EU nuclear energy strategy (e.g. Strunz et al., 2015; McCauley et al., 2018).

European and German policies on energy are co-evolving. At the same time, there have been key differences in the policy outputs and outcomes of these processes. One area where this difference can be felt is in nuclear energy. The aforementioned differences in position, with the EU favouring the use of nuclear energy and Germany lobbying against it at the EU level, calls for a thorough investigation of how the two strategies evolved, with an eye to the influence (or lack thereof) of European policy making on German policy, and vice-versa. Looking at the history of policy making in Europe, the EU often acts as an influential and external institution, which can be used as a predictor for change in the member states. For example, scholars have observed a Europeanization of energy policy in member states like Sweden (Nilsson 2011). Therefore, if policy making shows stability in the EU, one can expect stability in the member states. If the EU pushes for change, one might expect the member states to also change over time - especially in the case of highly complex issues like energy (Gormley, 1986). Looking at the history of German nuclear energy policy, we see punctuated changes that are not apparent at the EU level. At the same time, Germany is a highly influential member state, increasingly taking on leading roles in EU domains (Aggestam & Hyde-Price, 2019) and possessing influential power in EU institutions like the Parliament (Euractiv, 2009). Thus, the question arises: **How can one explain the policy evolution tracks of the German nuclear energy strategy?** (RQ) This research shall therefore trace German policy evolution and leverage theories of policy change to explain its trajectory. In policy research, "evolution" is often loosely defined (Cairney, 2013). This thesis adopts a broad definition of policy evolution as the pattern through which a government's (e.g. EU or Germany) policy changes over space and time. Just as species evolve, policies are expected to evolve in a dynamic way, experiencing periods of rapid change but also periods of relative stability (True et al., 2019). To explain these developments, the thesis then borrows insights from the key evolutionary policy frameworks (See Section 2) to give a thorough overview of this term.

This paper focuses on periods of stability and change within German nuclear energy strategy. Policy domains experience long periods of stability, as many of the forces active in policy making promote stability. This is apparent in works from historical institutionalists like Pierson and Skocpol (2005), as well as Baumgartner and Jones (2007), and Kingdon (2013), who are united in their assumption of an institutional structure that favours stability. Nevertheless, this must be combined with an explanation of policy change. Policy change is a central topic in the policy sciences, attracting the attention of a wide range of scholars interested in explaining why and how policy changes, and the extent to which these changes endure and diffuse (Sabatier, 1993;

Howlett & Ramesh, 1993). Authors like Kingdon and Baumgartner and Jones introduce change stimuli that promote change in policy domains. These stimuli take the form of endogenous (e.g. problems and entrepreneurs that use windows of opportunity to change policies in their favour) and exogenous (e.g. wars, tsunamis, European policy innovations like the Green Deal) phenomena. These explanations of forces of stability and forces of change are united in this paper with the aim of providing a more thorough understanding of stability and change stimuli in the case of German nuclear energy policy.

A historical case study is conducted on the basis of peer-reviewed academic literature, policy documents and interviews. The literature provides important insights and is underpinned by policy documents and first-hand data from key informant interviews. From this, a thematic analysis is employed to answer the research questions presented below. This design aims at strengthening the scholarship on stability and change by creating a new framework combining historical institutionalist, punctuated equilibrium and multiple streams approach insights as well as practical knowledge on the nuclear strategies of the EU and Germany. From this, the qualitative, exploratory research (RQ), **“How can one explain the difference in policy evolution tracks of the German and EU nuclear energy strategy?”** is unpacked into three sub-questions:

- First, *what factors shaped the European nuclear energy strategies' development over time?*

At the EU level, the EURATOM treaty of 1957, one of the founding treaties of the European community, is the defining policy that shapes nuclear energy governance. During its establishment, the signatories<sup>2</sup> wanted to safeguard their own national interests, especially in nuclear weapons technology. For this reason, member state discretion is a key part of EURATOM, meaning low integration on the EU level (Fouquet, 2019). The Amsterdam Treaty of 1999 only exacerbated this, giving countries the prerogative over their energy mix (von Hirschhausen, 2018). EURATOM has never been significantly amended. Its framework continues to prevent further harmonization of EU energy integration, especially regarding nuclear energy (Fouquet, 2019). As a most recent development in nuclear energy policy, the EU has decided to classify nuclear energy as a bridge technology, opening it up to be used as a method of CO<sub>2</sub> reduction in the energy sector (European Commission, 2022b). This development shows stagnation over the last sixty years of EU nuclear energy policy, notwithstanding the nuclear accident in Fukushima as well as multiple changes in government without big leaps of policy change occurring.

---

<sup>2</sup> Signatories of the 1957 EURATOM Treaty were Belgium, Germany, France, Italy, Luxembourg and the Netherlands

- Second, *what factors shaped the development of the German nuclear energy strategy over time?* Both these questions are more descriptive and exploratory in nature and meant to give a state of the art of the strategies and their development over time.

Nuclear energy is a topic that has been controversially discussed in academic and normative literature since its establishment. In Germany, this started around the 1960s, when both East and West Germany started using nuclear power after not having a nuclear industry before due to the demilitarization after the Second World War (von Hirschhausen, 2018). In West Germany, US technology was introduced while in East Germany, the Soviet Union pushed their advancements in nuclear energy. Nevertheless, coal remained the dominant force in the energy sector, with nuclear playing a supplementary role. The 1980s brought some changes as first thoughts of the “Energiewende” emerged, which would push Germany towards more renewable energies (von Hirschhausen, 2018). At the same time, the Chernobyl accident in 1986 turned public sentiments against nuclear power. While the anti-nuclear movement was strong in Germany before the accident, with the Green party bringing powerful anti-nuclear voices to the Bundestag for the first time in 1993, the accident brought the attention of the general public to the issue of nuclear energy (Feldhoff, 2014). First voices are raised to shut down this technology. This was exacerbated in the 1990s and 2000s, where debates on nuclear power were most active in Germany.

In 2001, the coalition government of SPD and Greens under Chancellor Schröder devised a policy that shut-down nuclear power plants (von Hirschhausen, 2018). This was followed by a campaign in the 2005 general election by the opposition of CDU/CSU and FDP, who ran on the promise to reverse this decision. The parties won and, united under Angela Merkel, planned the extension of nuclear power plant runtimes in 2010. Germany was headed towards an energy mix “troika” of coal, nuclear and renewables (von Hirschhausen, 2018). This changed suddenly with the Fukushima accident in the spring of 2011. Some scholars claim that the accident directly resulted in Merkel changing course, first establishing a moratorium on the seven oldest nuclear plants, and then establishing a policy to shut-down all German nuclear plants until 2022 (von Hirschhausen, 2018). However, *was Fukushima really so influential or was it just another stimuli pushing Germany forward on a trajectory it had already begun to take?* One can observe incremental decision-making with only small adjustments to strategies, interrupted by big leaps in policy change, for example with the 2005 election and after the Fukushima accident. The question is whether these changes were set in motion through a path dependent process, or whether they were triggered by focusing events - a tipping point, so to speak - as some of the literature suggests.

- The third sub-question asks if *the EU acted as a predictor of policy change in this case and how change and stability differ in the EU and in Germany.*

The EU acts as an external, stabilizing institution for its member states that acts as a change agent. If change occurs here, it often follows in the member states as well. A pattern of a longer period of stasis interrupted by sudden increases in policy change can be observed in a variety of policy-making areas (True et al., 2019), but does not seem to take effect in EU nuclear energy policy making, where the focus has largely been on energy security. Many studies have examined the level of influence that the EU has on member state policy-making, finding wide variation across a number of domains. The level of influence the EU holds over member state Energy policy is an open question which this thesis begins to explore by examining the alignment of German evolution with stimuli coming from the EU.

This research can contribute to the existing literature in various ways. First, regarding Historical Institutionalism, the current research on European or German nuclear energy strategy usually only contains a small section devoted to the history of the policies and institutions. By pulling this temporal explanation more into focus, this study can contribute new explanations about what made the strategies develop and diverge as they do and how forces of change and forces of stability affect them. Similarly, nuclear accidents have been discussed as focusing events encouraging policy change before (e.g. Klüver & Giger, 2012; Benson & Russel, 2015), but Punctuated Equilibrium Theory goes further than that in explaining the role of focusing events. Studying the EU and Germany as cases gives new theoretical insights as well. Looking at Germany as atypical in the EU, one can classify it as a deviant case. As a deviant case, it can contribute to the existing discussion on nuclear energy. Lastly, this thesis can give a strong contribution to the theory by creating a new framework that combines explanations of stability and change found in Historical Institutionalism, the Multiple Streams Approach and Punctuated Equilibrium Theory to determine which change stimulus was in play here to force change or stability in this case.

From a societal perspective, this research can contribute to the role of nuclear energy in both Germany and the EU. A harmonization of strategies might benefit climate change and geopolitics. For climate change, a more unified EU strategy might mean more efficiency in reducing CO<sub>2</sub> emissions to reach climate goals. In a time when one can begin to see the devastating effects of climate change first-hand, the issue of reducing CO<sub>2</sub> emissions is more important than ever. Geopolitically, a unified strategy gives the EU more power on a global stage.

This has become especially relevant in recent months, as dependence on Russian energy and gas has been questioned in light of the invasion of Ukraine. In exploring what forces led to change in nuclear energy strategies, one can draw assumptions about what encourages or prevents change in German and EU policy making. This thesis can further provide a viewfinder for readers on where to look in a search for how strategies diverge. Here, it points to institutional and temporal factors. The historical view is proven to be of key importance in this thesis.

## On Stability and Change

To observe patterns of policy evolution in institutions over time, a definition of institutional change must be provided. Important work was done in this field for example by Streeck and Thelen (2005), whose typology will be used in this thesis to explain institutional change. Defining institutions as “building blocks of social order” (Streeck & Thelen, 2005, p. 9), this explanation states that they represent social expectations regarding the behaviour of certain actors or certain activities. Institutions provide a differentiation between right and wrong for actors, as well as rights and obligations. This provides clear patterns for actor’s behaviour (Streeck & Thelen, 2005). To connect this to policy evolution, I argue here, following Streeck and Thelen (2005) as well as Pierson (2000), that policies which constitute enforceable rules for actors are institutions. The policy observed here, nuclear energy strategy, puts wide-reaching constraints on stakeholders, for example on the operators. This meets the definition suggested by Streeck, Thelen, and Pierson of a policy that constitutes an institution. Policy change and institutional change are therefore intertwined and cannot be discussed separately from each other.

In examining policy evolution, change seems to be at the foreground of policy frameworks. Commonly used theories like the Advocacy Coalition Framework by Sabatier (1987), the Multiple Streams Approach by Kingdon (2011), and the Policy Design Approach presented by Ingram, Schneider and deLeon (2007) all focus on how to explain change and how new policies are created through mechanisms of change. Nevertheless, as Mahoney and Thelen (2010) criticize, much of the literature on institutional change focuses on exogenous shocks that bring about rapid and intense changes. This view does not give enough focus to slower modes of change, which are often started endogenously and have a more incremental nature. To observe these changes, research must expand its view beyond current changes and adopt a historical timeframe, as is done in this study, to observe exogenous as well as endogenous change (Mahoney & Thelen, 2010). Streeck and Thelen additionally distinguish processes of change from results of change.

Change processes can happen either abruptly or incrementally and result in either continuity or discontinuity (Streeck & Thelen, 2005). Changes can happen incrementally and result in either a gradual transformation (if the change results in discontinuity) or in the maintenance of the status quo with only minimal adaptations (if the change results in continuity). Abrupt change can result in continuity as well, with drastic events maintaining continuity. For big changes to occur, there needs to be an abrupt change that results in discontinuity. Nevertheless, as noted by Streeck and Thelen, one must be aware to not disregard incremental change when observing policy change over time (Streeck & Thelen, 2005).

On the basis of this change definition, one can turn to the term of policy evolution. This term is often imprecisely defined, which is why the following sections will more closely examine policy evolution as defined by key evolutionary theories like Historical Institutionalism, the Multiple Streams Approach and Punctuated Equilibrium Theory. In different policy systems, there can be factors that either promote change or inhibit change. These factors, or change stimuli, can affect whether changes are big or small. The institutional structure of the system is elemental here in how sensitive a system is to forces of change or forces of stability. The theoretical approaches that are discussed in the following section explain what promotes stability and what promotes change, each with their own assumptions on what causes policy evolution. The goal of this thesis is to find how best to explain the evolution that is observed here in the nuclear energy policy of the EU and Germany.

## Stability

Beginning with a look at stability, while there are competing explanations for stability of policy making, a commonly cited concept for explaining pro-stability forces is the concept of path dependence. Pierson and Skocpol (2002) define path dependence as “the dynamics of self-reinforcing or positive feedback processes in a political system” (Pierson & Skocpol, 2002, p. 6). This involves a clearly defined logic in which events create feedback mechanisms that enable the current pattern of behaviour to continue. In the beginning, these behavioural patterns can still be amended, but once established, can be hard to break. As time passes, alternatives that were not chosen become even less likely. Path dependence is a key concept in Historical Institutionalism, as it explains pro-stability stimuli.

Path dependence as a major pro-stability stimulus can also be seen in the nuclear energy policy history of the EU. No major changes are apparent in their strategy, the current pattern of behaviour has been largely continued since EURATOM’s establishment. Pro-stability forces seem

to have the upper hand here, with path-dependence acting as a major stimulus. Nevertheless, there is some debate around this concept. While Campbell (2010) sees path dependence as a rather nuanced explanation for how institutions change, other authors have voiced criticism of the concept. Pierson & Skocpol (2002), for example, accuse it of “lacking clear meaning” (Pierson & Skocpol, 2002, p. 7), while Peter Hall, while admitting path dependence is of importance in Historical Institutionalism, states that it lacks clear agreement by scholars on what the term actually describes. Due to these debates within the historical institutionalist literature, in this thesis, I will come back to the definition established by Pierson and Skocpol that is commonly cited, of path-dependence as a self-reinforcing feedback process within the political system (Pierson & Skocpol, 2002).

Beyond path-dependence, stability in political systems is heavily featured in Baumgartner and Jones' theory of punctuated equilibriums. They describe a stasis-leap rhythm that defines policy evolution, with small and incremental changes or no changes occurring during long periods of stability. Political systems often exacerbate the maintenance of stability, as Baumgartner and Jones have found in the case of their US-based research, with institutions supporting the stasis-leap system (True et al., 2019). The theory has been increasingly used, outside the EU as well as in an EU context (e.g. Princen, 2013; Benson & Russel, 2014; Beyer et al., 2022). Punctuated Equilibrium Theory uses a basis of institutionalism and bounded rationality in decision making (Pierson & Skocpol, 2002). The bounded rationality aspect expects that decisionmakers are subject to rational choice models, but limited by their realities, a basis that founded incremental decision-making theories. Incrementalism describes stasis in policy making here, defined by True et al. as “marginal accommodations to policy making” (True et al., 2019, p. 156). This incrementalism is aided by processing structures, which is where Baumgartner and Jones introduce the concepts of serial and parallel processing. In parallel processing, an organization handles many issues simultaneously while in serial processing, issues are handled one or a few at a time. By separating into subsystems with different specialties, governments can handle issues in parallel with experts working within the subsystems. Then, change is usually small and incremental because the bargaining for change happens within the expert communities and public interest is low; the issue is not high on the agenda.

Even when changes do happen, Baumgartner and Jones often see reforms mitigated in the decision-making stages, termed institutional friction. Institutional friction is a strong pro-stability force in this theory. They state that institutional design affects the efficiency with which governments are aware of and react to changes in their environment. Trying to explain the inefficiency between inputs and outputs of governments, Baumgartner et al. hypothesize that

changes in output between countries must be due to institutional design, as countries have the same input situations. Institutional friction levels differ from country to country and from issue to issue (Baumgartner et al., 2009). This is apparent in the case at hand, as Germany and the European Union are exposed to similar events that affect input, such as nuclear disasters around the world or changes in government. Nevertheless, the output in the form of nuclear energy policies differs. Here, institutional friction stemming from different institutional designs may be one reason why this difference exists.

Baumgartner and Jones take their notion of a stable status-quo system from theories like that proposed by Sabatier and Jenkins-Smith (1993) and historical institutionalists. The issue here is that the authors, in focusing on their new notion of punctuations, only treated the insights taken from these authors superficially and did not address the issue of pro-stability and pro-change stimuli sufficiently. For this reason, historical institutionalist literature as well as the Multiple Streams Approach are more deeply discussed in this study to fill this gap in the framework and combine the approaches into a new framework that more closely displays the forces of change and stability.

For an explanation that links insights on stability and change, Kingdon's Multiple Streams Approach raises the question of how agendas are set for policymaking by actors that can either be encouraging forces of change or stability. In detail, Kingdon's approach defines three streams: problems, politics and policies. These streams flow as forces of stability if undisturbed. These mechanisms promote path dependencies in policy making (Kingdon, 2013), and thereby a system that favours stability forces. If they become active through stimuli, the streams become forces of change that encourage policy evolution. How a stream turns into a force of change through a stimulus will be addressed in the following section on change.

The theory on stability described here shows a force that is defined by path-dependence and institutional structures that favour stability. While some authors put more weight on temporal issues affecting stability, others push an institutional explanation. In this research, these approaches are unified in a framework that takes both explanations into account to more clearly explain stability in the case at hand.

## Change

Kingdon connects the forces of stability and the forces of change through his Multiple Streams Approach. As shown above, he stipulates that the three streams of problems, politics, and policies flow as a force of stability if undisturbed. If a stimulus activates a stream, this can act

as a force of change. This, according to Kingdon, works as follows: In the problem stream, indicators can have an effect on problem perception, acting as a stimulus that forces attention to an issue. Focusing events can also act as a stimulus, calling attention to a problem. Third, feedback about existing policies can call problems to the mind of the public and policy makers, stimulating change forces. If certain values are violated or if issues are compared with other units or shown in a different context, this can also lead to increased attention. The attention on problems is a key stimulus of change in Kingdon's work (Kingdon, 2013). Continuing with politics, this stream is independent of problem recognition. It includes political issues such as elections. Changes here can have a large effect on the forces of change and stability. A change in government can stimulate change or stability, depending on the ruling party's agenda. The third stream is that of policies. This constitutes the outcomes. Kingdon asks how policy alternatives are chosen and presents a picture that is comparable to natural selection. At first, many ideas float among the actors, which are often hidden from view (e.g., civil servants). The actors create, criticize, and consider ideas that relate to their specific policy expertise. For a policy idea to survive, it must be technically feasible, adhere to important values, fit within the future and the budget, and be acceptable to the public and the political stream.

Here, Kingdon claims, the magnitude of change of a policy is decided. In this system, the magnitude of the change is dependent on which streams the change stimulus is located. Small changes can be possible through activity in just one of the streams, for example through a change in government (politics stream) or a new problem perception (problem stream). Large changes occur when the streams are coupled. In this case, multiple streams produce a variety of change stimuli that encourage the issue to be set on the agenda. If there are no active streams, the forces of stability win out and the status quo persists.

Policy windows are a key concept here. These are opportunities for actors to push their preferred force of change to the policy stream. Because policy windows are rare, if actors are willing to invest resources, this is a good opportunity to advance their agenda (Kingdon, 2013). This is a key point of Kingdon's research that must be emphasized. Having events that occur rarely but result in opportunities for policy change underlines the need for a historical view of this issue. Sabatier (1986) raises this point as well, stating that a timeframe of ten years is necessary in research to encompass the full policy cycle from problem to change (Sabatier, 1986). Kingdon additionally raises the point that for policy change to actually occur, a long process of "softening-up" is needed (Kingdon, 2013). While Kingdon and Sabatier did not agree on the issue of change and stability in institutions, they did agree on the importance of a historical view. A temporal lens is therefore ideal for examining this case.

Kingdon stipulates that actors need to be preparing their ideas to fit the criteria for survival long before the window of opportunity arises, otherwise the window is missed, and the proposal fails. Kingdon puts a large amount of responsibility on the actors in this model. He distinguishes visible and invisible participants. Visible actors affect the agenda, such as politicians, while invisible actors affect the alternative policies, as in the process described above. This is a top-down process of importance: The more important, visible actors are able to affect the agenda the most, such as high-profile politicians. Kingdon introduces the term “entrepreneur” for all actors that have a particular agenda they want to push. If an entrepreneur does their job well, their supported change stimuli can take hold. If there is no entrepreneur that takes on an issue, no change stimuli are set and the status quo of stability will persist (Kingdon, 2013). Their success depends on resources, access, and their strategies in the face of stimuli of change. This theory has been extensively used in historical institutionalist research and is well established, but an element of unpredictability remains (Jones et al., 2015; e.g. Zaharididis, 2007; Blankenau, 2001; Ackrill & Kay., 2011). The Multiple Streams Approach lends itself well to the application onto the case of nuclear policy. The problem, politics and policy streams can be applied to cases where nuclear policy changes, as in after nuclear accidents such as Chernobyl or Fukushima. A problem emerges and pushes a pro-change stimulus, which is linked to the political stream through calls of high-level German politicians like Chancellor Merkel, providing a second pro-change stimulus. This encouraged policy change after the Fukushima accident 2011, where the German nuclear energy strategy was overhauled. The pattern is observable in policy change relating to nuclear energy, but these changes still rarely happen. This supports Kingdon and Sabatier’s notions of slow policy change and a historical approach to the subject, but also integrates how change is able to occur.

Kingdon has raised the concept of focusing events in the problem stream, acting as stimuli that cause punctuations in policy change. Birkland (1998) takes up Kingdon’s notion and extends it, starting with a clear definition of focusing events as sudden, rare, harmful (or harm-revealing) events that are concentrated on a particular area or community and that is known to policymakers and to the public. He supports Kingdon in stating that focusing events are an important stimulus in bringing about policy change and takes it further by looking specifically at interest groups that are searching for opportunities to change policy in their interest. Here, focusing events can help overcome barriers set up by pro-stability forces with the help of attention and symbols generated by the media. These symbols act as pro-change stimuli. In the case of German nuclear energy policy, especially the time around the Fukushima nuclear accident 2011, which can be characterized as a focusing event, barriers and pro-stability forces can be observed. After the

accident, a majority of parties and the general population shifted their opinion of nuclear power into the negative. Nevertheless, operators argued for the maintenance of nuclear power to maintain profits (Spiegel Online, 2011). They lobbied as advocates of stability to block change but were overcome by the majority of decision-makers being forces of change.

How fast groups can mobilize themselves during a focusing event is key in whether they are successful in this view (Birkland, 1998). Kingdon's term of entrepreneurs can be employed here as well, as done by Giger and Klüver (2012). If an entrepreneur takes up the stimuli caused, for example, by an event, change can be achieved. This applies whether the entrepreneur is a member of a political party or an interest group, but size and level of organization of the group matter for policy change (Giger & Klüver, 2012; Birkland, 1998). Change in this view is pushed heavily by entrepreneurs that react to stimuli in the policy streams to use windows of opportunity to force change.

Kingdon also considers issues exogenous to institutions. He takes into account processes of natural selection in the policies stream in how changes are chosen and includes the possibility of isolated institutions cooperating through policy entrepreneurs that want to push their pro-change or pro-stability agenda in a window of opportunity.

A comparable notion of change and change triggers is provided by Campbell (2004). In questioning what actually triggers change in institutions, he finds that problems can be seen as a key stimulus of change. These problems can occur within the organization or outside of it. While problems are a key part of stimulating change, they alone are not enough to cause institutional change. Rather, they start a struggle over power resources in the institution, with entrepreneurs looking to increase their power and supporting change or stability based on this need. For this, they need resources and previous success in change in an institution that fits well within the context of the field at hand. Campbell therefore presents a useful notion of problems as a change stimulus that is supported by entrepreneurs. The magnitude of change here depends on the resources the entrepreneurs have available. In this, Campbell provides similar findings to those of Kingdon, making this historical-institutionalist theory easy to integrate with the Multiple Streams Approach. It could therefore also lend itself well as an explanation of why the German and EU reaction to the change stimulus of nuclear accidents differ. While the problem of a nuclear accident is a key change stimulus, the resources available to entrepreneurs in Germany could support change while the resources available to entrepreneurs at the EU level support stability.

There exist a variety of models of how institutions change over time in historical institutionalism, which can be distinguished from one another. Peter Hall (2009), begins with the assumption that understanding institutional change comes with intrinsic difficulties. Researchers are called upon to see the plasticity of institutions and not to assume they are static. Nevertheless, this view raises the question of whether institutions affect actor's behaviour or whether they are subject of change by actors (Hall, 2009). Streeck and Thelen (2005) go deeper in their analysis, developing a model which shows incremental change accumulating into larger, transformative action. They object to a binary view of either supporting the notion of incremental change or radical change, such as observed in Punctuated Equilibrium Theory, but rather call attention to the possibility of slow change that also has transformative outcomes (Streeck & Thelen, 2005). In their theory, change stimuli cause incremental changes but still result in a high magnitude of change due to accumulation. While incrementalism tends to point to stability in most systems, Streeck and Thelen (2005) argue that it could act as a pro-change stimulus here. This could be what one can observe in the case of the German nuclear energy strategy. Here, small changes in strategy or public opinion seem to be a stimulus of stability at first glance. Looking more closely at the historical view overall shows large shifts in the strategy based on these incremental changes. Here, the incremental steps could be a pro-change stimulus that accumulated over the years.

These notions describing change so far have mainly stipulated that change needs to be prepared long before it can actually take place, in long-term processes that require intensive action from entrepreneurs. What is missing from this view is an explanation of sudden, large policy changes. This is where Baumgartner and Jones can provide additional insights: Punctuated Equilibrium Theory introduces the concept of punctuations, the sudden increase in policy action (True et al., 2019) can also be described as a big, meaningful change. The process is described in the theory as issues usually only being interesting to experts in that field, but sometimes "catching fire" (True et al., 2019, p. 6).

Policy images play a large role as change stimuli by expanding issues outside of special interests. Policy images in this framework consist of empirical information coupled with appeals to emotion, which plays a powerful role in defining issues (True et al, 2007). This pushes them to the public eye and can result in change in the policy subsystem. If attention shifts to an issue, publicity increases and often a shift to serial processing happens when the general public becomes aware. When issues are processed serially, larger policy changes occur, explaining the punctuations within periods of stability (True et al, 2007). A shift in processing, resulting from changing policy images, therefore acts as a pro-change stimulus that encourages large changes.

Hall (1993) presents a notion of policy evolution that also combines both slow- and fast-moving processes. In his new institutionalist view of Punctuated Equilibrium Theory, the institutions that make policies maintain stability over long periods of time, but, in crisis, can cause change stimuli that result in big changes. He stipulates that incrementalism tends to rule policy making processes. These can be interrupted by crises that force a new way of thinking, often also associated with institutional changes (Cairney, 2013). Hall stresses that a softening-up process for policy change as described by Kingdon is not necessary, as the complete paradigm shifts require new solutions (Cairney, 2013).

Change in these works can therefore be stimulated by problems, which are then used by entrepreneurs to push their desired changes in policy. Authors are split on whether this requires a long softening-up process or if changes can occur more spontaneously as well. While historical institutionalists like Streeck and Thelen (2005) raise the idea of accumulated incremental changes, Baumgartner and Jones see incremental change as stability and instead push a view of punctuations as triggered by stimuli in policy images and processing. These often competing views of change are not easy to reconcile. This work aims at determining which stimuli caused change in the EU and German nuclear energy strategy in the last years, combining insights from the explanations on change posed above to create the most fitting framework for this case.

These insights on stability and change combine into a useful framework for answering the research question, explaining the forces of stability as well as the forces of change and how they affect the magnitude of change and stability in the evolution of nuclear energy policy in the EU and Germany.

From this theory, three hypotheses emerge that will be used as an analytical framework for this research. They are analogous to the sub-questions presented above. They view policy making as being exposed simultaneously to pro-change and pro-stability forces. In this view, large institutions like the EU and other internal path dependent mechanisms are deployed to explain stability in German nuclear policy, while pro-change stimuli (such as focusing events like Fukushima) are used to explain policy change. This allows the thesis to weigh these competing explanations against each other simultaneously. The hypothesis are as follows:

H1: The European nuclear energy strategy provides an institutional structure that favours stability in Germany. It is a force that counters change stimuli, such as focusing events and policy entrepreneurs

H1.1: Path dependencies dominate the EU approach

H1.2: The EU approach influences Germany to favour stability

H2: The German nuclear energy strategy is a product of path dependencies that are historically defined.

H3: The German nuclear strategy is a product of change stimuli.

These hypotheses complement the sub-questions presented above. When looking at how the EU nuclear energy strategy has developed over time, the first hypothesis relating to the EU's institutional structure favouring stability in Germany will be tested. This will be done in two parts: First, the hypothesis that path dependencies dominate the EU approach is tested. Then, I will examine whether the EU approach influences Germany to also favour stability. The second sub-question asks how the German nuclear energy strategy has developed over time. Here, evidence to support or falsify the second hypothesis of historically defined path dependencies will be evaluated. The third sub-question asks if the EU acted as a predictor of policy change in this case and how change and stability differ in the EU and in Germany. This is linked to hypothesis three, where I hypothesize that the German nuclear energy strategy is a product of change stimuli. By looking at these sub-question and testing these hypotheses, I will be able to gain a thorough view of the histories of the strategies, see how they relate to stability and change, and finally use these insights to answer the main research question of how one can explain the difference in policy evolution tracks of the German and EU nuclear energy strategy.

## Research Design

To answer the central question of this thesis of how one can explain the evolution of German nuclear energy strategy, in light of stimuli from within and without (i.e. the European Union). I will first conduct a historical case study on the nuclear energy strategies of the EU and Germany. This case study will be largely based on qualitative data gathered from analysing policy and peer-reviewed literature as well as key informant interviews. I will then leverage a thematic analysis according to guidelines developed by Herzog et al. (2017) to see how Germany responded to these stimuli.

This thesis will use a case study approach. Conducting a case study here is most suitable to answer the research question, as Gerring (2004) states that combining single-unit case studies and across-unit research makes for a complementary research design, which is what the aim of this study is in examining the EU and Germany (Gerring, 2004). Further, case studies are best

used when inferences are descriptive and aimed at depth of knowledge. Also, the internal comparability in case studies has a higher representativeness. Lastly, case studies are ideal for exploratory research (Gerring, 2004). As these characteristics are given in this research, a case study presents the ideal choice of method.

Germany was selected as a relevant case at the macro level. For this selection, sampling was conducted according to Seawright and Gerring's (2008) case selection technique for case study research. More specifically, Germany emerged as a deviant case within the EU population. Seawright and Gerring stipulate that a deviant case presents a surprising value which is not yet explained by the existing literature (Seawright & Gerring, 2008). Germany, with its energy strategy of phasing out nuclear power and relying mostly on renewable energy, stands in contrast to other EU member states and the EU itself, which follows a strategy of combining carbon capture coal power, nuclear energy, and renewables (Bruninx et al., 2013). Choosing Germany as a deviant case here is useful, as it subverts the expectation mentioned above of the EU acting as a predictor for change when it comes to policy. The expectation that member states follow suit when the EU models stability does not seem to prove true here. While the EU nuclear energy strategy has not changed much in the last decades, Germany has been subject to multiple substantial changes. This raises the question of why this member state does not fit the expectations set by the EU. Public opinion in Germany about nuclear energy is more negative than in other EU countries (Sonnenberger et al., 2021). Especially in a European context, the decision to phase-out nuclear power while other EU member states maintained nuclear as an energy source highlights the deviant nature of Germany as a case. In 2011, when the decision was finalized, Germany had a strong nuclear energy infrastructure with 14 nuclear power reactors, which were providing more than 17% of the electricity (AG Energiebilanzen e.V., 2011). Other EU member states using nuclear power were similarly affected by the Fukushima Daiichi accident, but none decided to implement a phase-out as drastic as Germany.

Germany is lonesome in having enacted such a drastic phase out, raising the question of why outputs differ so much with similar inputs. In other cases, the EU pushes change in its member states through regulations and directives. In this case the opposite seems to be true: While the EU exhibits signs of stability in nuclear energy strategy, the member state has shown large changes. This idiosyncrasy gives reason to examine the two levels with regard to regulatory history. Lastly, the purpose of a deviant case is exploratory (Seawright & Gerring, 2008), fitting well within this research design. Selecting the deviant case country Germany is therefore ideal for answering the research question.

In this study, the proposition that EU member states follow the energy strategies given by the Union is disproven at first glance at the nuclear energy strategies. Looking at temporal processes in the history of the development of the two strategies can give more insights into this discrepancy. Further, looking at a deviant case is useful for additional research. Findings from deviant case studies can be used to explain other deviant cases, in addition to findings that can be generalized and applied to other cases in the population. It can further encourage other researchers to look more closely at European nuclear energy strategies and whether they deviate from or comply with EU regulation (Seawright & Gerring, 2008).

Care must be taken when working with a deviant case. Especially when looking at the representativeness of results, the advantage of a deviant case in straying from the norm makes generalization of results difficult. To address this, Seawright and Gerring suggest a generalization of the results attempting to find similarities between the deviant and typical cases. Also, by looking at a deviant case from a historical perspective, a researcher can try to determine what made the two strategies diverge.

## Materials

Data for this study was collected from three main sources: peer-reviewed literature, policy documents, and interviews. For the literature relating to sub-questions one and two, I selected peer-reviewed article relating to the nuclear energy strategies of the EU and Germany, which were accessed via databases such as Scopus, Web of Science and Google Scholar using the search terms “nuclear phase-out” and “energy/nuclear strategy” for the EU and Germany. For Germany, the terms were searched in German as well as in English to utilize the larger base of research in both languages. Relevant articles range in timeframe from 2005-2020 (the Merkel Government years). This timeframe is suitable as it includes changes in nuclear energy strategy, but also shows articles that include historical information on previous events. Table one shows the number of articles used in the literature review. A thorough listing of all articles can be found in appendix G.

*Table 1: Number of Articles used*

Years	Articles EU	Articles Germany
2005-2010	3	4
2011-2015	7	26
2016-2020	7	22

Not all article results on energy policy were relevant for this research. An inclusion criterion for data is a historical perspective. To scope out relevant articles, the key terms “Germany”, “Nuclear Energy” and “Policy” as well as “European Union”, “Nuclear Energy” and “Policy” were searched for in different time spans on Web of Science and SCOPUS. The results were narrowed down further by filtering by public administration, political science, international relations and law literature on Web of Science and energy, social sciences and arts and humanities on SCOPUS. This search was preliminary, articles were further limited based on content and relevance when choosing literature for this thesis.

For the policy documents, German and European Union documents were used directly from the source of the respective governments, as they generally get publicized online. The timeframe of 1949-2022 was relevant for the historical case study. These policy documents are accessible online via databases. For Germany, that is the database [gesetze-im-internet.de](http://gesetze-im-internet.de), which is run by the ministry of justice, and the documentation system of the Bundestag DIP. For the EU, the [EUR-lex database](http://eur-lex.europa.eu) was used. This database lends itself well to this type of research, as it provides free access to European law. Blom-Hansen (2019) writes that this makes it a unique source of data, as it can be used in descriptive research relating to the EU. It also lends itself well to temporal analysis. EUR-Lex includes legal acts of the EU, with the exception of decisions that relate to specific addressees. Researchers must be aware of this caveat. Aside from this, EUR-lex makes for a valuable and underused resource (Blom-Hansen, 2019), which is why it has been used in various research projects (e.g. Schmitt & Schulze, 2011; Ponciano et al., 2020; Baisa et al., 2016). Search terms were the same as in the literature review above but were supplemented by what the first literature review revealed to be relevant policies and events that influenced policy. Table two shows the policy documents that were used in this research. The literature review revealed the relevant policy documents that were key points of change in Germany or the EU. For Germany, the three legal changes to the Atomgesetz (AtG) are included, as well as two coalition agreements within the relevant timeframe that addressed the nuclear energy strategy. For the EU, relevant policy documents consist mainly of treaties, for example the EURATOM Treaty and the Treaty on the Functioning of the European Union, but also directive 96/92/EC, which changed the nuclear energy policy at the EU level. A complete list of consulted policy documents can be found in appendix G.

Table 2: Policy Documents used

Category	Policy Document	
Documents Germany	22.04.2002	Gesetz zur geordneten Beendigung der Kernenergienutzung zur gewerblichen Erzeugung von Elektrizität
	11.11.2005	Koalitionsvertrag von CDU, CSU und SPD
	26.10.2009	Der Koalitionsvertrag zwischen CDU, CSU und FDP
	08.12.2010	Elftes Gesetz zur Änderung des Atomgesetzes
	31.07.2011	Dreizehntes Gesetz zur Änderung des Atomgesetzes
Documents EU	17.04.1957	Treaty establishing the European Atomic Energy Community (EURATOM)
	19.12.1996	Directive 96/92/EC
	26.10.2012	Treaty on the European Union and Treaty on the Functioning of the European Union

Collecting data in this way is appropriate for testing the theories described above because in Historical Institutionalism, temporal processes play the deciding role. With this method, the researcher is dependent on secondary data sources. This can make the research difficult, as literature that does not fit exactly within the research design or the conceptualization can hinder gathering data. Using literature to first gain an overview that is then validated with policy documents remedies this and fits well within the theoretical framework. Further, the sources are reliable and by documenting relevant search terms, timeframes and databases used, validity of the research is ensured.

To validate the data gathered for sub-questions one and two using literature and policy documents, small-n key informant interviews were conducted. This acted as a method of triangulation to validate the results of the evidence reports on nuclear strategies of Germany and the EU. The interviews were conversational, meaning working qualitatively with in-depth, open-ended, and semi-structured questions (following guidelines on key informant interviews by Kumar, 1989). Informants were selected using a purposive sampling technique based on their direct knowledge on the topic of the German and/or EU nuclear energy strategy. This especially includes academic experts. Snowball sampling followed the first contacts, with possible respondents

suggesting further relevant experts. Before the interviews, respondents were sent an informed consent form containing all necessary information on voluntary participation, anonymization of the data and confidentiality. Seven respondents were interviewed between June and July 2022, depending on the respondent's availability. The full overview of interview respondents can be found in table three and in appendix F. Using either video or phone call, the interviewees were introduced to the general topic of the thesis and reminded of the ethical considerations consistent with the informed consent form, followed by introductory questions. After the main questions section, additional questions were asked based on the information given by the respondent. Interview length ranged from 15 to 45 minutes, again based on the respondent's availability. The interview guide and transcripts can be found in Appendices C and D.

*Table 3: Interviews*

No.	Position	Date	Length
I	Member of the Bundestag and the Committee on the Environment, Nature Conservation, Nuclear Safety and Consumer Protection	09.06.2022	26:19 min
II	Sustainability researcher and member of the Ethics Commission "Future of Energy Supply" appointed by Federal Chancellor Angela Merkel in 2011	14.06.2022	17:13 min
III	Employee of the JRC, research on nuclear energy	27.06.2022	45:37 min
IV	Employee of the JRC, research on nuclear energy	27.06.2022	Joint interview w/ Respondent III
V	Researcher on Energy and Climate policy	03.07.2022	17:01 min
VI	Member of the Bundestag and Speaker of their party for nuclear energy	07.07.2022	14:57 min
VII	Department head of a German nuclear energy agency	13.07.2022	24:48 min

This method is suitable for validation and triangulation, as it constitutes an affordable way to verify the findings from literature and policy documents and complete them with first-hand knowledge from experts. This can add new ideas or findings to this thesis that were not apparent from literature and policy alone. Nevertheless, researchers using key informant interviews must be aware of some limitations. First, interviewer effects are a threat in every interview process. Being aware of these effects can help address and remedy them when conducting interviews.

Bias can also be created in informant selection. For this reason, it is important to choose a variety of informants from different stakeholder groups. For this research, this consists of a mixture of academic and occupational experts, which helps to address this issue. Using conversational interviews also makes for less structured data, which can hinder analysis. This will be remedied here by first, using clear coding in the thematic analysis and second, conducting a smaller number of interviews. As the interviews mainly have a validating role, a small n will not affect the reliability of the data but will help reduce the large time consumption that is inherent in using interviews as a main data source (Kumar, 1986).

## Methods

For analysing the data, a thematic analysis was conducted. This includes coding and examining the collected data in order to identify certain themes or patterns. Herzog et al. (2017) distinguish six steps in the thematic analysis that will be followed here: (1) familiarizing with the data, (2) generating initial codes, (3) looking for themes, (4) reviewing those themes, (5) defining and naming the themes and (6) producing a report. This method is best suited for my research as it is widely applicable and its benefits as a method of exploratory research makes it ideal here. Further, it is cost-effective and flexible within various theoretical frameworks. Herzog et al. also state that thematic analysis is most suited to qualitative data with a variety of sources, as is the case here (Herzog et al., 2017).

*Table 4: Simplified overview of the codebook*

Category	Code Group	Codes
Germany	Law-G	Atomkonsens2000, AtG2010, AtG2011, Koaltung2005, Koaltung2010
	PET-G	stasis, punctuation, policy image, processing, institutional friction
	HI-G	temporalism, institutionalism, path dependence, incrementalism
	Kingdon-G	problem stream, politics stream, policies stream, joined streams, entrepreneurs, focusing event
EU	Law-EU	CouncilDecisions, Strategy, Energy Directive 1996, Art.1942 TFEU, EURATOM, EEC

---

PET-EU	stasis, punctuation, policy image, processing, institutional friction
HI-EU	Temporalism, institutionalism, path dependence, incrementalism
Kingdon-EU	problem stream, politics stream, policies stream, joined streams, entrepreneurs, focusing event
Comparison	Comparison strategy, history, other

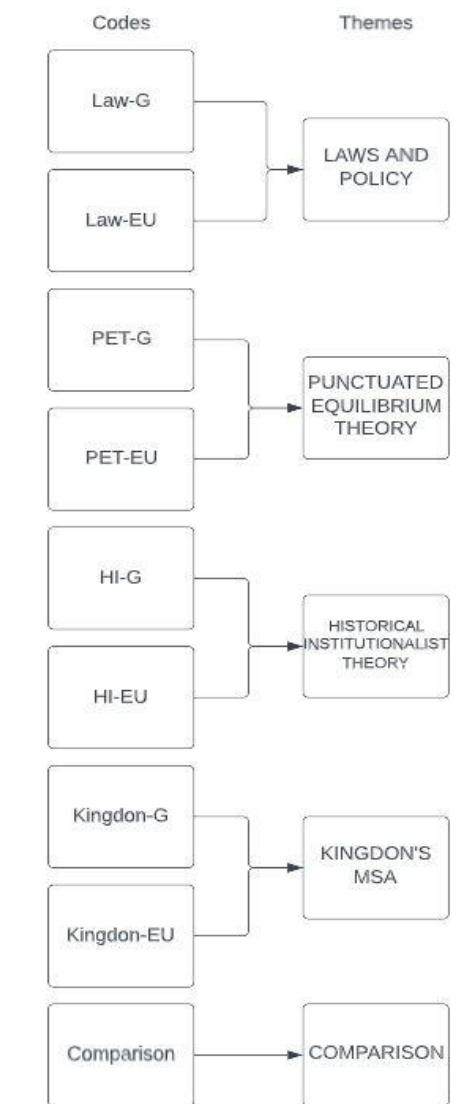
---

In accordance with this method, the following steps were taken to analyse the documents: After collecting the data, I familiarized myself with the documents by importing them to ATLAS.ti and conducting a first sighting of the articles. Second, I generated a first draft of the codebook, the final version of which can be found in Appendix A. A simplified overview of the codes can be observed in table four. I categorized the codes from the beginning, separating into the categories “Germany”, “EU”, and “Comparison”. This enabled me to cleanly examine the two units later on. The code groups run parallel to the theory presented above, with codes correlating to Punctuated Equilibrium Theory (PET), Historical Institutionalism (HI) and Kingdon. Further, codes for policies (LAW) and for the comparison in the third sub-question were established. Lastly, the specific codes in each code group correlate to specific elements of the theory, for example the code PET-G (punctuation) or HI-EU (incrementalism). With this codebook, I started coding the articles. Examples of how the codes were used can be found in Appendix E. During coding, first themes were discovered and reviewed. At this time, I further refined codes and themes to fit better into the dataset I had created. The themes run analogous to the theoretical framework and code categories. After coding all documents, I finalized, refined, and named the themes and concluded by producing a report. The final themes can be found in Appendix B, with a simplified model of the themes in figure 2. The themes that resulted from the codes were that of Laws and Policy,

Punctuated Equilibrium Theory, Historical Institutional Theory, Kingdon's Multiple Streams Approach and Comparison.

This approach does, however, have its limitations. Researchers attempting thematic analysis must beware of the “methodological fogginess” of the method (Herzog et al. 2017, p. 2). Much of thematic document analyses across policy research have not discussed their empirical method in detail, which contributes to this. Herzog et al. show examples from communications, media and cultural policy studies that exhibit this “fogginess”. They call for more transparency and

*Figure 2 : Simplified overview of codes and correlating themes*



methodological reflexivity. The latter goes beyond describing what is done in the research, but also diving into why it is done, reflecting the analysis and ethical considerations critically. I ensured

this is done in this research in order to remedy the flaws of this method. A second pitfall researchers must be aware of is the involvement of individual judgment in the coding process and in identifying and revising themes. Because no criteria exist beforehand for doing this, interpretation is necessary (Herzog et al. 2017). The authors suggest documentation to remedy this, with the goal of making the research transparent and increasing trustworthiness and being honest about the limitations of findings (Herzog et al., 2017). In this research, documentation of the research process will therefore be a strong focus to ensure reliability and validity of the study. All abovementioned materials and methods can be found in detail in the appendix. In practice, the software ATLAS.ti will be used to create and manage the codes and produce preliminary reports. This adds to the reliability and documentation called for by Herzog et al. (2017).

Using these methods helps specifically in addressing the research question and sub-questions established above. Sub-Question one and two ask about the development of the German and European nuclear energy strategy, respectively. This thesis achieves this by using the data gathered through the document search of articles and policy documents to create an evidence report of the policy history of nuclear energy in the EU and Germany. The thematic analysis is especially useful here, as it allows for a strategic coding, reviewing, and reporting of the data. In combining the two strategies to examine them in sub-question three, the thematic analysis was also useful. The data for the EU and Germany was coded with similar codes, facilitating comparability of the forces of stability and change. The codebook used can be found in Appendix A. A thematic analysis allows for further comparability here. For the three sub-questions, the information gathered using the data was supplemented and validated by the interviews. This contributes a further source of knowledge and insights that may be missed by relying solely on written data.

## Analysis

I will first give an overview of relevant historical events and policies regarding nuclear energy policy in the European Union before analysing them around hypothesis one: The European nuclear energy strategy provides an institutional structure that favours stability in Germany and is a force that counters change stimuli (e.g. focusing events and policy entrepreneurs). This hypothesis will be examined in two parts: First, I will determine whether path dependencies

dominate the EU approach. Second, I will determine if the EU approach influences Germany to favour stability.

The roots of the European Union lie in energy policy. With the founding of the European Coal and Steel Community in 1952 and the subsequent treaties creating the European Economic Community EEC and the European Atomic Energy Community EURATOM in 1958, energy was at the heart of cooperation in Europe. With the ECSC and EURATOM focusing heavily on energy policy, the EEC treaty mainly related to economic integration, only taking up energy policy within that frame and slowly increasing the integration of energy policies from the 1960s on (Benson & Russel, 2015). EURATOM remained the key treaty dealing with nuclear energy, as seen in the code correlation between EURATOM and temporalism (Appendix E). Created to increase cooperation in the fields of nuclear energy generation and research, its institutions remained separate from those of the EEC. EURATOM's original aim of establishing a European nuclear power sector today mainly concerns nuclear safety, supply, and research (Benson & Russel, 2015). Since its establishment, EURATOM's ability to unify nuclear energy policy to an EU level was hindered by member state's desire to protect their own national interests. As such, it was never a treaty that increased harmonization. In this context, the member states today are still powerful actors supporting the status quo (Fouquet, 2019).

A different milestone in the regulation of EU nuclear energy policy was the Treaty on the Functioning of the European Union 1957. The TFEU, specifically article 194.2, regulated that EU member states are entitled to determine their own energy mix. This is based on the idea that the member states have a variety of conditions that affect the energy mix needed. The EU therefore determined that the energy mix can be chosen as national strategies that have to adhere to the EU framework (Aszódi et al., 2021; Rochette & Vela, 2021). As the EEC was absorbed into the new European Union structure in the 1990s, energy policy shifted towards national models (Wood, 2010). Subsequent EU directives relating to energy were, for example, the 1996 energy directive that established common law for energy generation, transfer, and circulation of energy.

This was accompanied in the Commission with a shift in how nuclear energy was documented. Before 1996, Wood (2010) sees a negative connotation of nuclear energy, while after the ratification of the Kyoto Climate protocol 1997, nuclear energy is mentioned in a more positive light in connection to meeting the CO<sub>2</sub> reduction targets (Wood, 2010; European Commission, 2000). This continues into the 2000s, with a commission greenpaper in 2006 defining three goals for EU energy policy: sustainability, competitiveness, and supply security. Based on this, the council of the EU spoke out for an integrated energy policy approach in the EU in 2007

(Wood, 2010; European Commission, 2007). These goals opened a door for nuclear energy, as they were in line with the use of nuclear power. The commission tried to block opposition by countries such as Germany, who are fundamentally against the use of nuclear power, by calling for an objective debate on its use in the EU and the construction of new power plants. With climate goals in mind, nuclear power made a comeback in the EU (Wood, 2010). In 2009, a legally binding directive was passed that holds EU countries accountable when it comes to nuclear safety (Jorant, 2011).

Since the early 2000s, the EU is heading towards more integration. This can be attributed to new challenges in the energy sector (Wood, 2010). Today, the common goals of supply security, affordability and climate protection persist in EU energy policy. An integrated energy market is commonly cited as a way to reach these goals (de Menzes & Houllier, 2015). Feldhoff (2014) even states that an internal energy market is one of the EU's highest priorities (Feldhoff, 2014). Despite this, the goal seems far away. Due to the trend towards member state discretion in energy policy in the early years of the EU, there is a large divide when it comes to energy use in the member states, especially when looking at nuclear energy. While Germany is in the process of phasing it out completely, as discussed above, countries like France went through a "renaissance of nuclear energy", not insignificantly funded by EU resources (Marr, 2014, p. 102). This was not influenced by events like the Fukushima accident, after which the EU required a stress test of member states nuclear plants and slightly modified their energy roadmap, reducing the prognosis for nuclear energy generation in 2050 from 26,4% to 20,5% (Jorant, 2011; Selosse et al., 2013). EU regulation therefore shows a shift in EU attitude from nuclear-sceptic to nuclear-support, with member state independence in nuclear energy policy defining its early years and hindering integration today.

### **Path dependencies in the EU**

In examining the first hypothesis, that the European nuclear energy strategy provides an institutional structure that favours stability in Germany, the first step is to ask whether path dependencies dominate the EU approach. Evidence of the forces of stability are strong here. Code correlations for the EU Strategy show a correlation of 3 with the code stasis, a correlation of 2 with the code path-dependence and a correlation of 5 with the code incrementalism (Appendix E). Wood (2010) writes that policy makers in the EU have limited options when it comes to energy policy due to economic, climate, and geopolitical challenges. This limitation in options for change is a stimulus for stability. Benson and Russel (2015) as well as Selosse et al. (2013) only see gradual development and path-dependence (Benson & Russel, 2015; Selosse et al., 2013). Historically, the integration of the EU energy sector has been slowly happening since the 1960s

(Pollack, 2000). EURATOM has been expanding gradually (Benson & Russel, 2015). The magnitude of change exhibited here speaks against strong change stimuli and for incremental change stimuli. In the history of regulation presented above, Wood (2010) stipulates that greenpapers and Commission discourse is a signifier of changing EU attitudes (Wood, 2010). Wood additionally describes how, for policy making in the energy sector, avoidance and delay may be the new go-to EU response due to high pressure (Wood, 2010). These pressures act as stimuli of stability here through which changes do not occur, or, if pressures turn towards change, incremental change happens. The slow magnitude of change in the EU could be due to these opposing pressures. Multiple authors have directly attributed incrementalism to the EU (e.g., Pollack, 2000; Benson & Russell, 2015). The latter attribute the incremental nature of the EU to its multi-level structure and many veto actors. The institutional structure itself promotes path-dependence, in which the veto actors block each other, resulting in the status quo (stability) persisting.

There is ample evidence of path-dependence in the EU institutions, building up to a strong force of stability. Benson and Russell (2015) directly relate the slowness in policymaking to institutional friction, bringing the argument to Punctuated Equilibrium Theory. Institutional friction has been mentioned in the EU by the literature, such as Menzes and Houllier (2015), who conclude that an integrated EU energy policy would be hard to achieve (Menzes & Houllier, 2015). This friction is a powerful force of stability in the EU. Wood (2010) sees political factors as problematic when trying to integrate EU nuclear energy policy (Wood, 2010), preventing change stimuli from taking hold. Benson & Russel (2015) go even further, determining that the institutional framework is critical to the production of policy outputs in the EU. They state that in the EU, policy action in response to events is often delayed due to the complex institutional structure of the EU. This leads to issues being processed in parallel, with a multi-level system acting slowly (Benson & Russel, 2015), and path-dependence persisting. The EU does respond to what Benson and Russel call the issue attention cycle after notable events such as Chernobyl, when safety measures were introduced, and Fukushima, when safety checks were ordered (Benson & Russel, 2015; Selosse et al., 2013). Here, the events did act as stimuli of change, but only resulted in small changes. Yet processing does not really diverge from the institutions it usually resides in, with EURATOM handling nuclear energy issues in the EU (Benson & Russel, 2015). This speaks for a stronger pro-stability force in EU institutions that is not meaningfully affected by pro-change stimuli.

The EU shows a strong pattern of stability in decision-making, rather than a pattern of change. Policy-makers in the EU face a wide variety of demands from consumer, interest

representatives, their governments, institutions, and citizens. These can act as stimuli of change or stability. Respondent II says that “the EU is having a hard time because countries are very different”, while Respondent IV states that “the challenges imposed by history on the conclusions to make are really different between the countries, but I think also energy policy has to be seen in that context” (Appendix D-2 and D-3). This is especially relevant in energy policy, where unity between the member states is low due to historical differences (Wood, 2010) and member state jurisdiction in their energy mix. This complexity of the EU system underlines why parallel processing is necessary and serial processing, even after strong change stimuli, like external shocks, is rare. Punctuated Equilibrium Theory has been applied to EU policy making. Nevertheless, some authors argue that significant political events such as the ratification of treaties act as critical junctures in the EU, not specific policy changes (Benson & Russel, 2015). Analysing the policy change presented above, I concur with Benson and Russel that no pattern of punctuations is observable in the EU when it comes to nuclear energy policy, instead showing a strong force of stability and path-dependence. This is supported by there being no code correlation with notable EU regulatory events and the punctuation code (Appendix E). Change always happened slowly and incrementally, due to the institutional friction and complexity of the EU institutional structure acting as stimuli of stability.

Looking at Kingdon’s three streams model in the EU context confirms the force of path-dependence. There are no correlations between notable EU policy events and the codes for Kingdon’s three streams (Appendix E). In the problem stream, I have defined Chernobyl and Fukushima as focusing events and notable change stimuli in Germany. The nature of the events did not change, they were still rare events that revealed harm, but the reaction on the EU level was widely different to that in Germany. After Chernobyl, some safety measures were introduced and protocols for future emergencies were created (Benson & Russel, 2015; Jorant, 2011). The magnitude of change here is minuscule compared to Germany. Interview respondent three sees a “huge turning point after Chernobyl”, where member state opinions on nuclear energy went in different directions, culminating in the statement by Respondent II that “at the EU level, we have a very different view on nuclear energy.” (Appendix D-3; D-2). Whether Chernobyl acted as a change stimulus like it did in Germany is debated (McCauley et al., 2018). In the member states, opinions on nuclear energy diverged after this point, forcing the EU to take on a mediating position. While this does constitute a change, its magnitude is not comparable with the reversal in Germany that this same stimulus caused. The data on Fukushima tells a similar story. The Fukushima accident “actually did not contribute significantly to a change actually in nuclear policy” (Appendix D-2). A stress test and a slight modification of the prognosis for the use of nuclear power in the

Commission plans were the reaction from the EU (Jorant, 2011; Selosse et al., 2013), meaning the stimulus did result in slight change. In general, one can again observe that focusing events did not act as meaningful stimuli of big policy change in the EU. This can be attributed to the institutional friction being a stronger stimulus of stability, supported by the institutional structure as described above.

In the EU, the problem stream is also not as closely linked to the politics stream as on the national level. Additionally, there is no evidence of policy feedback from the public affecting EU decision-making when it comes to nuclear power. This is a powerful change stimulus that is not as effective on the EU level due to institutional structure, as it could be due to a lack of awareness of EU citizens to their status as EU citizens rather than citizens of their country. In the 2021 Eurobarometer, 73% of respondents indicated that they could identify with their nationality, while being European was among the least important identifying values, with 56% of respondents identifying with being European (Becuwe & Baneth, 2021). This could result in citizens voicing policy feedback on the national level, rather than the EU one.

In the politics sphere, no strong change stimuli could be distinguished on the European level either. While Wood (2010) writes that nuclear power could become a “political showdown” in the EU (Wood, 2010, p. 316), there is no evidence so far of the political stream affecting nuclear energy policymaking in the EU. The forces of stability here maintain the status quo. There is a difference of opinion between member states when it comes to nuclear power, but this was not a key topic during EU elections or in the political sphere as of yet. In the policy sphere, while there are a large number of entrepreneurs with widely different values, no one group was so far able to come out on top to change policy in their interest. If changes do occur, they are pushed by technocrats focusing on big policy solutions like EURATOM or the Treaty of Amsterdam. Here, change stimuli are set by technocrats, accumulating into bigger changes. Change stems from endogenous action instead of exogenous event and does not seem to occur suddenly. The parallel processing structure of the EU described above plays a role here as a stimulus of stability, as the EU has to deal with multiple priorities such as trade, economic issues, and migration at the same time. While countries like Germany act as anti-nuclear entrepreneurs, there are pro-nuclear interests like that of France, which hold their own. No force could prevail here so far. A selection of policies on this level needs to create a consensus between actors rather than force a certain view to pass, which is why the EU is holding a middle ground of leaving nuclear policy in member state hands. Respondent V states in this context that expecting anything other than a middle ground approach would be “unrealistic” (Appendix D-4).

To conclude, the EU was founded on energy policy and shows path-dependent patterns of change rather than punctuations due to its institutional structure. Change stimuli are scarce and tend to act from within the EU instead of reacting to exogenous events. Forces of stability prevail in most key decision-making stages, even if changes do happen, they are incremental. Since the 1960s, the EU has been increasingly involved in energy policy, despite member states still holding discretion over their own energy mix. With the increasing importance of climate change mitigation, the EU has slowly accepted nuclear energy as part of their member state's solution to CO<sup>2</sup> reduction (Benson & Russel, 2015). While the member states have full choice of whether to use nuclear, the EU regulates safety frameworks and international cooperation (Kanellakis et al., 2013). The EU strategy can therefore be described as moving towards integration, but incrementally. Looking again at the two forces of historical path-dependence and incrementalism (stability) vs. fast-paced punctuations (change), the force of path-dependence and incrementalism are what defines nuclear energy policymaking in the EU, mainly due to its size and complexity. The EU is motivated by solution-focused technocrat entrepreneurs from inside the EU institutions, speaking for more endogenous change.

I can therefore confirm hypothesis 1.1, that path dependencies dominate the EU approach to nuclear energy policy. Forces of stability persist over stimuli of change, resulting in only incremental and path-dependent changes over the years.

## **Influence on Germany**

Hypothesis 1.2 stipulates that the EU approach influences Germany to favour stability. An interconnection of German and EU energy policy is apparent when examining the latter's evolutionary track. (West) Germany was a founding member of the European Communities, joining EURATOM in 1957 in an attempt to keep pace with the international nuclear community (Hake et al., 2015). From this moment of unification, the EC, later EU, supported their member state's independence of energy policy (EURATOM Treaty, 1957). Germany pursued its own energy policy, largely influenced by national issues as well as international crises like the nuclear accidents in Chernobyl and Fukushima. Today, Germany is closely interlinked with the other EU member states. The energy grids in the EU are connected (Menzes & Houllier, 2015). Nuclear safety shows the connection of the systems, with the EU providing a safety framework for the production of nuclear energy for Germany (Shim et al., 2015). Both Germany and the EU share similar goals when it comes to their energy policy. Germany supports the EU aims of supply security, sustainability, and affordability (Menzes & Houllier, 2015).

The difference in strategies is not different aims but different methods of achieving these aims. Respondent II states that “many goals are similar” between Germany and the EU, and Respondent IV, while discussing climate goals, sums it up by saying “how to get there? That’s national” (Appendix D-2; D-3). Here, the EU entertains a variety of methods, including nuclear power, while Germany attempts to reach the goals using only renewable energy. Lastly, on climate policy, a common EU strategy is being pushed. The role of nuclear energy here is still being debated, but it is clear that emissions in one member state will affect the goals of the entire EU. Some member states are therefore pushing nuclear energy as a CO<sub>2</sub>-friendly alternative to fossil fuels, a method that is being subsidized by the EU. In Germany, meanwhile, the “Energiewende” counts solely on renewables to fill their energy demand (Marr, 2014). This is a typical example of regulation on the EU level, where goals are set, while the means to achieve these goals are left for the member states to decide (Appendix D-3). This affects other EU member states. While the phase-out of nuclear power is within the scope of EU legislation, as member states can choose their own energy mix, it has been argued that this right is restricted by the obligation to adhere to other EU legislation, such as climate goals and supply security (Rochette & Vela, 2021). This discussion has been extensively led by Rochette and Vela (2021). While the discussion around meeting climate and energy supply goals is valid, this does not change the fact that the Amsterdam Treaty gives member states the prerogative over their energy mix. This includes the use - or disuse - of nuclear energy. The EU therefore has no jurisdiction here to determine Germany’s energy mix. Whether to influence them through other means, such as the taxonomy of nuclear energy as sustainable or other pressures, cannot be determined within the scope of this paper. Here, the question of whether EU stability and counter-change stimuli influence Germany is the focus. The EU is subject to strong stability influences and is relatively immune to change stimuli from without, but these do not seem to influence Germany.

The EU does not exhibit a susceptibility to change stimuli. Comparing the reaction after a strong stimulus occurred, like a nuclear accident, does not show a policy change at the EU level. Here, despite a problem stimulating change, there are no strong anti-nuclear entrepreneurs that use this opportunity to push their agenda. This could be due to a lack of resources at this level. A factor that inhibits change through entrepreneurs is the institutional structure of the EU. Due to its size, the policy processes in the EU are slow-moving and not reactive. Since this is the case, there is no precedent of change for entrepreneurs to refer to when lobbying for change. Additionally, EU policy makers are not very sensitive to change stimuli or the influence of public opinion, again, due to the size and institutional structure of the EU. Even if the same events stimulate change in Germany and the EU, the entrepreneurs in Germany react very differently to it than those in the

EU. The EU institutional structure is more dominated by solution-focused technocrats than in Germany. Here, these entrepreneurs push or prevent change based on endogenous factors instead of outside stimuli. This explains why the EU has shown itself more susceptible to forces of stability than change in nuclear energy strategy over the years.

The EU approach therefore does not seem to influence Germany, due to the different institutional structures and reactions to stimuli of stability and change. The first hypothesis can therefore only partly be confirmed: While the European nuclear energy strategy provides an institutional structure that does favour stability, this is only the case at the EU level. Here, the institutional structure is indeed a force that is able to counter even strong change stimuli like the Chernobyl or Fukushima nuclear accident and pro-change entrepreneurs. Despite that, the EU institutional structure does not favour stability in Germany. To show how this nation reacts to forces of stability and change, the two following hypotheses will dive deeper into the German nuclear energy strategy.

### **Path dependencies in Germany**

Looking at Germany, I have presented the hypothesis that the German nuclear energy strategy is a product of historically defined path dependencies. In the following section, I will examine the last 40 years of German nuclear energy policy, confirming that there is evidence of path dependencies that are historically defined.

Five key events proved themselves relevant when talking about the recent history of the German nuclear energy strategy. The first significant event is the Chernobyl nuclear accident. On April 26<sup>th</sup>, 1986, a reactor at the Chernobyl nuclear power plant in what was then the Soviet Union, now Ukraine, exploded during a test, producing one of the biggest nuclear accidents to date (IAEA, 2022). After the Chernobyl accident, the data shows a change in attitude towards nuclear power in Germany after the accident, which set in motion anti-nuclear path dependencies. The ruling coalition of CDU/CSU and FDP maintained their support of nuclear power in Germany, acting as a force of stability. Nevertheless, nuclear projects like the Kalkar reactor were discontinued and the building of new nuclear power reactors was not taken up again (Glaser, 2012). Hartwig (2014) writes that this accident started a gradual phase-out of nuclear power in Germany (Hartwig, 2014). McCauley et al. (2018) and Renn and Marshall (2016) likewise see the nuclear accident as a critical juncture that disrupted existing policy and triggered large policy changes, but none of them occurred as a direct result after the disaster. Here, the argument can be made that Chernobyl changed Germany's path from pro- to anti-nuclear. The change stimulus given by the accident

created a path dependency that favours change, thereby providing a positive feedback loop for policies to come. Future events, like changes in government, compound the impact of Chernobyl.

The second event that stood out in the data is the “Atomkonsens”, which constitutes a punctuation in German nuclear energy strategy. This consensus between the German government, by then made up of the SPD and Greens, came into law on April 22<sup>nd</sup>, 2002, and caused a fundamental change in the existing strategy driving Germany's nuclear power sector by planning to shut down all German nuclear power plants until 2021 (Bundestag, 2012). Respondent V states that “2000 was actually the big one, the big turning point for nuclear energy”. They also see the influence of operators: “of course, it must also be said that the special thing about the design of the nuclear phase-out 2000 is that it was worked out together with the energy suppliers” (Appendix D-4). While German incrementalism was still at play, with powerful industry interests and utilities negotiating for a more lenient phase-out (Feldhoff, 2016), for Germany as a whole, this consensus completely changed the nuclear strategy. For the SPD and Green coalition under Chancellor Schröder, this phase-out was in line with their attitudes on nuclear power and had long been planned (Feldhoff, 2014), showing stability of the parties. Mez (2012) calls the Atomkonsens a “fundamental revision of nuclear policies” (Mez, 2012, p. 24), indicating a punctuation. This is evident from the coding, with two codes correlating the Atomkonsens and the punctuation-code (Appendix E). The Atomkonsens firmly set Germany on the anti-nuclear path. While the previous CDU-led government favoured nuclear energy, with the election of Chancellor Schröder in a red-green coalition in 1998, the SPD and Greens could bring their anti-nuclear path to the agenda and continue on their own anti-nuclear path, while steering the overall German strategy in this direction as well. This is a direct result of the Chernobyl accident turning the SPD anti-nuclear.

The year 2005 brought another change in government with Angela Merkel being elected Chancellor and heading a grand coalition of CDU/CSU and SPD. Here, despite a change in government, there is evidence of stasis and path-dependence as stimuli of stability in nuclear energy policy, meaning that forces of stability prevailed over forces of change. The new government takes on the previous red-green government's environmental policy, including their stance on nuclear energy despite the CDU running on a pro-nuclear platform (CDU/CSU, 2005). For the SPD, the agreed-upon phase-out of nuclear power constituted a line in the sand during negotiations (Wurzel, 2010). As the SPD support was necessary for coalition building, the CDU/CSU had to accept this boundary and continue on the path of a nuclear phase-out (Wurzel, 2010). Here, the data shows a change stimulus set by the CDU/CSU, who wanted to reinstate nuclear power. This change stimulus is forced against a stimulus of stability, the persistence of the SPD to maintain the Atomkonsens. This is supported by code correlations, where there are

no codes correlating the 2005 coalition to punctuation, but there is a correlation to stasis and path dependence (Appendix E). The path-dependence continued in 2005. Despite the CDU under Merkel being the strongest power in the newly elected government and running on a pro-nuclear platform, the SPD as junior coalition partner is able to leverage their position to keep the Atomkonsens and with it Germany's anti-nuclear path.

The next federal election triggered a punctuation of policy change in Germany. In the 2009 election, the CDU/CSU was able to build a coalition with the liberal FDP, who maintained their pro-nuclear position. Both parties ran on the promise to reverse the nuclear phase-out. This did not happen until 2010, when the "phase-out of the phase-out" (Schreurs, 2012) extended the period in which nuclear power plants could produce energy in order to bridge the energy supply on the way towards decarbonization (Feldhoff, 2014). This was a big change in the nuclear strategy, constituting a punctuation. Germany first diverges from the path taken after Chernobyl with the 2009 coalition of CDU and FDP. This pro-nuclear government pushed through runtime extensions in a 2010 amendment to the nuclear energy law. Despite that, there is still evidence of path-dependence in this decision. While both ruling parties are pro-nuclear, the law took more than a year to take shape and ended up with a mild runtime extension instead of a reinstatement of nuclear energy. This was due to the influence of societal interest groups and the opposition, which acted as stability forces to keep the government to the previous path. Despite Merkel and her government having given election promises to deviate from the path (Frankfurter Allgemeine Zeitung, 2009), they cannot, as the forces favouring de-nuclearization are too strong.

The biggest change in German nuclear energy policy is the one that followed the Fukushima nuclear accident 2011. On March 11<sup>th</sup>, 2011, an Earthquake shook the region around Japan. This resulted in a tsunami which, in combination with the quake, caused a major accident at the Fukushima Daiichi nuclear power plant. The accident was classified as a level seven on the International Nuclear and Radiological Event Scale, only comparable to the accident of Chernobyl 1986. Germany's reaction was drastic: Chancellor Merkel reversed her decision to stop the phase-out, issuing a moratorium on the seven oldest nuclear power plants and planning a shut-down of all nuclear power plants until 2022. This constitutes a reversal of the previous nuclear policy that was established no more than half a year before the accident. Despite that, there are arguments that speak against this policy change being a punctuation and instead point at stimuli of stability being apparent. Multiple interview respondents stated that there was a long run-up to the decision to phase-out nuclear power: "It has been developed since Fukushima, or was developed before, but there is the long-term plan" (Appendix D-1) and "in the wake of the reactor accident in Fukushima, the phase-out date was redefined" (Appendix D-5). Respondent V goes even further,

stating that “I think the nuclear phase-out would have come in Germany, even if a little later, even without Fukushima” (Appendix D-4). Hartwig and Tkach-Kawasaki (2019) support this notion. While they do state that a punctuation was caused in public discourse, they do not see the policy change as drastic as it is often described. Rather, they argue that Germany was already heading in the direction of phasing out nuclear power and that Fukushima did not cause the policy change but balanced the precarious political circumstances that were caused by Merkel’s “phase-out of the phase-out” in the direction of anti-nuclear forces (Hartwig & Tkach-Kawasaki, 2019). This argument is also made by McCauley et al. (2018) and Hartwig (2014), who state that Fukushima only maintained the critical juncture and phasing-out process that was started by Chernobyl in 1986 (McCauley et al., 2018; Hartwig, 2014). The argument here is that forces of change have been active since the stimulus of the Chernobyl accident, working incrementally to improve their resources and accumulate into big changes once a window of opportunity arises in the form of a new, strong change stimulus. Despite evidence of a large policy change, one can also distinguish evidence of stability. As Glaser (2012) writes, the decision to phase-out nuclear did not come “out of the blue”, Germany had been on this path for several decades (Glaser, 2012, p. 11).

With these notable events in mind, we can now turn to the hypothesis that path dependence defines the strategy in Germany. Several authors find evidence of reinforcing sequences and path dependence, stressing the slow change and temporalism as forces of stability in the German public and political consciousness when it comes to nuclear energy (Hartwig, 2014; Karapin, 2020; Aldrich et al., 2019; McCauley et al, 2018). Similar results are seen when looking at incrementalism. Due to a large number of veto players and state agents that are involved in decision making, the German institutional structure favours incremental change (McCauley et al., 2018), which can still culminate in large changes. Examining the events chronologically, each of the exhibits evidence of path-dependencies. The hypothesis can therefore be confirmed.

### **Stability and Change Stimuli in the German Strategy**

The last hypothesis stipulates that the German nuclear energy is a product of change stimuli. In the following section, evidence for stability and change stimuli in Germany is presented, showing that change stimuli are strong and define the nuclear energy strategy in Germany.

#### **Chernobyl**

Again working chronologically, from a policy standpoint, the Chernobyl accident did not stimulate an immediate policy change in Germany. While some socio-political changes took place,

with parties like the SPD turning from pro- to anti-nuclear and public opposition increasing (Hake et al., 2015; Hartwig, 2014; Rinscheid, 2015), the overall policy structure indicates a stability of policy change after Chernobyl. While the forces of stability won out - in the short term - to prevent policy change directly after the accident, change stimuli nevertheless exist here. While they result in small changes immediately after Chernobyl, in the long-term, one can observe larger changes that are attributable to this event. This can also be seen when examining the three policy streams after the crisis. In the problem stream, Chernobyl did act as a focusing event that “re-energized (...) debate” (Glaser, 2012, p. 11). It was, according to Kingdon’s definition, a rare, harmful, and harm-revealing event, acting as a stimulus of change here. Policy feedback also propelled the problem recognition, with Chernobyl being defined as the start of the general German population’s anti-nuclear views (Feldhoff, 2014). The anti-nuclear movement had been active in Germany since the 70s, with Chernobyl pushing it into the general population (Feldhoff, 2014). Respondent I states that “the real awakening came, of course, with the Chernobyl meltdown, which directly affected Germany” (Appendix D-1). Respondent VI goes even further, stating that “that [Chernobyl] was of course the big trigger at the time to consider phasing out nuclear energy, and the Federal Republic of Germany then stayed on this path.” (Appendix D-V). For Respondent V, „Chernobyl was a key driver” for Germany (Appendix D-IV). Interview respondents and evidence from the literature point to a similar conclusion regarding Chernobyl, stating that it put Germany on the anti-nuclear path. Here, we can see an active problem stream that acted as a change stimulus, resulting in small changes in the overall attitude towards nuclear energy.

While the problem stream was active, the politics stream only partly provided a push for policy change. Until the accident, the Green party, who joined the Bundestag in 1983, was the sole opposition to nuclear power in the Bundestag. The Chernobyl accident made the SPD turn against nuclear as well: “Then came, I would say, the increasing disillusionment also in the established parties, especially with the SPD, which I think essentially began with Chernobyl” (Appendix D-2; Winter, 2013); this made the anti-nuclear opinion more established. Nevertheless, the ruling coalition of CDU/CSU and FDP were firm in their support. One can observe the conflict between the forces of change and the forces of stability here. While the pro-stability government won out immediately after Chernobyl, a stimulus of change was set in the opposition parties that endured from this point on, building up to larger changes I will examine in this chapter.

In the policies stream, policy selection was affected by the anti-nuclear opinion becoming more “mainstream”, affecting entrepreneurs (Glaser, 2012). Nevertheless, the stream could not be coupled with the politics or problem stream, meaning no policy change happened. Relevant

entrepreneurs during this time were the parties, on the one side Greens and SPD, the anti-nuclear opposition, and on the other side CDU/CSU and FDP, the pro-nuclear government. Interview Respondent two sees the policy stream after Chernobyl as a key time when the pro-stability entrepreneurs lost support: "The first major interlude was then also with the major nuclear power plant accidents, i.e., (...) Chernobyl. So, the nuclear energy positive front slowly collapsed." (Appendix D-2). The public and stakeholders from institutions such as industry, science and religion also started supporting the anti-nuclear movement here (Mez, 2012), but were not successful in using the active problem stream to set a strong change stimulus. Respondent VIII further brings in voters as relevant actors. They see Chernobyl as an event that "very strongly drew public attention to the dangers of nuclear energy in general. And that has been very limiting." (Appendix D-6), showing that public opposition to nuclear power affects policy selection. Here, as in the politics stream, forces of stability and forces of change are apparent, with the stability stimuli bringing a stronger force due to the government acting as a powerful entrepreneur with a lot of resources. Nevertheless, change stimuli exist as well and will become relevant at a later time.

In conclusion, in the case of the Chernobyl nuclear accident, while there are some small policy changes, the forces of stability are the stronger stimuli. The change happening in Germany can be more closely described as a mood change, meaning opposition parties and the general public embracing anti-nuclear notions. Some authors (e.g. McCauley et al, 2018 and Renn & Marshal, 2016) see the event as a critical juncture, but as the government did not change their policy track, the conclusion can be drawn that stability is the stronger force here. This is supported when looking at the three streams: Germany exhibits stimuli of stability as well as of change in the three streams after the Chernobyl accident. Due to the strength of pro-stability entrepreneurs and their resources in the government, the stability forces win out. Nevertheless, change stimuli have been set and will continue to set stimuli during the coming events.

## **Atomkonsens**

During the Atomkonsens, while parties show stability, the strategy itself changes significantly. Looking at Kingdon's streams, all three streams are active during the Atomkonsens-decision, indicating a large policy change. While there is no evidence of the problem stream playing a direct role, the anti-nuclear attitude of the ruling SPD can be attributed to the Chernobyl accident 16 years before. One can argue that Chernobyl constituted a focusing event, acting as a powerful stimulus of change that influenced this policy change. Respondent V states that anti-nuclear actors have been preparing in the 90s, enabling them to put the issue on the agenda successfully in 2000: "This also contributed to the fact that in 2000 or at the end of the 90s, in a

situation where the topic was already being discussed so widely and many actors were in favour of going ahead and improving the legal basis, this [the policy change] was made possible." (Appendix D-4). Here, we see the implications of a stimulus set 16 years before the change. What was, after Chernobyl, still a small force of change caused a reversal of policy in the year 2000. In the politics stream, the transfer of power in the 1998 elections to the anti-nuclear parties SPD and Greens was the main reason for this policy change. Pro-change entrepreneurs were able to use the stimulus after the accident to promote change on a large scale once they had more resources available by being in the government. The politics stream therefore plays a leading role here. In the policies stream, the pro-change advocates made up the government and were able to put the issue on the agenda successfully. The Atomkonsens code correlates with the politics, the policies, and the joined stream codes (Appendix E). This mirrors what Streeck and Thelen (2005) term the accumulation of small changes into one large policy change as well as Campbell's insights into problems as change triggers (in this case still Chernobyl) and the use of resources by entrepreneurs.

To conclude, in this case, path-dependence as a force of stability is apparent within the parties, but not in the German nuclear strategy. One can observe a big policy change which was produced by the combination of problem stream, with Chernobyl acting as an early stimulus of change, a transfer of power in the politics stream to anti-nuclear parties and the phase-out being a "core project" (Feldhoff, 2014) for the ruling parties in the policy stream. Chernobyl therefore heavily influenced policy change in the Atomkonsens and caused a punctuation in which an information-sensitive environment reacted quickly to stimuli of change in the politics and policy stream.

## 2005 Coalition

In the 2005 Coalition, forces of stability are stronger than forces of change. Looking at the policy streams, the activity in the politics and policy stream is not strong enough to impose change stimuli. No change is apparent in problem perception, there are no codes correlating the 2005 coalition to the problem stream (Appendix E). While an election caused change in the politics stream, the divisive nuclear issue was decided in favour of the SPD, the "pivot party" in the coalition (Wurzel, 2010, p. 461). This conflict is relevant to the policy stream, where the pro-change entrepreneur CDU/CSU and the pro-stability entrepreneur SPD were actively trying to pursue their policy goals. Due to their powerful negotiating position as only possible coalition partner for the CDU, the SPD was able to push through their policy goals of maintaining the phase-out of 2000. The CDU was not able to gather enough resources, in this case votes in the election, to choose a

coalition partner more freely, to push through their entrepreneurial agenda. Activity in the policies stream is apparent through a correlation of codes (Appendix E). One can conclude that, for the coalition of 2005, the forces of stability won out over stimuli of change set by the weaker negotiation partner CDU/CSU, with the new government being forced to accept the previous legislature's phase-out.

## **2009 Coalition / 2010 Law**

With the 2010 amendment to the nuclear energy law, forces of change and of stability are in the balance. Looking at the three streams, activity in the problem, politics, and policy stream acted as change stimuli. In the problem stream, indicators around the use of nuclear energy as a bridge technology were used to justify the change (Feldhoff, 2014). Policy feedback acted more as a force of stability, with public opposition regarding nuclear being high (Glaser, 2012) and mass demonstrations following the extension of runtimes (Hager, 2015). These constituted powerful stimuli of both change and stability. In the politics stream, the newly elected coalition of CDU/CSU and FDP meant that the Merkel government could finally see through their goal to retain nuclear power in Germany. Here, a powerful stimulus of change was set through the change in government. In the policies stream, Merkel and the new government, together with operators, acted as entrepreneurs fighting for change, a reversal of the phase-out (Hager, 2015). Respondent VII stresses the influence of operators as entrepreneurs: "the private sector is, of course, an important driver, which, for example, also had a very massive effect when it was switched back on, so to speak, in the case of the 2010 extension - this was a development that was also very strongly driven by the energy supply companies." (Appendix D-6). Stimuli of change are pushed by these actors.

All three streams and the joined streams code correlate with the events around the 2010 coalition and policy change (Appendix E). On the other side, the public and the opposition parties maintained their pro-stability view (Hager, 2015), making the government's decision extremely controversial (Feldhoff, 2014). The selection of the policy took more than a year, despite both ruling parties supporting the new policy. The "fragile compromise" that was taken held a balance between operators' wishes and those of the public (Glaser, 2012, p. 18). This shows the influence change and stability stimuli have on the magnitude of change. As forces of stability (public opinion and the opposition) held their ground against forces of change (the government and operators), the change that resulted was not as big as pro-change advocates might have hoped given the strong stimulus in the politics stream. Here, the stimuli given clearly affect the magnitude of change.

The policy change balanced pro- and anti-nuclear opinions, showing pro-change as well as pro-stability forces. Here, while the new government diverged from the path that was taken with the Atomkonsens, stability is still visible due to the influence of anti-nuclear entrepreneurs like the public and the opposition. This is supported with a code correlation between the 2010 coalition and the incrementalism-code (Appendix E). Nevertheless, pro-nuclear entrepreneurs in the government and operators persisted in change. Here, the problem stream does not play a role. Nevertheless, change forces in the politics stream with the 2009 election and in the policy stream with the new government and operators acting as pro-change entrepreneurs were enough to put the issue on the agenda. The result is a punctuation of a carefully balanced, controversial policy change.

## Fukushima

After the Fukushima accident, forces of change and of stability are apparent, which change forces dominating overall. A sudden policy change took place and reversed the 2010 law (Feldhoff, 2014). Interview respondents see the accident as a stimulus for policy change, e.g. Respondent VII, who states that “this decision [to shut-down nuclear] was made especially with the Fukushima catastrophe in mind” (Appendix D-6) and Respondent I, who thinks that Fukushima “made an impression” on Chancellor Merkel (Appendix D-1). After the accident, the already generally anti-nuclear public turned even more anti-nuclear (Rinscheid, 2015; McCauley et al., 2018), providing a stimulus of change. Winter (2013) argues that this crisis was needed as a change stimulus for the fundamental policy change that followed (Winter, 2013). Code correlation show five correlations between the 2011 Atomgesetz amendment and the code punctuation (Appendix E). This speaks for Fukushima being a punctuation in policy change and for strong forces of change.

Whether forces of stability or change prevailed after Fukushima becomes clearer when looking at how all three streams showed strong activity. In the problem stream, eight correlations exist in codes between the 2011 Atomgesetz amendment and the problem stream and focusing event codes (Appendix E). The literature describes the Fukushima accident as a “drastic event” (Hartwig & Tkach-Kawasaki, 2019, p. 2078), which “changed the conditions” (Rinscheid et al, 2020, p. 666). Fukushima revealed the harm that could befall Germany, as stressed by Chancellor Merkel after the accident (Winter, 2013). The Fukushima-Daiichi accident can therefore be seen as a typical example of a focusing event, which acted as a change stimulus that opened up a window of opportunity. Policy feedback mechanisms were also very active at this time, further increasing activity in the problem stream. Public opinion of nuclear power deteriorated further (Feldhoff, 2014), with citizens going to the streets to demonstrate (Hager, 2015). Public discussion

was at a high, Fukushima invigorated debate (Rinscheid, 2015; Winter, 2013), which provided an additional change stimulus. Jahn and Stephan (2016) are cited by Hartwig & Tkach-Kawasaki, stating that the problem stream was already active when the accident happened in March 2011, with public sentiment being strongly anti-nuclear (Hartwig & Tkach-Kawasaki, 2019). The Fukushima accident seems to have exacerbated an already strong problem perception in the public mind and provided an additional stimulus for change in the anti-nuclear direction.

In the politics stream, three code correlations are active as well (Appendix E). No transfer of power caused activity, as it was with the previously examined events. The change stimulus did not stem from an election. In this case, the current government was fearful of losing voters to anti-nuclear parties in upcoming Länder elections (Feldhoff, 2014; Hake et al., 2015). Feldhoff (2014) sees this as a more rational explanation to why the government changed their position compared to the publicly proclaimed safety concerns (Feldhoff, 2014; Winter, 2013). Here, the stimulus in the politics stream that encouraged change was not a transfer of power, but a newly found fear of losing it.

In the policies stream, the natural selection process that Kingdon describes in his research is clearly visible. The policies and entrepreneur codes correlate to the Fukushima event five times (Appendix E). The accident made the policy, acting as a strong stimulus of change. The decision to phase-out completely was reinstated, backed by legitimization of the ethics commission (Hake et al., 2015). Key entrepreneurs were the Merkel government, who changed their opinion from pro- to anti-nuclear and thereby provided a strong change stimulus. This, as well as her demand to conduct security checks on all German nuclear plants, is seen as motivated by the upcoming Länder elections by a variety of authors (e.g. Hake et al., 2005; Huß, 2014; Feldhoff, 2014). This gave them an advantage by aligning themselves more with the anti-nuclear movement, which was very much supported by the German public at the time. Here, Merkel and her party acted as a key entrepreneur to stimulate policy change. Interviewees see party politics and entrepreneurs as relevant, as stated by Respondent I ("That was purely a question of coalition. Because it was purely a question of who had which, not only, but also which party-political preferences, and of course it was also a question of how the respective lobbyists got their way here.", Appendix D-1). Respondents also focus more on the role of the public as a relevant actor. Respondent II states that "first of all were the citizen initiatives", and Respondent VII goes further in saying that "the social movements [...], that was a very strong driving factor without which there would certainly not have been the phase-out. [...] The history of nuclear energy in Germany shows that it is one of the greatest success stories of civil society movements, certainly of civil society resistance"

(Appendix D-6). The accident gave anti-nuclear activists room to voice their views in public discussion, which they did extensively, acting as an additional change stimulus (Rinscheid, 2015). All three streams were therefore coupled, stimulating policy change, and therefore culminating in a substantial policy reversal.

To conclude the findings for the German situation after the Fukushima accident, a policy change did take place. Argument surrounds the status of the policy change as a punctuation. While the literature is divided, I argue that, as the policy the same government established less than a year before this policy change was introduced was completely contrary to the phase-out, a policy punctuation is apparent here. This is supported by the three combining policy streams: The problem stream shows Fukushima as a focusing event that resulted in immense policy feedback from the public; in the politics stream, fear of losing upcoming elections motivated the politicians and in the policy sphere, alternatives became obsolete. In all three streams, convincing stimuli of change were active. The three streams therefore combined, creating a quick-reacting environment that was sensitive to the new information on the dangers of nuclear power and the effect it has on voters. In conclusion, the strong change stimuli in the three streams resulted in this complete reversal of policy, indicating that despite stimuli of stability, the change stimuli were the stronger force after the Fukushima accident.

The two forces seem to be equally strong, alternating in defining the policy processes of Germany's nuclear energy strategy. Fukushima is of special interest in this case. After Fukushima, there is a punctuation and the three streams combined to create a complete reversal of the nuclear strategy at that time, reacting to powerful change stimuli even without a change in government. Yet, forces of stability are still visible, since the nuclear phase-out had been in progress since Chernobyl, as emphasized by multiple interview respondents (Appendix D-1; D-4). This unique situation enabled the German nuclear energy strategy to be both historically defined by stability *and* containing big leaps of policy. Germany's institutional design seems to make it more sensitive to exogenous change factors, such as problems and events like nuclear accidents. While the literature often promotes Germany as an example of sudden policy change, especially with the policy reversal after the Fukushima accident in mind, this research suggests something different: While sudden punctuations of policy do occur in Germany, showing its sensitivity to exogenous events, decision-making is more incremental than is first apparent. The discussion of whether Fukushima constitutes a punctuation perfectly encapsulates this: While some authors (e.g. Feldhoff, 2014; Winter, 2013) see a sudden policy reversal, others (e.g. Glaser, 2012; Hartwig 2014; McCauley et al., 2018; Hartwig & Tkach-Kawasaki, 2019) point towards the incremental

changes made in the German institutional structure since Chernobyl that prepared Germany for this change. A historical analysis has shown that focusing on a longer timeframe exposed the events *and* the incremental changes that affect policy change and stability in Germany.

Hypothesis three, that the German nuclear energy strategy is a product of change stimuli, can therefore be confirmed. Looking at the German history of nuclear policy presented here, one can see strong evidence of the influence of stimuli of change as well as of stability in the three policy streams. It is important to note that time plays a key part in this case, which is why I underscore the necessity of a temporal approach. Several interviewees and authors mentioned the effect that the German history has had on its nuclear policy (e.g. Glaser, 2012, Shim et al., 2015; Appendix D-4). Interview respondents stress the importance of a temporal approach, e.g., Respondent V: "I think what's important is to look at the long term". "History matters", write Hake et al. (2015, p. 533) in this context, showing how path-dependence shapes the German nuclear energy strategy. Despite this strong evidence for stability and incremental change in Germany, one can observe punctuations of policy change. Changes in the image of nuclear power and in how the issue is processed act as powerful change stimuli. There are multiple instances when Kingdon's streams are active in stimulating pro-change forces. The problem stream works mostly through focusing events, like the nuclear accidents of Chernobyl and Fukushima, which act as change stimuli. In the politics stream, a sharp partisan distinction is discernible in nuclear energy policy (Appendix D-1; D-2; Rinscheid, 2015). Elections and transfers of power have a large impact on nuclear energy strategy, stimulating either change or stability, depending on entrepreneurial agenda. Authors stress a high level of polarization in the German nuclear energy sphere (Rinscheid, 2015). Lastly, in the policy stream, forces of change and of stability try to influence policy (Appendix D-1). Also, policy feedback by the public in the form of demonstrations and voting are recurring themes in the German nuclear policy history (Appendix, D-2), with the anti-nuclear movement evolving to relevant policy actors setting stimuli for change in their interest ("The opposition to nuclear energy, which in Germany of course goes back even further historically, but then to channel it in this way and then to make something more politically out of it, so to speak, than just movements that demonstrate", Appendix D-4).

## Discussion and Conclusions

The aim of this research was to determine how one can explain the difference in policy evolution tracks of the German and EU nuclear energy strategy in light of exposure to historical events. Using a theoretical framework linking insights on stability and change from Punctuated

Equilibrium Theory, Historical Institutionalism and the Multiple Streams Approach, a thorough analysis of key informant interviews, peer-reviewed literature and policy documents was conducted. A thematic analysis proved to be effective in analysing this amount of various data. Using these methods, I approached the question that led this research.

For this, I formulated three hypotheses. Hypothesis one stated that the European nuclear energy strategy provides an institutional structure that favours stability in Germany. It is a force that counters change stimuli such as focusing events and policy entrepreneurs. This hypothesis was falsified. While I did find that the EU nuclear energy strategy shows strong influences of stability in the form of path-dependencies, stemming from its institutional structure, this finding cannot be extended to Germany. I have found no evidence that this stability-favouring institutional structure of the EU influences stability in Germany. This can be attributed mainly to the Amsterdam treaty, which gives the EU member states the prerogative over their energy mix.

In hypothesis two, the stipulation was that the German nuclear energy strategy is a product of historically defined path dependencies. This hypothesis was confirmed by the data. Path dependencies do seem to strongly influence German nuclear energy policy, rooting from the Chernobyl accident which put Germany on the anti-nuclear path. From this, it only slightly diverged in 2010 and was promptly returned after the Fukushima accident.

Hypothesis three suggested that the German nuclear energy strategy is a product of change stimuli. This hypothesis, too, could be confirmed. Stimuli of stability as well as stimuli of change play important roles in the German nuclear energy policy. History matters a lot in this policy context as well. Nevertheless, punctuations occur too. Here, the three streams combine to provide powerful change stimuli. Focusing events like nuclear accidents in the problem stream, party competition and coalitions in the politics stream and entrepreneurs in the policy stream were especially important stimuli in Germany's nuclear energy policy history. The institutional structure of the nation encouraged change in this policy field.

Interestingly, the findings suggest that both path-dependencies as a stability stimulus and change stimuli play a strong role in Germany's nuclear energy history. The strength of these forces can be an explanation for why the EU does not influence nuclear energy policy in Germany. When the EU transferred the power of choosing the energy mix to the member states with the Amsterdam Treaty in 1999, it gave Germany the power to react nationally to forces of stability and change in nuclear energy. As the country was already on the path for a phase-out since Chernobyl, it was free to follow this path and react to forces of stability and change in its own right, independently from the EU. Meanwhile, the EU needs to reconcile a variety of national opinions on nuclear

energy, limiting them in their reactions to change stimuli. An institutional structure favouring change and its anti-nuclear path in Germany and an institutional structure favouring stability and the need to represent different opinions in the EU were therefore key in why the strategies diverged as they do.

These findings affect scientific and societal spheres. Looking at the theories used here, this thesis put the focus on temporal factors and Historical Institutionalism, which is often an afterthought in nuclear energy policy research. While this research focused a lot on the institutional side of historical institutionalism, the role history plays must not be negated. I have found that past instances of stability and change affect how institutions deal with stability and change in the present and the future. Looking at stability and change in the past few decades therefore brings an important contribution to this research. Here, one must pay attention to where to draw the line. Looking too far back in time will hurt transferability of the results by muddying the waters, giving insights that might not be as relevant to today's policy making. This is especially important when looking at a topic like nuclear energy, where technological advancements have been immense in the past 100 years. For this reason, while this thesis mentions events previous to the 1980s, the biggest focus lies on events of the last 40 years. This increases the explanatory power of why the strategies differ.

By integrating this temporal view with Punctuated Equilibrium Theory and the Multiple Streams Approach, this thesis provided a new framework that was able to be applied to this case fittingly. Insights on stability and change from the US-developed Punctuated Equilibrium Theory was proved to also work well in an EU and German context. Looking further at the case at hand, choosing the EU and Germany provided new insights into this interconnected system. Here, the Multiple Streams Approach and Historical Institutionalism provided additional background on the theory of stability and change that were useful here. On the EU level, Kingdon's approach did not reveal a lot of change stimuli in the three streams. One can raise the question of whether the approach fits the complex institutional framework of the EU system. More research may be beneficial here. The biggest contribution in addition to creating the new framework is the focus this study provides researchers on where to look for answers in examining policy. The historical and evolutionary view provides a useful microscope which researchers are encouraged to use when examining policy. Learning from a historical perspective may increase attention to issues that were prevalent in the past. A better understanding of policy evolution may thereby help to avoid policy failure in the future.

From a societal viewpoint, the insights gained in this thesis aimed at looking at evolutionary tracks, which makes for an approachable introduction to these topics for laymen as well as for researchers. The finding that the EU does not always act as a solid predictor of policy stability and change is useful here as well. Lastly, the focus on path dependencies brings to mind again the importance of a temporal approach when examining policies on the national and the supranational level.

While the findings in this research are based on a solid footing of data, some shortcomings cannot be avoided. In this thesis, having the main data source consist of articles makes one reliant on what has been published by secondary sources. Additionally, when conducting the interviews, a small-n approach cannot guarantee that there is no issue missed. Nevertheless, this was necessary due to time and scope constraints in this thesis. As the interviews were mainly here to triangulate findings from the articles and policy papers, conducting a relatively small number of interviews still maintains validity of the findings. Additionally, combining the two approaches is the best way to gather the most data for a paper of this scope.

The research design itself is not free of potential caveats either. By selecting to do a case study, one is subjected to the disadvantages that come with that. Since Germany is a deviant case as well, this can make generalization difficult. This is why, in this study, inferences are drawn about Germany specifically and only generalized in terms of the approach. Germany's findings are difficult to generalize onto other member states because it is very specific to its past, but the methods of using a temporal approach can be generalized. By mainly drawing data from articles and policy papers, as mentioned above, one must be aware of the disadvantages of using secondary data. The trustworthiness of the studies is one caveat, which is why I used peer-reviewed articles. Still, a lot of time was spent finding, evaluating, and filtering relevant and trustworthy articles, making time constraints one disadvantage of using secondary literature. Another time-sensitive issue was conducting the interviews. Interviews are complex to plan and conduct, which is why a small-n approach was chosen here. In combination, these two methods of collecting data supplemented each other and provided a well-triangulated research design.

Lastly, using thematic analysis comes with threats to the research design as well. In the discussion of the research design, the "methodological fogginess" of the method was already mentioned (Herzog et al. 2017, p. 2). To combat this, I took Herzog et al.'s suggestions to track and document the steps in the analysis as closely as possible to ensure reliability. Documentation was also necessary to combat the disadvantages that come with only having one researcher coding the data. This can open up the analysis to pre-determined biases. Maintaining awareness

of these biases is key to limiting their influence. The documentation of codes and themes can be found in Appendices A and B. Lastly, in the interviews, all ethical considerations and informed consent was carried out in accordance with the academic requirements. A difficulty was set by the form of key informant, conversational interviews. This sometimes collided with the aim of documenting the data as closely as possible. To adapt to the flow of conversation in the interview, one could not adhere too closely to the predetermined questions. In turn, one had to adapt the interview to adhere to the goal of documentation. Obtaining the respondents consent to record and transcribe the interviews was key here in maintaining documentation while individualizing the interviews.

Despite these challenges, in this thesis, a newly combined framework of Punctuated Equilibrium Theory and Historical Institutionalism was established to successfully investigate stability and change in the German and EU nuclear energy strategies. This contribution is one of the strengths of this research, as the fusion of these theoretical backgrounds is unique in this field. In future research, scholars may want to look more closely at how the Multiple Streams Approach can be adapted to fit better into the institutional structure of the EU and how the EU institutions exact influence in the member states. Additionally, I call on researchers to examine other EU member states in terms of how their evolutionary track has influenced policy today. This can give further insights into how different views combine at the EU level and enable us to learn from the past to better understand our future.

## References

- Ackrill, R., & Kay, A. (2011). Multiple streams in EU policy-making: the case of the 2005 sugar reform. *Journal Of European Public Policy*, 18(1), 72-89. <https://doi.org/10.1080/13501763.2011.520879>
- AG Energiebilanzen e.V. (2011). Energieverbrauch in Deutschland im Jahr 2011 (p. 26). Berlin: AG Energiebilanzen e.V.
- Aldrich, D., Forester, S., & Horhager, E. (2018). Triggers for policy change: the 3.11 Fukushima meltdowns and nuclear policy continuity. *Environmental Politics*, 28(7), 1214-1235. doi: 10.1080/09644016.2018.1510216
- Aszódi, A., Biró, B., Adorján, L., Dobos, Á., Illés, G., & Tóth, N. et al. (2021). Comparative analysis of national energy strategies of 19 European countries in light of the green deal's objectives. *Energy Conversion And Management*: X, 12, 100136. doi: 10.1016/j.ecmx.2021.100136
- Baisa, V., Michelfeit, J., Medved, M., & Jakubíček, M. (2016). European Union Language Resources in Sketch Engine. In *Tenth International Conference on Language Resources and Evaluation* (pp. 2799-2803). Portorož; European Language Resources Association ELRA. Retrieved 4 April 2022.
- Baumgartner, F., & Jones, B. (1993). *Agendas and instability in American politics*. The University of Chicago Press.
- Baumgartner, F., Breunig, C., Green-Pedersen, C., Jones, B., Mortensen, P., Nuytemans, M., & Walgrave, S. (2009). Punctuated Equilibrium in Comparative Perspective. *American Journal Of Political Science*, 53(3), 603-620. <https://doi.org/10.1111/j.1540-5907.2009.00389.x>
- Becker, K. (1989). International Harmonization of Nuclear and Radiation Standards and the Future of Nuclear Energy. *Energy Sources*, 11(2), 85-94. doi: 10.1080/00908318908908945
- Bezuwe, N., & Baneth, O. (2021). *Special Eurobarometer 508*. Brussels: European Commission.
- Benson, D., & Russel, D. (2014). Patterns of EU Energy Policy Outputs: Incrementalism or Punctuated Equilibrium?. *West European Politics*, 38(1), 185-205. doi: 10.1080/01402382.2014.936707

Beyer, D., Breunig, C., Green-Pedersen, C., & Klüser, K. (2022). Punctuated Equilibrium and the Comparative Study of Policy Agendas. *Politische Vierteljahresschrift*, 63(2), 275-294. doi: 10.1007/s11615-022-00400-y

Birkland, T. (1998). Focusing Events, Mobilization, and Agenda Setting. *Journal Of Public Policy*, 18(1), 53-74. <https://doi.org/10.1017/s0143814x98000038>

Blankenau, J. (2001). The Fate of National Health Insurance in Canada and the United States: A Multiple Streams Explanation. *Policy Studies Journal*, 29(1), 38-55. <https://doi.org/10.1111/j.1541-0072.2001.tb02073.x>

Blom-Hansen, J. (2019). Studying power and influence in the European Union: Exploiting the complexity of post-Lisbon legislation with EUR-Lex. *European Union Politics*, 20(4), 692-706. <https://doi.org/10.1177/1465116519851181>

Bruninx, K., Madzharov, D., Delarue, E., & D'haeseleer, W. (2013). Impact of the German nuclear phase-out on Europe's electricity generation—A comprehensive study. *Energy Policy*, 60, 251-261. <https://doi.org/10.1016/j.enpol.2013.05.026>

Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit. (2016). *Klimaschutzplan 2050*. Berlin: BMU.

Bundestag (2012). Deutscher Bundestag - Der Einstieg zum Ausstieg aus der Atomenergie. Retrieved 1 August 2022, from [https://www.bundestag.de/webarchiv/textarchiv/2012/38640342\\_kw16\\_kalender\\_atomaustieg-208324](https://www.bundestag.de/webarchiv/textarchiv/2012/38640342_kw16_kalender_atomaustieg-208324)

Bundestag. (2022). *Drucksache 20/1037*. Berlin.

Cairney, P. (2013). What is evolutionary theory and how does it inform policy studies?. *Policy & Politics*, 41(2), 279-298. doi: 10.1332/030557312x655486

Campbell, J. (2004). Institutional change and globalization. Princeton, N.J.: Princeton University Press.

Campbell, J. (2010). Institutional Reproduction and Change. Oxford Handbooks Online. doi: 10.1093/oxfordhb/9780199233762.003.0005

CDU/CSU. (2005). *Deutschlands Chancen nutzen. Wachstum. Arbeit. Sicherheit. Regierungsprogramm 2005 - 2009*. Berlin: CDU/CSU.

Chalvatzis, K., & Hooper, E. (2009). Energy security vs. climate change: Theoretical framework development and experience in selected EU electricity markets. *Renewable And Sustainable Energy Reviews*, 13(9), 2703-2709. doi: 10.1016/j.rser.2009.07.013

Conrad, H., & Staacke, G. (2016). Current issues and challenges in the geography of energy in Germany. *Bulletin De L'association De Géographes Français*, 93(1), 26-45. doi: 10.4000/bagf.772

de Menezes, L., & Houllier, M. (2015). Germany's nuclear power plant closures and the integration of electricity markets in Europe. *Energy Policy*, 85, 357-368. doi: 10.1016/j.enpol.2015.05.023

destasis. (2022). *Stromerzeugung im 1. Quartal 2022: Kohle weiter wichtigster Energieträger*. Retrieved from [https://www.destatis.de/DE/Presse/Pressemitteilungen/2022/06/PD22\\_233\\_43312.html](https://www.destatis.de/DE/Presse/Pressemitteilungen/2022/06/PD22_233_43312.html)

European Commission. (2000). *Green Paper - Towards a European strategy for the security of energy supply*. Brussels: European Commission.

European Commission. (2007). *COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN COUNCIL AND THE EUROPEAN PARLIAMENT AN ENERGY POLICY FOR EUROPE*. Brussels: European Commission.

European Commission. (2022a). *REPowerEU: Joint European action for more affordable, secure and sustainable energy*. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_1511](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1511)

European Commission. (2022b). *EU Taxonomy: Complementary Climate Delegated Act*. Retrieved from [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_711](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_711)

Farfan, J., & Breyer, C. (2017). Aging of European power plant infrastructure as an opportunity to evolve towards sustainability. *International Journal Of Hydrogen Energy*, 42(28), 18081-18091. doi: 10.1016/j.ijhydene.2016.12.138

Feldhoff, T. (2014). Post-Fukushima energy paths: Japan and Germany compared. *Bulletin Of The Atomic Scientists*, 70(6), 87-96. doi: 10.1177/0096340214555108

Fouquet, D. (2019). Nuclear Policy in the EU from a Legal and Institutional Point-of-View. *Energiepolitik Und Klimaschutz. Energy Policy And Climate Protection*, 169-209. [https://doi.org/10.1007/978-3-658-25987-7\\_8](https://doi.org/10.1007/978-3-658-25987-7_8)

Frankfurter Allgemeine Zeitung. (2009). Atomenergie: Kernkraftbetreiber rufen nach Laufzeitverlängerung. Retrieved 22 September 2022, from

<https://www.faz.net/aktuell/wirtschaft/wirtschaftspolitik/atomenergie-kernkraftbetreiber-rufen-nach-laufzeitverlaengerung-1853915.html>

Gerring, J. (2004). What Is a Case Study and What Is It Good for?. *American Political Science Review*, 98(2), 341-354. <https://doi.org/10.1017/s0003055404001182>

Giger, N., & Klüver, H. (2013). *Focusing events and policy change: The aftermath of Fukushima*. Presentation, Berlin.

Glaser, A. (2012). From Brokdorf to Fukushima: The long journey to nuclear phase-out. *Bulletin Of The Atomic Scientists*, 68(6), 10-21. doi: 10.1177/0096340212464357

Gormley,, W. (1986). Regulatory Issue Networks in a Federal System. *Polity*, 18(4), 595-620. doi: 10.2307/3234884

Hager, C. (2015). Germany's Green Energy Revolution: Challenging the Theory and Practice of Institutional Change. *German Politics And Society*, 33(3), 1-27. doi: 10.3167/gps.2015.330301

Hake, J., Fischer, W., Venghaus, S., & Weckenbrock, C. (2015). The German Energiewende – History and status quo. *Energy*, 92, 532-546. doi: 10.1016/j.energy.2015.04.027

Hall, P. (1993). Policy Paradigms, Social Learning, and the State: The Case of Economic Policymaking in Britain. *Comparative Politics*, 25(3), 275. doi: 10.2307/422246

Hall P. (2009) Historical Institutionalism in Rationalist and Sociological Perspective. In: Explaining Institutional Change: Ambiguity, Agency, and Power. Cambridge University Press.

Handrlíca, J. (2010). Harmonisation of Nuclear Liability in the European Union. *Nuclear Law Bulletin*, 2009(2), 35-64. doi: 10.1787/nuclear\_law-v2009-art14-en

Hartwig, M., Kobashi, Y., Okura, S., & Tkach-Kawasaki, L. (2014). Energy policy participation through networks transcending cleavage: an analysis of Japanese and German renewable energy promotion policies. *Quality & Quantity*, 49(4), 1485-1512. doi: 10.1007/s11135-014-0093-9

Hartwig, M., & Tkach-Kawasaki, L. (2019). Identifying the 'Fukushima Effect' in Germany through policy actors' responses: evidence from the G-GEPON 2 survey. *Quality & Quantity*, 53(4), 2081-2101. doi: 10.1007/s11135-019-00857-x

Hayashi, M., & Hughes, L. (2013). The Fukushima nuclear accident and its effect on global energy security. *Energy Policy*, 59, 102-111. doi: 10.1016/j.enpol.2012.11.046

Herzog, C., Handke, C., & Hitters, E. (2019). Analyzing Talk and Text II: Thematic Analysis. In H. Van den Bulck, M. Puppis, K. Donders & L. Van Audenhove, *The Palgrave Handbook of Methods for Media Policy Research* (1st ed.). Palgrave Macmillan.

Howlett, M., & Ramesh, M. (1993). Patterns of Policy Instrument Choice: Policy Styles, Policy Learning and the Privatization Experience. *Review Of Policy Research*, 12(1-2), 3-24. doi: 10.1111/j.1541-1338.1993.tb00505.x

Huß, C. (2014). Energy Transition by Conviction or by Surprise? Environmental Policy from 2009 to 2013. *German Politics*, 23(4), 430-445. doi: 10.1080/09644008.2014.953068

Infratest dimap. (2022). *ARD DeutschlandTREND*. Retrieved from [https://www.infratest-dimap.de/fileadmin/user\\_upload/DT2204\\_Report.pdf](https://www.infratest-dimap.de/fileadmin/user_upload/DT2204_Report.pdf)

Ingram, H., Schneider, A., & Deleon, P. (2007). Social Construction and Policy Design. *Theories Of The Policy Process*, 93-126. doi: 10.4324/9780367274689-4

Jahn, D., Stephan, S.: Germany's Energiewende after Fukushima. Nuclear politics at the forefront of change. In: Hindmarsh, R., Priestley, R. (eds.) *The Fukushima Effect: A New Geopolitical Terrain*. Routledge, London (2016)

Joas, F., Pahle, M., Flachsland, C., & Joas, A. (2016). Which goals are driving the Energiewende? Making sense of the German Energy Transformation. *Energy Policy*, 95, 42-51. doi: 10.1016/j.enpol.2016.04.003

Jones, M., Peterson, H., Pierce, J., Herweg, N., Bernal, A., Lamberta Raney, H., & Zahariadis, N. (2015). A River Runs Through It: A Multiple Streams Meta-Review. *Policy Studies Journal*, 44(1), 13-36. <https://doi.org/10.1111/psj.12115>

Jorant, C. (2011). The implications of Fukushima. *Bulletin Of The Atomic Scientists*, 67(4), 14-17. doi: 10.1177/0096340211414842

Kanellakis, M., Martinopoulos, G., & Zachariadis, T. (2013). European energy policy—A review. *Energy Policy*, 62, 1020-1030. doi: 10.1016/j.enpol.2013.08.008

Karapin, R. (2020). Household Costs and Resistance to Germany's Energy Transition. *Review Of Policy Research*, 37(3), 313-341. doi: 10.1111/ropr.12371

Kingdon, J. (2011). *Agendas, alternatives, and public policies*. Harlow: Pearson. 2<sup>nd</sup> edition

Kumar, K. (1986). *Conducting Key Informant Interviews in Developing Countries*. AID.

Landgeist (2020). Nuclear Energy in Europe. Retrieved 1 August 2022, from <https://landgeist.com/2022/03/15/nuclear-energy-in-europe/>

Marr, S. (2014). Climate and Energy Policy in the eu and Germany at a cross roads. *Journal For European Environmental & Planning Law*, 11(2), 95-115. doi: 10.1163/18760104-01102003

McCauley, D., Brown, A., Rehner, R., Heffron, R., & van de Graaff, S. (2018). Energy justice and policy change: An historical political analysis of the German nuclear phase-out. *Applied Energy*, 228, 317-323. doi: 10.1016/j.apenergy.2018.06.093

Mez, L. (2012). Germany's merger of energy and climate change policy. *Bulletin Of The Atomic Scientists*, 68(6), 22-29. doi: 10.1177/0096340212464358

Nilsson, M. (2011). Changing the Decision Space: European Policy Influence on Energy Policy and Systems Change in Sweden. *Public Administration*, 89(4), 1509-1525. doi: 10.1111/j.1467-9299.2011.01946.x

Percebois, J., & Pommeret, S. (2021). Efficiency and dependence in the European electricity transition. *Energy Policy*, 154, 112300. doi: 10.1016/j.enpol.2021.112300

Pierson, P. (2000). Increasing Returns, Path Dependence, and the Study of Politics. *American Political Science Review*, 94(2), 251-267. doi: 10.2307/2586011

Pierson, P., & Skocpol, T. (2002). Historical Institutionalism in Contemporary Political Science. In I. Katzenbach & H. Milner, *Political Science: State of the Discipline* (pp. 693-721). W.W. Norton.

Pollack, M. (2000). The End of Creeping Competence? EU Policy-Making Since Maastricht. *JCMS: Journal Of Common Market Studies*, 38(3), 519-538. doi: 10.1111/1468-5965.00233

Ponciano, R., Santos, J., & Isento, J. (2020). Information Search Mechanisms for Government Entities using Machine Learning and Natural Language Processing Techniques. *International Journal Of Computer Applications*, 176(21), 1-7. <https://doi.org/10.5120/ijca2020920150>

Princen, S. (2013). Punctuated equilibrium theory and the European Union. *Journal Of European Public Policy*, 20(6), 854-870. doi: 10.1080/13501763.2013.781822

Rehner, R., & McCauley, D. (2016). Security, justice and the energy crossroads: Assessing the implications of the nuclear phase-out in Germany. *Energy Policy*, 88, 289-298. doi: 10.1016/j.enpol.2015.10.038

Renn, O., & Marshall, J. (2016). Coal, nuclear and renewable energy policies in Germany: From the 1950s to the “Energiewende”. *Energy Policy*, 99, 224-232. doi: 10.1016/j.enpol.2016.05.004

Rinscheid, A. (2015). Crisis, Policy Discourse, and Major Policy Change: Exploring the Role of Subsystem Polarization in Nuclear Energy Policymaking. *European Policy Analysis*, 1(2). doi: 10.18278/epa.1.2.3

Rochette, G., & Vela, E. (2021). Is the German Nuclear strategy lawful under EU law? Article 194(2) TFEU and its limitations. *The Journal Of World Energy Law & Business*, 14(4), 277-290. doi: 10.1093/jwelb/jwab023

Sabatier, P. (1986). Top-Down and Bottom-Up Approaches to Implementation Research: a Critical Analysis and Suggested Synthesis. *Journal Of Public Policy*, 6(1), 21-48.  
<https://doi.org/10.1017/s0143814x00003846>

Sabatier, P. (1987). Knowledge, Policy-Oriented Learning, and Policy Change. *Knowledge*, 8(4), 649-692. doi: 10.1177/0164025987008004005

Sabatier, P. (1993). Policy Change over a Decade or More. In P. Sabatier & H. Jenkins-Smith, In *Policy Change and Learning: An Advocacy Coalition Approach*, page (pp. 13-40). Boulder: Westview.

Saidi, K., & Omri, A. (2020). Reducing CO<sub>2</sub> emissions in OECD countries: Do renewable and nuclear energy matter?. *Progress In Nuclear Energy*, 126, 103425.  
<https://doi.org/10.1016/j.pnucene.2020.103425>

Schiffer, H. (2015). Europe's Road to a Sustainable Energy-Supply System. *Energy & Environment*, 26(1-2), 111-126. doi: 10.1260/0958-305x.26.1-2.111

Schmitt, S., & Schulze, K. (2011). Choosing environmental policy instruments: An assessment of the ‘environmental dimension’ of EU energy policy. *European Integration Online Papers*, 15(1). Retrieved 4 April 2022.

Schreurs, M. (2012). The politics of phase-out. *Bulletin Of The Atomic Scientists*, 68(6), 30-41. doi: 10.1177/0096340212464359

Seawright, J., & Gerring, J. (2008). Case Selection Techniques in Case Study Research. *Political Research Quarterly*, 61(2), 294-308. <https://doi.org/10.1177/1065912907313077>

Selosse, S., Ricci, O., & Maïzi, N. (2013). Fukushima's impact on the European power sector: The key role of CCS technologies. *Energy Economics*, 39, 305-312. doi: 10.1016/j.eneco.2013.05.013

Shim, J., Park, C., & Wilding, M. (2015). Identifying policy frames through semantic network analysis: an examination of nuclear energy policy across six countries. *Policy Sciences*, 48(1), 51-83. doi: 10.1007/s11077-015-9211-3

Sonnberger, M., Ruddat, M., Arnold, A., Scheer, D., Poortinga, W., & Böhm, G. et al. (2021). Climate concerned but anti-nuclear: Exploring (dis)approval of nuclear energy in four European countries. *Energy Research & Social Science*, 75, 102008. <https://doi.org/10.1016/j.erss.2021.102008>

Spiegel Online. (2011). Atomausstieg: RWE-Chef warnt vor Industrieschwund in Deutschland. Spiegel.de. Retrieved 4 April 2022, from <https://www.spiegel.de/wirtschaft/unternehmen/atomausstieg-rwe-chef-warnt-vor-industrieschwund-in-deutschland-a-767817.html>.

Streeck, W., & Thelen, K. (2005). Beyond Continuity: Institutional Change in Advanced Political Economies. Oxford: Oxford University Press.

Streeck, W. (2009). Institutions in history: bringing capitalism back in. (MPIfG Discussion Paper, 09/8). Köln: MaxPlanck-Institut für Gesellschaftsforschung.

Strunz, S., Gawel, E., & Lehmann, P. (2015). Towards a general "Europeanization" of EU Member States' energy policies?. *Economics Of Energy & Environmental Policy*, 4(2). doi: 10.5547/2160-5890.4.2.sstr

The 1986 Chernobyl nuclear power plant accident | IAEA. (2022). Retrieved 1 August 2022, from <https://www.iaea.org/topics/chernobyl>

Treaty establishing the European Atomic Energy Community (EURATOM) (1957). Rome.

Tronea, M. (2010). European quest for standardisation of nuclear power reactors. *Progress In Nuclear Energy*, 52(2), 159-163. doi: 10.1016/j.pnucene.2009.06.015

True, J., Jones, B., & Baumgartner, F. (2007). Punctuated-Equilibrium Theory. In P. Sabatier, *Theories of the policy process* (pp. 155-187). Boulder: Westview Press.

True, J., Jones, B., & Baumgartner, F. (2019). Punctuated-Equilibrium Theory. In P. Sabatier, *Theories of the Policy Process* (2nd ed., pp. 155-187). Routledge.

Umbach, F. (2010). Global energy security and the implications for the EU. *Energy Policy*, 38(3), 1229-1240. doi: 10.1016/j.enpol.2009.01.010

von Hirschhausen, C. (2017). *Nuclear power in the twenty-first century - An assessment (Part 1)*. Berlin: Deutsches Institut für Wirtschaftsforschung (DIW).

von Hirschhausen, C. (2018). German Energy and Climate Policies: A Historical Overview. In C. von Hirschhausen, C. Gerbaulet, C. Kemfert, C. Lorenz & P. Oei, *Energiewende "Made in Germany"* (pp. 17-43). Springer.

Wettengel, J. (2022). German politicians reject EU green label for nuclear power, welcome gas provisions. Retrieved 23 August 2022, from <https://www.cleanenergywire.org/news/german-politicians-reject-eu-green-label-nuclear-power-welcome-gas-provisions>

Winter, G. (2013). The Rise and Fall of Nuclear Energy Use in Germany: Processes, Explanations and the Role of Law. *Journal Of Environmental Law*, 25(1), 95-124. doi: 10.1093/jel/eqs031

Wood, S. (2010). Europe's Energy Politics. *Journal Of Contemporary European Studies*, 18(3), 307-322. doi: 10.1080/14782804.2010.507916

World Nuclear Association. (2022). Nuclear Power in the European Union - World Nuclear Association. Retrieved 21 September 2022, from <https://world-nuclear.org/information-library/country-profiles/others/european-union.aspx>

Wurzel, R. (2010). Environmental, Climate and Energy Policies: Path-Dependent Incrementalism or Quantum Leap?. *German Politics*, 19(3-4), 460-478. doi: 10.1080/09644008.2010.515838

Zahariadis, N. (2007). The Multiple Streams Framework Structure, Limitations, Prospects. In P. Sabatier, Theories of the Policy Process (pp. 65-92). Routledge. Retrieved 4 April 2022.

# Appendix

## Appendix A: Codebook

### Category: Germany

**Law-G:** This code describes mentions of policy in Germany relating to their nuclear energy strategy.

Code	When to use
Law-G (Atomkonsens2000)	Use when the data gives information on the Atomkonsens in the year 2000, an agreement between the first government under chancellor Schröder and energy operators to shut-down nuclear power plants.
Law-G (AtG2010)	Use when the data gives information on the 2010 change of the Atomgesetz, often called “exit from the exit”. This change was started by the coalition of Union and FDP and prolonged the lifetime of German nuclear power plants.
Law-G (AtG2011)	Use when the data gives information on the 2011 change of the Atomgesetz, which occurred after the Fukushima Daiichi nuclear accident. In this change, the same government that prolonged lifetimes in 2010 planned to shut down nuclear plants in Germany starting immediately up to 2022.
Law-G (Koalition2005)	Use when the data gives information on the discussion of nuclear energy strategy during the transfer of power and coalition building in 2005's great coalition of Union and SPD.

Law-G (Koalition2010)	Use when the data gives information on the discussion of nuclear energy strategy during the transfer of power and coalition building in 2010's coalition of Union and FDP.
-----------------------	--

**PET-G:** This code describes content relating to Baumgartner and Jones' theory of punctuated equilibriums in Germany.

Code	When to use
PET-G (stasis)	When the data shows evidence of policy stasis in Germany as described by Baumgartner and Jones. The authors describe stasis as the maintenance of the status quo over a period of time (True et al., 2019)
PET-G (punctuation)	When the data shows evidence of policy punctuations or sudden leaps in policy action in Germany as described by Baumgartner and Jones. Punctuation are interruptions in the status-quo of policy maintenance where sudden larger policy changes occur (True et al., 2019).
PET-G (policy image)	When the data shows the use of policy images in Germany, meaning empirical information couples with appeals to emotion (True et al., 2007).
PET-G (processing)	When evidence of either serial or parallel processing in the German organizational structure is observed. While serial processing, organizations work on one issue after the other. In parallel processing, multiple issues are handled at the same time, often by different departments (True et al., 2007).

PET-G (institutional friction)	When the data shows institutional friction in Germany, meaning inefficiency the mitigation of reforms during the policy cycle (Baumgartner et al, 2009).
--------------------------------	--

**HI-G:** This code describes content relating to the theory of historical institutionalism in Germany.

Code	When to use
HI-G (temporalism)	When the data shows how issues over time affect the German nuclear energy strategy. This code underscores the historical view in applying historical institutionalism
HI-G (institutionalism)	When the data shows how institutions in Germany affect the German nuclear energy strategy. This code focuses on the role institutions play in looking at data from a historical institutionalist perspective
HI-G (path dependence)	When the data shows evidence of path-dependence for the German nuclear energy strategy, as defined by Pierson and Skocpol (2002) as positive feedback processes that are self-reinforcing in a political system.
HI-G (incrementalism)	When the data shows evidence of incrementalism, meaning only small adjustments to the German nuclear energy strategy.

**Kingdon-G:** This code describes content relating to Kingdon's multiple streams approach in Germany, which asks about why some issues end up on the agenda and others do not.

Code	When to use
Kingdon-G (problem stream)	Use when the data shows evidence of Kingdon's problem stream in Germany. The problem stream relates to the question of

	why some problems get more attention than others. Kingdon answers this with three suggestions: Indicators that affect problem perception, focusing events and feedback about existing policies (Kingdon, 2013).
Kingdon-G (politics stream)	Use when the data shows evidence of Kingdon's politics stream in Germany. The politics stream describes what happens during in the political sphere, such as elections, which can have a large effect on agenda-setting (Kingdon, 2013).
Kingdon-G (policies stream)	Use when the data shows evidence of Kingdon's policies stream in Germany. The policies stream relates to political outcomes, for which Kingdon raises the questions of how policy alternatives are chosen. He proposes that a process similar to natural selection happens, with actors creating, criticizing, and considering ideas in their sphere of interest. Policies "survive" when they are feasible, fit values and budget and are acceptable to public and politicians (Kingdon, 2013).
Kingdon-G (joined streams)	Use when evidence of a joining of Kingdon's three streams is observed in the case of Germany. Kingdon states that if the three streams of problem, politics and policies join, the likelihood that an issue will be set on the agenda is very high (Kingdon, 2013).
Kingdon-G (entrepreneurs)	Use when the data shows actions of policy entrepreneurs in Germany as defined by Kingdon (2013). Kingdon states that policy entrepreneurs are actors that have an agenda they want to push. If entrepreneurs

	take on an issue, it is likely that this issue ends up on the agenda if a suitable policy window arises.
Kingdon-G (focusing event)	Use when events are mentioned in the data that exhibit characteristics of focusing events in Germany (Birkland, 1998; Kingdon, 2011). Focusing events are mentioned by various authors to describe events that can cause punctuations in policy change through their rare, harmful, or harm-revealing nature. They can be used as an instrument by entrepreneurs to push their agenda.

## Category: EU

**Law-EU:** This code describes mentions of policy in the EU relating to their nuclear energy strategy.

Code	When to use
Law-EU (CouncilDecisions)	When the data shows information on EU council decisions which affect the nuclear energy strategy of the European Union
Law-EU (Strategy)	When the data shows general information relating to the EU nuclear energy strategy as mentioned in the data that cannot be assigned to a certain law or policy document
Law-EU (Energy Directive 1996)	When the data gives information on the 1996 energy directive, a EU directive that establishes common rules for the EU internal market in electricity.
Law-EU (Art. 194.2 TFEU)	When the data mentions the effects of Art. 194.2 of the Treaty on the Functioning of the European Union, which describes the goals of the EU regarding the energy market.

Law-EU (EURATOM)	When the data mentions the effects and results of EURATOM, one of the founding treaties of the EU/EC that connected the founding member state's nuclear capacities.
Law-EU (EEC)	When the data mentions the European Economic Community as one of the predecessors of the EU and its nuclear energy strategy.

**PET-EU:** This code describes content relating to Baumgartner and Jones' theory of punctuated equilibriums.

Code	When to use
PET-EU (stasis)	When the data shows evidence of policy stasis in the EU as described by Baumgartner and Jones. The authors describe stasis as the maintenance of the status quo over a period of time (True et al., 2019)
PET-EU (punctuation)	When the data shows evidence of policy punctuations or sudden leaps in policy action in the EU as described by Baumgartner and Jones. Punctuation are interruptions in the status-quo of policy maintenance where sudden larger policy changes occur (True et al, 2019).
PET-EU (policy image)	When the data shows the use of policy images in Germany, meaning empirical information coupled with appeals to emotion (True et al, 2007)
PET-EU (processing)	When evidence of either serial or parallel processing in the EU organizational structure is observed. While serial processing, organizations work on one issue after the

	other. In parallel processing, multiple issues are handled at the same time, often by different departments (True et al., 2007). (True et al., 2007)
PET-EU (institutional friction)	When the data shows institutional friction in the EU, meaning inefficiency the mitigation of reforms during the policy cycle (Baumgartner et al, 2009)

**HI-EU:** This code describes content relating to the theory of historical institutionalism.

Code	When to use
HI-EU (temporalism)	When the data shows how issues over time affect the EU nuclear energy strategy. This code underscores the historical view in applying historical institutionalism
HI-EU (institutionalism)	When the data shows how EU institutions affect the EU nuclear energy strategy. This code focuses on the role institutions play in looking at data from a historical institutionalist perspective.
HI-EU (path dependence)	When the data shows evidence of path-dependence for the EU nuclear energy strategy, as defined by Pierson and Skocpol (2002) as positive feedback processes that are self-reinforcing in a political system.
HI-EU (incrementalism)	When the data shows evidence of incrementalism in the EU nuclear energy strategy meaning only small adjustments to the EU nuclear energy strategy.

**Kingdon-EU:** This code describes content relating to Kingdon's multiple streams approach.

Code	When to use

Kingdon-EU (problem stream)	When the data shows evidence of Kingdon's problem stream in the EU. The problem stream relates to the question of why some problems get more attention than others. Kingdon answers this with three suggestions: Indicators that affect problem perception, focusing events and feedback about existing policies (Kingdon, 2013).
Kingdon-EU (politics stream)	When the data shows evidence of Kingdon's politics stream in the EU. The politics stream describes what happens during in the political sphere, such as election, which can have a large effect on agenda-setting (Kingdon, 2013).
Kingdon-EU (policies stream)	When the data shows evidence of Kingdon's policies stream in the EU. The policies stream relates to political outcomes, for which Kingdon raises the questions of how policy alternatives are chosen. He proposes that a process similar to natural selection happens, with actors creating, criticizing, and considering ideas in their sphere of interest. Policies "survive" when they are feasible, fit values and budget and are acceptable to public and politicians (Kingdon, 2013).
Kingdon-EU (joined streams)	When evidence of a joining of Kingdon's three streams is observed in the case of the EU. Kingdon states that if the three streams of problem, politics and policies join, the likelihood that an issue will be set on the agenda is very high (Kingdon, 2013).
Kingdon-EU (entrepreneurs)	When the data shows actions of policy entrepreneurs in the EU as defined by Kingdon (2011). Kingdon states that policy

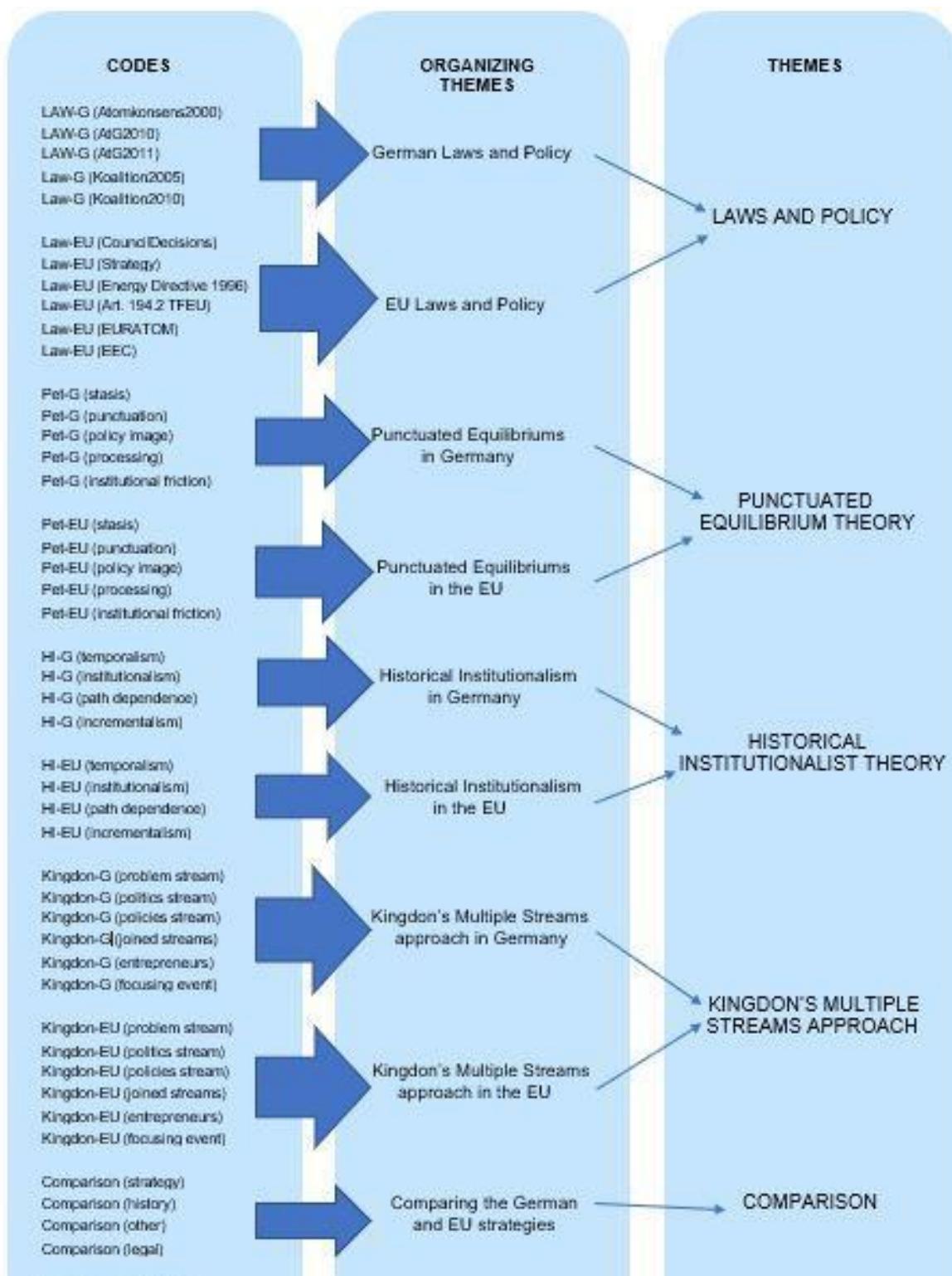
	entrepreneurs are actors that have an agenda they want to push. If entrepreneurs take on an issue, it is likely that this issue ends up on the agenda if a suitable policy window arises.
Kingdon-EU (focusing events)	When events are mentioned in the data that exhibit characteristics of focusing events in the EU (Birkland, 1998; Kingdon, 2011). Focusing events are mentioned by various authors to describe events that can cause punctuations in policy change through their rare, harmful, or harm-revealing nature. They can be used as an instrument by entrepreneurs to push their agenda.

### Category: Comparison

**Comparison:** This code describes mentions of a comparison between the EU and German nuclear energy strategy in the literature

Code	When to use
Comparison (strategy)	When the data shows a comparison of the German and EU nuclear energy strategy
Comparison (history)	When the data shows historical comparisons between the German and EU nuclear energy strategies.
Comparison (other)	When other elements of Germany and the EU are compared which are relevant for this case.

## Appendix B: Themes



## Appendix C: Interview Guide

### Introduction

- Smalltalk, thanks for participating
- Purpose of the study: to research the implications of the German and EU nuclear energy strategy on German citizens
- Who is involved: Me, Dr. Le Anh Long for UT , Prof. Dr. Antje Vetterlein for WWU
- Why I chose respondent: personalized
- How the info will be used and shared: Informed consent
- Ask about recording

### Germany

#### Warm-up question

**How does your work relate to nuclear energy in Germany?**

#### Key questions

**What do you know about the Germany strategy with regard to nuclear energy?**

**Has the strategy changed since the last Merkel administration? If yes, how? Do you think this change is significant?**

**At what times did the strategy change? Why?**

**Who or what was the driving force behind changes in the strategy?**

**Looking back further: What were notable German nuclear energy strategies or changes before the Merkel administration?**

**Do you think that the strategy changing again in the future?**

#### Probing questions

**(based on notes)**

Closing question

**Do you think that Germany stay on the path it is on now with regard to its nuclear energy strategy? If not, how should it change?**

Summarize, conclude

## **EU**

Warm-up question

**How does your work relate to nuclear energy in the EU?**

Key questions

**What do you know about the EU strategy with regard to nuclear energy?**

**Has the strategy changed since Ursula von der Leyen became Commission President? If yes, how? Do you think this change is significant?**

**At what times did the strategy change? Why?**

**Who or what was the driving force behind changes in the strategy?**

**Looking back further: What were notable EU nuclear energy strategies or changes before the von der Leyen Commission?**

**Do you think that the strategy changing again in the future?**

Probing questions

**(Based on notes)**

Closing question

**Do you think that EU stay on the path it is on now with regard to its nuclear energy strategy? If not, how should it change?**

Summarize, conclude

### **Comparison**

**Does the German strategy align within the EU strategy for nuclear energy? How so?**

**Would you advocate for more or less harmonization of EU nuclear energy strategies? Why?**

## Appendix D: Transcripts

### D-1: Respondent 1      26:35 Minutes

00:00:02 Interviewer

Ja, gut super also, wenn sie wollen können sie wenn Sie mir gerne was zu sagen haben können Sie direkt loslegen. Ich habe ein paar Fragen vorbereitet, aber sie können natürlich auch gerne.

00:00:12 Respondent I

Ja, also vielleicht generell vorneweg, Sie haben sich ja ein spannendes Thema ausgesucht, das gerade unter der Fragestellung Gas-Embargo oder ähnliches ja nochmal neu diskutiert worden ist. In Teilen jedenfalls. Ich persönlich habe da eine ganz klare Haltung ich will nur mit einer kleinen Vorbemerkung vielleicht ihre Erwartungshaltungen ein klein wenig dämpfen, denn sie haben ja mitbekommen. Ich bin neu im Deutschen Bundestag, habe mich also vorher auch mit Atompolitik herzlich wenig beschäftigen müssen als [City] Bürgermeister und kenne insofern die Vorgeschichte, die das alles hat auch nur aus der Presse. Insofern habe ich eine Haltung und kann vielleicht auch auf das Thema politische Prozesse eingehen und solche Fragestellungen schon eher, ja, aber die Details sozusagen der letzten, keine Ahnung 2, 3 oder gar mehr Jahrzehnte da sind andere viel berufener als ich. Das wollte ich nur vorneweg sagen, denn bei vielen Details werde ich sicher die Antwort schuldig bleiben müssen. Wir können sicherlich manches im Nachgang auch noch mal recherchieren. Aber das wird sich ja im Gespräch ergeben. Ich denke, das ist nur fair, wenn ich das mal vorneweg sage, ich will auch nicht um heißen Brei herum. Wenn ich irgendwo die Antwort schuldig bleiben muss.

00:01:26 Interviewer

Nein, das ist völlig in Ordnung, also ich bin auch sehr an Ihrer Meinung interessiert, einfach als Bundestagsabgeordneter. Und auch wenn die Infos, die Sie haben aus der Presse kommen, das ist völlig in Ordnung, natürlich.

Wie hängt denn Ihre Arbeit aktuell mit der mit der Kernenergie in Deutschland zusammen? Also ich weiß, dass Sie als Bürgermeister wahrscheinlich nicht so viel am Hut hatten, aber so im Bundestag jetzt wie arbeiten sie da mit dem Thema?

00:01:47 Respondent I

Na, ich selbst bin Energie und Klima, Ausschuss, Berichterstatter für das Thema Energiepolitik. Der Berichterstatter für das Thema Atompolitik, Entschuldigung, Atompolitik. Im Umweltausschuss, indem ich selber auch noch bin, macht das ein anderer Kollege. Aber wir arbeiten natürlich, wenn diese Fragen auftauchen, intensiv zusammen. Im Moment geht es ja einerseits, um die große Frage Endlagersuche, die ist ja auf dem Weg. Wie ich finde, haben da unsere Vorgänger also in den vorigen Legislaturperioden sich wirklich ein schlaues, sehr transparentes und wissenschaftliches Verfahren ausgedacht, mit dem ich, soweit mir das bislang vorgestellt worden ist, ehrlich gesagt sehr zufrieden bin. Noch transparenter, fundierter und auch von der Öffentlichkeitsarbeit und Beteiligung her aufgeschlossener kann ich mir ehrlich gesagt kaum vorstellen, weil da so viele Rückversicherungs- und. Und Öffentlichkeitsschleifen eingebaut sind. Das finde ich schon grandios, also so ausgefeilt hab ich das bisher noch nirgendwo gesehen. Insofern bin ich sehr zuversichtlich, dass wir zwar einerseits nicht um die Diskussion herumkommen werden, und das ist klar, das Thema, gerade wenn sozusagen der Kreis möglicher Standorte sich ein bisschen verkleinert und die, die dann noch im Topf drin sind, sozusagen erst aufmerksam werden. Aber es wird so, die Debatte sehr, sehr, sehr stark verschälichen, und das finde ich dem Thema wirklich angemessen und der andere Punkt ist natürlich die Debatte um eine Verlängerung der Laufzeit der verbliebenen 3 Kernkraftwerke und ein paar ganz abseitige fordern auch neue Kernkraftwerke. Und damit habe ich mich natürlich dann auseinanderzusetzen, da hat es ja auch schon entsprechende Redebeiträge gegeben. Entsprechende Auseinandersetzungen in den Ausschüssen und im Parlament also insofern, das sind die beiden Bereiche also: Die Diskussion um die Stilllegung und die Frage der Endlager suche das sind eigentlich die Bereiche, mit denen ich mich im Moment auseinandergesetzt habe.

00:03:50 Interviewer

Ja ja. Das. Passt auch sehr gut. Vor allem der zweite Punkt über generell Stilllegung und so was wissen Sie denn generell über die Strategie, die. Deutschland hat für die Nutzung der Kernenergie. Und mit Strategie mein ich jetzt die Ziele oder der Plan.

00:04:07 Respondent I

Na ja, die Strategie ist ja die zur Energiegewinnung vorhandenen Atommeiler stillzulegen. Bis Ende diesen Jahres gibt dem seit einigen Jahren feststehenden, seit Fukushima entwickelten oder beziehungsweise entwickelt worden ist er ja schon vorher, aber es gibt ja den langjährigen Plan. Die Betreiber der AKWs haben sich entsprechend mit ihren Planungen darauf eingestellt. Sie wissen ja, dass die Kernenergie eine sehr komplizierte Technologie ist, sehr aufwendig, das müssen viele, viele Kompetenzen ineinander greifen, um so eine Technik sicher und dauerhaft

beherrschen zu können. Das ist ja der entscheidende Punkt also sicher meine ich zum Beispiel für Mitarbeiterinnen und Mitarbeiter, aber auch für Umwelt, für Anwohnerinnen und Nachbarn usw. Es ist eine sehr komplexe Industrie. Ich will jetzt nicht auf Einzelheiten eingehen, aber das Herunterfahren einer solchen Industrie jedenfalls für Deutschland ist ungefähr genauso komplex wie das Hochfahren einer solchen Industrie. Auch wenn das natürlich alles im internationalen Verbund damals geschehen ist. Alleine hätte Deutschland das ohnehin nicht auf die Reihe bekommen, allein schon wegen nicht ausreichender Uranvorkommen. Das heißt, man muss halt die gesamte aus wirtschaftlicher Sicht würde man sagen Wertschöpfungskette, man könnte auch sagen, Produktionskette betrachten und in all diesen Bereichen müssen ja Kapazitäten abgebaut werden also nicht nur industrielle Kapazitäten im Sinne von Fabriken oder groß industriellen Anlagen, die bestimmte Fertigungs- und Produktionsschritte machen, sondern auch beim Personal, ja mindestens genauso. Auch hier sind ja im Laufe der Jahrzehnte viele sehr spezielle Qualifikationen aufgebaut worden, die so nach einer Stilllegung aller Kernkraftwerke nicht mehr gebraucht werden, auch das geht nicht in einem Schritt dann die ganze Frage der Sicherheit des Teile Austausch. Es muss darüber hin, also sozusagen die Sicherheitsschritte sind ja zum Teil nicht mehr alle durchgeführt worden. In Erwartungen der Stilllegung der Kernkraftwerke hat man bestimmte Sicherheitszyklen ja verlängert aus meiner Sicht auch völlig zu recht. Und ganz am Ende muss natürlich auch der Rückbau gewährleistet sein. Das ist eine finanzielle Frage. Es ist aber auch eine technologische und das ist eben auch eine Lager- undendlagerfrage für die Teile, die eben radioaktiv belastet sind, so das ist der Kontext, in dem wir uns da bewegen, und deswegen ist es aus meiner Sicht völlig richtig an der geplanten Stilllegung, an dem Fahrplan festzuhalten. Ein Umsteuern an der Stelle wäre enorm aufwendig gewesen. Also das wäre vielleicht nicht ganz ausgeschlossen gewesen, aber ich halte es eigentlich für ziemlich schwierig. Es hätte uns auf lange Sicht weiterhin an diese, aus meiner Sicht eher veraltete Technologie, gebunden. Und das hätte enorme gesellschaftliche Kosten verursacht und die entsprechenden finanziellen Mittel hätten in der Folge für andere Dinge, die wir viel nötiger haben, nicht zur Verfügung gestanden, also in Abwägung all dieser Aspekte, glaube ich, ist es, oder halte ich es für absolut richtig, an dem Ausstiegsfahrplan festzuhalten.

00:07:28 Interviewer

Ja, Sie meinten gerade, dass ähm, das sozusagen der Aufbau der Kernenergie sehr komplex war und genauso komplex wie ein Abbau und dass der ohne internationale Partner nicht möglich gewesen wäre. Wie sehen Sie das so im Hinblick auf den Abbau? Weil wenn man da so Europa anguckt, ist Deutschland ja schon relativ alleine mit dem sehr drastischen Austritt aus der Kernenergie.

00:07:52 Respondent I

Ja, das ist richtig, das hat bei uns ja eine sehr lange Tradition, einen langen Vorlauf. Ich glaube das richtige Erwachen kam natürlich mit dem Supergau von Tschernobyl davon war Deutschland ja unmittelbar betroffen. Andere Länder waren davon nicht so sehr betroffen, manche natürlich auch sehr viel stärker als wir aber zumindest der Ostblock hatte ja damals durch die strikte Medienpolitik der entsprechenden Regime, da gab es gar nicht die Möglichkeit, eine entsprechende öffentliche Debatte darum zu führen, es gab gar nicht die Möglichkeit der flächendeckenden Meinungsbildung zu dem Thema und das war bei uns natürlich auch damals schon anders. Also insofern hat sich in Deutschland dabei ein weit anderes Bewusstsein herausgebildet als in anderen Staaten. Meine Überzeugung ist tatsächlich, dass wir mit den erneuerbaren Energien ein ausreichend großes Potenzial haben, um unseren Energiebedarf zu decken. Sicherlich nicht alles inländisch, aber wie gesagt, die Uran Produktion ist auch nicht inländisch. Auch hier müssen wir so quasi externe Quellen anzapfen. Insofern hat sich bei der Frage der Vernetzung der Globalisierung und des Einkaufs auf internationalen Märkten vom Grundsatz her ja nichts verändert. Das war in Deutschland schon lange so, dass, das wird auch weiterhin so sein. Wir arbeiten natürlich daran, es zu reduzieren, das ist auch völlig richtig. Insofern sind die hochgesteckten Ziele völlig in Ordnung. Wir werden uns aber eben nach anderen Energiequellen umsehen müssen, und da ist ja auch einiges in der Pipeline, also es ist nicht so, dass wir Kernenergie nicht ersetzen könnten. Wir können das und wir können es auch ohne, ohne Erdgas, ohne Öl und ohne Kohle dass der Überfall Russlands auf die Ukraine jetzt dann nochmal ein anderes Zeichen gesetzt hat, ein paar andere politische Vorgaben mit ins Spiel gebracht haben hat auf die wir kurzfristig reagieren müssen, steht auf einem völlig anderen Blatt. Das ändert aber in der Mittel, bis langfristigen Perspektiven nichts. Für Frankreich, Sie spielen also ein bisschen drauf an auf andere europäische Länder, das ist ja nicht nur Frankreich, aber es ist auch Frankreich. Man muss an der Stelle sagen, es gibt in unserer wenig perfekten Welt ja, noch einen weiteren Aspekt, der für manche Staaten das Aufrechterhalten der Kernenergie notwendig macht, und das ist die atomare Abschreckung. Sie haben natürlich ohne eine Atomtechnologie, ohne eine solche Industrie auch kaum die Möglichkeit, Atombomben zu bauen. Das heißt, man muss das immer im Kontext denken, und insofern ist auch das ein Aspekt, der wahrscheinlich, auch wenn er öffentlich gar nicht so sehr diskutiert wird, wahrscheinlich für Frankreich auch eine mitentscheidende Rolle spielt. Neben der Tatsache, dass man in der Vergangenheit ja sehr, sehr stark auf Atomstrom, Atomkraft gesetzt hat und noch viel weniger viel, viel, viel weniger als Deutschland aussteigen könnte und auch in Frankreich wäre das ein Jahre, bis wenn nicht Jahrzehntelanger Prozess bis Frankreich in der Lage wäre, das zu tun, wenn sie es denn

überhaupt wollen. Sie kriegen aber natürlich die gleichen Schwierigkeiten wie wir, oder sie haben sie, es geht ja nicht nur um die hochradioaktiven Abfälle, die irgendwann endgelagert werden müssen, sondern es geht auch um die leicht- und mittelaktiven Abfälle. Wir haben ja wie gesagt große industrielle Anlagen mit massiven atomaren Kontaminationen. Und von daher wird das, wird das sicherlich für Frankreich auch noch ein sehr dickes Brett werden, also wir tun jedenfalls gut daran, den Pfad, den wir haben, nichts zu verlassen ich halte den nach wie vor für richtig. Und ich glaube auch, dass es ein gutes Beispiel sein kann, dass auch eine Hochindustrienation in der Lage ist, auf die fossilen Energieträger wie auch auf Atome, atomaren Energieträger zu verzichten also auch dieses Beispiel ist vielleicht für die Welt nicht schlecht, ohne dass man wahrscheinlich annehmen kann, dass jetzt alle jubelnd hinterherlaufen und sofort alle Atommeiler abstellen. Wie gesagt, geht sowieso nicht. Aber ich finde es auch wichtig, dass Deutschland es zeigt, dass das funktionieren kann, und da sind wir jetzt. Bei allen Schwierigkeiten, die wir natürlich haben, eigentlich auf einem ganz guten Pfad.

00:12:14 Interviewer

Ja, sie hat schon gesagt also Deutschland auf diesem Pfad Richtung Ausstieg, das ist auch schon ein langwieriger Prozess ist, also schon seit etwas längerer, können sie das noch ein bisschen mehr ausweiten was Sie damit meint?

00:12:26 Respondent I

Naja, wir hatten ja zunächst die, da bin ich in den Jahreszahlen nicht ganz Faktensicher, das müssten sie gegebenenfalls anders recherchieren. Aber wir hatten ja unter Rot-Grün im Bund das erste Mal ein Ausstiegsszenario, das auch auf dem Pfad war. Ich meine, es war dann Schwarz-Gelb das den Ausstieg vom Ausstieg beschlossen hatte. Bis dann Fukushima auch bei der Kanzlerin so viel Eindruck gemacht hat, dass der Ausstieg vom Ausstieg vom Ausstieg, ja dreimal genau, so zusagen verkündet worden ist, was letztlich ja bedeutet, dass man sozusagen den Ausstiegspfad, der im ersten Schritt festgelegt worden ist, dass man den wieder hat aufleben lassen, sicherlich zeitlich angepasst und auch an die aktuelle Situation angepasst usw. Aber dieses Hin und her, das lässt sich ja nur durch die parteipolitischen Konstellationen in der Bundesrepublik erklären anders ist das nicht erklärbar.

00:13:27 Interviewer

Sie sehen der Parteipolitik schon als, als ausschlaggebend für das, das Hin und her sozusagen?

00:13:32 Respondent I

Na klar, dass das war eine reine Koalitionsfrage. Weil das war eine reine Frage, wer da welche auch nicht nur, aber eben auch parteipolitischen Präferenzen hat und es war natürlich auch ne Frage wie soll ich hier jeweilige Lobbyisten durchsetzen. Ich will jetzt gar nicht sagen, welche gut oder schlecht sind könnte ich ihnen natürlich auch erklären, wenn ich meine Meinung sage ich sag mal so ja, aber im politischen Prozess sozusagen war ja lange Zeit die Ausstiegsfrage aus der Atomenergie in der Bundesrepublik zwar so in der öffentlichen Meinung, dass eine Mehrheit schon für den Ausstieg war, aber es war in der Breite der Bevölkerung kein Konfliktthema, das breite Massen bewegt hätte. Also die, soweit ich das in Erinnerung habe, war die Bevölkerung mehrheitlich mit dem Atomausstieg immer einverstanden, hatte aber auch so ein bisschen die Haltung. Na ja, wenn die Regierung meint, sie kriegen das sicher und vernünftig hin, dann kann man es halt auch weiter betreiben. Also so also gab natürlich in dem Spektrum möglicher Meinungen alle, das ist klar, aber es war nie so ein politisches Streitthema, an dem sich jetzt eine Wahl explizit entschieden hätte. Sie haben ja manchmal Konstellationen, da entscheiden sich Wahlen an einer einzigen Frage also Gerhard Schröders Nein zum Irak Krieg war genauso ein Beispiel.

00:14:58 Interviewer

Ja, auf jeden Fall.

00:15:02 Respondent I

Das rumeiern der Union und die klare Haltung des damaligen Kanzlers hatte ihm ja die Wiederwahl beschert, also das es gibt manchmal solche Fragen. Aber die Atomfrage war nie so eine Frage, jedenfalls nach meiner Erinnerung nicht. Es gab heftige Auseinandersetzungen mit Bürgerinitiativen mit der ganzen grünen Bewegung, und so, die ging auch durch die Presse, aber es war auch damals auch in den achtzigern immer eher eine eine kleinere Bewegung, die nicht die breite Masse bewegt hat.

00:15:37 Interviewer

Sie haben auch schon Fukushima erwähnt und Tschernobyl? Wie sehen Sie diese, diese Events da in dem Zusammenhang?

00:15:45 Respondent I

Nach Tschernobyl war ja das erste richtige Fanal. Wo allen Mittel Europäern klar geworden ist, der Supergau ist nicht nur eine theoretische Möglichkeit, der kann tatsächlich eintreten. Inzwischen weiß man ja glaube ich relativ gut Bescheid über den Ablauf der Dinge, die da passiert

sind. Das war viel menschliches Versagen mit von der Partie und so weiter nur diesen menschlichen Faktor kann man nie ausschließen und man kann auch technisches Versagen hier ausschließen. Und von daher sind alle Wahrscheinlichkeitsberechnungen hinsichtlich der Verwendung von hoch radioaktiven Substanzen, ja, also sind so Betrachtungen, die letztlich für den Einzelfall nicht viel Aussagen, also Wahrscheinlichkeitsaussagen. Machen ja nur eine Aussage für eine sehr große Anzahl von Fällen sozusagen. Also das ist wie beim Würfeln, wenn sie einen Würfel eine Millionen mal würfeln, dann wird in ziemlich genau einem Sechstel der Fälle die eins kommen Wenn sie aber nur 3 mal würfeln, dann kann dir 1 gar nicht kommen. Oder sie würfeln drei Einsen hintereinander und trotzdem hat sich an der Wahrscheinlichkeit ein Sechstel nichts geändert. Das heißt, der Einzelfall, wie oft er dann tatsächlich eintritt ist völlig, ist völlig unklar und bei diesem Wahrscheinlichkeitsberechnungen kommt noch eines hinzu. Die fußen ja alle auf mathematischen Modellen. Und jetzt diese mathematischen Modelle müssen mit Annahmen rechnen. Ich weiß zum Beispiel nicht bei Fukushima, inwiefern man mit der Wahrscheinlichkeit also bei der Abschätzung des Risikos bei der Wahrscheinlichkeit mit Tsunamis gerechnet hat. Also ich bin fast sicher das Erdbeben-Risiko musste man ja irgendwie einplanen. Klare Sache. Aber ganz offensichtlich, würde ich jetzt mal sagen, ist die Gefahr doch eher etwas unterschätzt worden. So und in dem Kontext würde ich immer sagen, die Verantwortung für die Menschheit und auch für Umwelt und Natur sollte uns immer die einfachere Technologie wählen, wählen lassen, wenn sie dann zur Verfügung steht. Deswegen hab ich ja gesagt für die Energieversorgung kommen wir mit regenerativen hin, das ist eine sehr im Grunde technologisch eine total triviale Angelegenheit. Absolut nichts Überraschendes. Es gibt ein paar technische Fragestellungen hinsichtlich der Netze, der Einspeisung, wie machen wir das eigentlich mit dezentralen Energieversorgern und so? Aber auch das ist technisch weitgehend gelöst wir wissen, wie es funktioniert und die Risiken dabei sind wirklich äußerst gering. Also es gibt eine gewisse Naturbelastung, eine gewisse Belastung der betreffenden Ökosysteme, das wissen wir, das kann man auch abschätzen, das kann man auch ein Stück weit steuern. Man kann in gewissem Umfang auch technologisch drauf reagiert. Aber die Risiken sind ungleich geringer als bei der Kernkraft und das haben eben diese beiden Events, aber es gibt ja noch mehr, wie sie wissen es gibt ja. Noch mehr solche schwierigen Events auch in den USA Harrisburg, glaube ich war so ein Thema.

00:18:57 Interviewer

Ja, Three-Mile-Island.

00:18:59 Respondent I

Ja, genau. Also und eben diese Endlagersuche, ne, da zeigt sich nochmal auch ganz deutlich, wie sensibilisiert sensibilisiert auch die Bevölkerung beispielsweise ist, denn niemand möchte unter seinen Füßen ein solches Endlager. So, und trotzdem sind wir gezwungen, die hochradioaktiven Abfälle in unserer Bundesrepublik endzulagern. Wir können Sie nicht auf den Mond schießen, wir können nicht im Meer versenken. Das alles sind keine sicheren Lagermöglichkeiten, es gibt nur die eine Möglichkeit, wir müssen eine geologische Formation finden, wo wir die Dinger für ztausende von Jahren nach allem, was wir wissen in größter Verantwortung sicher unterbringen. Und das ist eben das, was wir jetzt leisten müssen.

00:19:44 Interviewer

Mhm, Mhm ja. Also Deutschland, auf jeden Fall auf dem Weg raus aus der Kernenergie? Ich glaube, das ist das ist klar. Glauben Sie, dass sich das jetzt vor allem vor dem Hintergrund der aktuellen Ereignisse nochmal ändern könnte in der Zukunft oder sehen Sie Deutschland da auf dem Pfad weiter?

00:19:58 Respondent I

Nein, nein. Nein, das wird sich nicht ändern, also es gibt. Also man soll sich ja mit Prognosen zurückhalten, insbesondere wenn sie die Zukunft betreffen. In diesem Sinne würde ich jetzt mal behaupten, wenn diese Koalition am Ruder bleibt, die wir jetzt haben, wenn es die Ampel bleibt, wird sich daran auch nichts ändern, dann haben und davon gehe ich ja aus also jetzt wird nicht innerhalb der nächsten 3 Wochen die Ampel krachen oder so, das wird nicht passieren, insofern werden wir den Ausstieg, die endgültige Abschaltung Ende des Jahres sehen. Ob eine zukünftige Regierung wieder etwas anderes entscheidet kann ich mir ehrlich gesagt angesichts des Aufwandes nicht vorstellen, was ich mir sehr wohl vorstellen kann, ist, dass wir in Zukunft noch mal beim Thema Kernfusion was anderes sehen, daran wird ja kräftig geforscht aus meiner Sicht durchaus also auch ne Hochtechnologie ganz klar. Aber eben dadurch, dass keine hoch radioaktiven Abfälle entstehen, dass nicht mit Uran gearbeitet werden muss, sondern mit relativ leicht verfügbaren Grund Bausteinen eine sehr verheißungsvolle Technologie, die natürlich, ich sag immer ganz gerne, oder stell dir mal ganz gerne die Frage was kommt nach den Windrädern? Im Moment haben wir alle Angst, dass die Windräder die Landschaft verschandeln, dass die Vögel geschreddert werden und was weiß ich ja? Damit setzen wir uns auseinander, dass die Landschaft verschandelt wird. Ok, man kann es allerdings auch anders sehen, man kann auch sagen, so boah, wie klasse das dann Windrad steht. Das sorgt dafür, dass mein Film und meine Beleuchtung zu Hause funktionieren, und ich auch noch Musik hören kann, also von daher. Es kommt immer darauf an, wie wir das Konnotieren aber tatsächlich bin ich fest überzeugt es wird

so sein, dass in 20 oder 30 oder vielleicht auch 35 Jahren wir die Windräder wieder abbauen werden. Also Windräder haben auch eine begrenzte Lebenszeit. Wehen sehen Sie jetzt einige kommen an das Ende ihrer Lebenszeit. Das heißt, es gibt eine Materialermüdung. Es gibt Korrosionen, es gibt alle möglichen Abnutzungsprozesse und es gibt natürlich neue technische Möglichkeiten. Im Moment nennen wir das Repowering, das heißt statt des alten kleinen Windrades bauen wir ein viel größeres Leistungsfähigeres hin. Ich bin fast sicher nee, ich bin ganz sicher, dass wir neue Technologien entwickelt werden, so dass wir irgendwann auch in der Lage sein werden, die Windräder, Windräder wieder zurückzubauen, und dann haben wir den freien Blick auf die Landschaft nur im Moment haben wir die Möglichkeit nicht, sondern es ist Photovoltaik und Windräder sind die entscheidende Möglichkeit jetzt zu Dekarbonisieren, aus den fossilen auszuschalten, und das ist im Moment der wichtigste Punkt: Wir haben nicht mehr die Zeit, weiterzumachen wie bisher, und insofern könnte die Kernfusion ist ja auch ne Kernenergie nur ne ganz andere sozusagen könnte in Zukunft auch wieder eine Rolle spielen. Die Kernenergie alter Machart mit Uran da sehe ich in Deutschland keine Zukunft.

00:22:56 Interviewer

Mhm abschließend würde ich gerne also ihre persönliche Meinung einmal zum Thema hören, also sind Sie, sind Sie der Meinung, dass Deutschland auf einem guten Weg ist? Und sollte Deutschland auf dem Weg bleiben, wo es jetzt ist oder sehen Sie da persönlich in der Zukunft noch einen anderen Weg Der da Ihnen lieber wären.

00:23:12 Respondent I

Also vom Grundsatz her muss Deutschland auf diesem Weg bleiben. Es sind an so vielen Stellen jetzt die Weichen in die Richtung erneuerbare Energien gestellt und Aussiedlung aus fossilen und aus Atomkraft, das es schwersten Schaden auch für die Industrie anrichten würde, wenn da irgendeine Nachfolgeregierung wieder was völlig anderes entscheiden würde. Wir reden ja hier über lang sehr langfristige Investitionsentscheidungen, auch der Privatwirtschaft nicht nur des Staates, auch der Privatwirtschaft, die dringend notwendig sind, die ja und diese Investitionsentscheidungen, die fallen dieses und nächstes Jahr. Deswegen machen ja alle so ein hohes Tempo. Deswegen drängelt die Industrie auch klare Entscheidungen zu treffen, einen klaren Rahmen zu setzen, innerhalb dessen die Investitionsentscheidungen getroffen werden können. Denn die Industrie hat kein Interesse daran, Dinge, die einmal festgelegt sind, auf die lange Bank zu schieben, also ein Herumeiern ist eigentlich das Schlimmste, was der deutschen Industrie passieren kann. Klare Rahmenbedingungen sind wichtig, die werden jetzt in dieser Legislaturperiode also in diesem und im nächsten Jahr aus meiner Sicht gesetzt und ich glaube auch gut und richtig gesetzt, und

insofern gibt es da ehrlich gesagt gar kein Wackeln. Wir dürfen nur auf der anderen Seite auch beim Thema Forschen nicht nachlassen. Also einmal die Frage wie wirken sich die Dinge auf Natur und Umwelt aus? Das ist, glaube ich, schon eine wichtige Frage, denn ein paar Umwelteinflüsse gibt es ja, wenn sie ans Wattenmeer denken, wenn sie an die Fluss Systeme denken, wenn sie wie gesagt, an Vögel, Fledermäuse usw. denken. Da gibt es natürlich gewisse Einflüsse. Das müssen wir auch unter. Wenn es dafür am Ende nicht sein, dass wir den Klimawandel begrenzen auf Kosten der Biodiversität und des Artensterbens sozusagen also das darf so nicht sein. Und insofern gibt es eine Menge zu tun und bei der Energie an sich ist es schon wichtig, dass wir weiterhin auch nach weiteren Alternativen suchen. Ich bin fast sicher, dass der Energiebedarf insgesamt steigen wird. Und wir dürfen viele, viele Randthemen, die damit zusammenhängen, dürfen wir nicht vernachlässigen. Also Landwirtschaft ist so ein Beispiel, wie ernähren wir uns, wie wir uns ernähren hat auch was damit zu tun, wie wir mit unseren Böden umgehen. Ich will damit nur andeuten, dass es eben nicht nur um den Klimawandel und dessen Beherrschung oder Begrenzungen an sich geht, sondern dass viele, viele andere Problem Fälle auch damit zusammenhängen, die ich jetzt noch gar nicht erwähnt habe und auch nicht mehr erwähne.

00:25:39 Interviewer

Alles klar das war's von meiner Seite also wenn sie noch was zu ergänzen haben, gerne aber erstmal danke ich Ihnen vielmals dafür, dass Sie mitgemacht haben und meine Fragen so ausführlich beantwortet haben, ist auf jeden Fall sehr hilfreich und ich war dankbar, dass Sie mich unterstützen können.

00:25:54 Respondent I

Ja, sehr gerne, also wenn ich habe unterstützen können, dann freut mich das persönlich auch sehr wünsche ihnen weiterhin viel Erfolg und wenn die Arbeit fertig ist, wäre ich interessiert eine ansichts Exemplar zu bekommen, das wäre nett.

00:25:58 Interviewer

Auf jeden Fall. Auf jeden Fall gut notier ich mir werden sie jetzt kriegen wahrscheinlich im August, wenn es gut läuft.

00:26:10 Respondent I

Ja, ist doch großartig, ich drücke Ihnen die Daumen. Vielen Dank, und das ist eine klasse Arbeit wird.

00:26:13 Interviewer

Und vielen Dank für Ihre Zeit.

00:26:16 Respondent I

Dankeschön.

## D-2: Respondent 2 17:02 Minutes

00:00:00 Interviewer

Alles, klar. Super. Also erst würde ich gerne ein paar Fragen zu Deutschland stellen und dann auch zur EU, weil ich weiß, dass sie auch auf beiden Ebenen geforscht haben, also fangen wir mal mit Deutschland an. Wie hängt denn ihre Arbeit mit der Kernenergie in Deutschland zusammen?

00:00:21 Respondent II

Na ja, also mein Lebenslauf ist ja so, dass ich jetzt Zeitlang am Forschungszentrum Jülich gearbeitet habe, das war damals noch in den 70er und 80er Jahren Kernforschungszentrum Jülich, also das hatte sehr viel mit Kernenergie zu tun. Zur damaligen Zeit war das also der absolute Hochtemperaturreaktor der dort entwickelt wurde, der dann nicht weiter verfolgt wurde, aber da war ich natürlich schon sehr stark mit der ganzen Kernenergieentwicklung vertraut und ich glaube dass den stärksten Einfluss richtung Kernenergie war, weil ich 2011 Mitglied der Sonderethikkommission der Bundesregierung war, wo wir dann mehr oder weniger den Ausstieg aus der Kernenergie bis 2022, also genau bis zum Ende dieses Jahres empfohlen hatten.

00:01:02 Interviewer

Mhm ja, Sie haben ja schon gesagt, die Strategie für Deutschland was wissen Sie denn generell über die die Strategie die Deutschland verfolgt für die Nutzung von Kernenergie?

00:01:12 Respondent II

Ja gut, das hat sich aber auch für die Zeit sehr geändert ja, ich glaube in den 50er, 60er Jahren hatte man geglaubt, dass Kernenergie mehr oder weniger die Kohle und alle anderen Energieträger ablösen würde. Es gab sehr viele Pläne die Kernenergie so auszubauen, dass sie den gesamten Stromsektor in der wesentlichen Kernenergie war zumindest so die Grundlast, in der Mittellast vielleicht noch ein bisschen Kohle und in der Spitzenlast Gas das war so das

Leitthema. Dann in den 70er, 80er Jahren kam der ganze Protest gegen Kernenergie in der Bevölkerung auf, da haben sie auch die offiziellen Pläne geändert. Also es kam dann eher dazu dass man sagte Kernenergie ist ein Element der Grundlast aber nicht das entscheidende, sondern wir werden weiter und bei Kohle bleiben, vor allem bei Braunkohle, Steinkohle ging damals auch schon zu Ende, und dann kam eigentlich so die Phase ab, ich sag mal 2000er Jahre es fing schon etwas früher an, mit den Ausstieg aus der Kernenergie. Das war jetzt zunächst mal ein rot-grüne Debatte, die dann auch zum Ausstiegsbeschluss führte, der aber wohl noch ein bisschen halbherzig war. Sollte ja bis 2035 alles zu Ende sein. Und dann würde ich sagen 2011 war dann der bekannte, Sargnagel für die Kernenergie dann wirklich fertig. Als dann der Ausstiegsbeschluss bis spätestens 2022 dann auch erfolgt seinen sollte, und das war dann glaub ich auch die Phase bei dem klar wurde es wird auch keine Renaissance der Kernenergie mehr geben. Inzwischen gibts natürlich in Deutschland wieder stimmen, das wollen aber ich glaube nicht, dass es wirklich Erfolg haben wird, also wir Deutschland werden meines Erachtens nicht mehr in die Kernenergie zurücktreten. Das sind natürlich noch die Altlasten, also Abbau der bestehenden Kernkraftwerken plus Endlagerung ja, das sind natürlich die beiden großen Themen, die noch bleiben, aber ein Ausbau oder Neubau von Kernkraftwerken in Deutschland sehe ich nicht.

00:03:08 Interviewer

Mhm ja, sie hat das gerade schon einmal kurz erwähnt, also dass sich die Strategie auch geändert hat, zu welchem zu welchem Zeitpunkt speziell und warum hat sich die Strategie geändert?

00:03:17 Respondent II

Na ja also ich würde sagen, die ersten großen Bedenken gegenüber Kernenergie kamen 70er Jahre auf, denkt an die vielen Demonstrationen und erst gegen Wyl '74 dann Brokdorf '76. Da fing es an zu bröckeln, du musst das so sehen, die Grünen kamen jetzt gerade auf die waren also noch nicht in irgendeiner Regierung vertreten. Ich glaub, Hessen war die erste dann. Und, und die waren natürlich sehr Anti-Kernenergie eingestellt. Die SPD war interessanterweise sehr pro-Kernenergie zur damaligen Zeit. Die CDU war eigentlich froh, aber jetzt nicht, sagen, konnte sich nicht vorstellen, dass man nicht mehr auf Kohle setzen könnte, also der erste große Einschub war dann eben auch mit den größeren Kernkraftwerksunfällen also Anfangs Three-Mile-Island und dann natürlich Tschernobyl. Das da also die Kernenergie, positiv-Front langsam zusammenbrach, aber es blieb ja noch bis Mitte der 90er Jahre, so dass die Kernenergie weiterhin als Zukunftstechnologie gefeiert wurde, aber nicht mehr als einzige. Also das war eine Veränderungen gegenüber der Vorzeit. Auch erneuerbare Energien wurden plötzlich interessant. Die waren bis sagen wir mal '75 als additive Energie überhaupt gefragt und dann, wie gesagt

kommt die rot-grüne Bundesregierung rein mit dem Wunsch, eben einen Kernenergieausstieg zu haben, das ist die zweite große Phase. Also mit Joschka Fischer, damals und Trettin, der ja als Umweltminister und da war eben die ja den langsam Ausstieg aus der Kernenergie vorzunehmen. Der wurde auch beschlossen, aber als dann die CDU wieder gewann, wurde wieder überlegt, ob nicht doch Kernenergie weiter betrieben werden sollte, zumindest dass man noch länger mit Kernenergie als Übergangstechnologie arbeiten sollte und dann kam Fukushima, und das war dann sozusagen wirklich das der Endpunkt.

00:05:27 Interviewer

Mhm, wen sie bei diesen Veränderungen so als treibende Kraft also wen oder was sehen Sie als treibende Kraft, weil das ja schon so ein hin und her mehrmals.

00:05:35 Respondent II

Also ich denke zuerst mal war, waren tatsächlich die Bürgerinitiativen, die noch gar nicht so stark parteipolitisch verankert waren, dann kam die grüne Partei, die natürlich ihre Identität ist am Anfang als Anti-Kernkraftwerkspartei gefunden hatte und die natürlich da, wo sie Einfluss hatte, das auch ausgewirkt hatte. Dann kam ich sag mal, die zunehmende Ernüchterung auch in den etablierten Parteien vor allem mit der SPD auf das fing glaube ich mit Tschernobyl im Wesentlichen an. Three-Mile Island hat glaub ich nicht so großen Einfluss gehabt. Aber Tschernobyl hatte schon großen Einfluss. Und da brach sozusagen die eher linke SPD mit der Kernenergie und dann war die SPD gespalten also die eher Gewerkschaftsfaktion, aber weiter dafür die eher ich sag mal die links-intellektuelle Fraktion war dagegen. Bei CDU war eher der Wunsch weiterzumachen, bis eigentlich Fukushima und bei Grün, klar, war immer schon und die FDP war eigentlich die besondere Ausschlaggebene der Debatte, aber eher für Kernenergie. Ich glaube, das ist auch die Partei, die jetzt am ehesten noch mal an Renaissance denken würde ich glaub in anderen Parteien ist es auch nicht mehr so Debatte.

00:06:55 Interviewer

Also sie sehen so parteipolitische Elemente als als treibende Kraft hinter dem Wechsel?

00:06:57 Respondent II

Ja, ja schon, und natürlich Zivilgesellschaft, ja, also das ist klar die war von Anfang an ja sehr stark, also der Kernkraftwerksprotest war ja außerordentlich heftig und auch mit vielen Menschen, die dahinter standen, also von daher hat natürlich die Akzeptanz der Bevölkerung auch eine große Rolle gespielt.

00:07:20 Interviewer

Und mit Blick in die Zukunft glauben sie, dass sich die deutsche Strategie nochmal ändern würde oder bleibt man auf dem Pfad wo man jetzt ist?

00:07:26 Respondent II

Ich glaube das bleibt dann also gut, man kann nie sagen, aber dann müsste etwas sehr entscheidendes, das sich verändert also ich glaube, dass in Deutschland Ausbau der Kernenergie nicht mehr ansteht, es ist auch so, dass wir gar keine Firma mehr haben, die das machen würde. Wir haben auch gar keine Fachkräfte mehr dafür, ja also von daher ist es natürlich auch ein bisschen ausgeblutet. Man kann natürlich auch etwas importieren, aber wir werden eher Strom importieren. Das kann natürlich sein, dass wir Atomstrom importieren schon bei der europäischen Sicht, aber dass wir neue Kernkraftwerke bei uns in Deutschland zulassen, seh ich im Moment so gut wie keine Chance.

00:08:04 Interviewer

Und ihre persönliche Meinung also sollte, sollte Deutschland ihrer Meinung nach auf dem Weg bleiben oder sehen Sie da noch andere Alternativen als relevant?

00:08:12 Respondent II

Also ich denke ich hab jetzt keinen vehementen Anti-Kurs für Kernenergie, also ich denke die hat ihre Vorteile aber ich glaube, dass es für Deutschland a) gar keine Chance mehr gibt, ja also was realistisch sieht b) ich sie auch nicht für sinnvoll halte also sind noch dicht besiedeltes Land, ir können mit erneuerbaren Energien uns versorgen, weil sehe ich jetzt sich ein, also das Risiko nochmal auf uns nehmen müssen.

00:08:38 Interviewer

Mhm super ja, sehr interessant also, auf jeden Fall auch perfekt relevant für meine Forschung. Jetzt machen wir mal nächsten schrittrichtung EU. Sie forschen auf jeden Fall auch auf dem Gebiet der EU. Was was hat ihre Arbeit denn generell mit Kernenergie auf dem EU Level zu tun?

00:08:55 Respondent II

Naja, beim EU Level haben wir eine sehr unterschiedliche Auffassung zur Kernenergie. Wir haben Frankreich, Belgien, die sehr stark weiter auf Kernenergie setzen. Finnland auch. Wir haben Länder, die zumindest verbal stark auf Kernenergie setzten Großbritannien. Wobei das ist nicht EU aber trotzdem Teil des Europas. Auch Spanien, behauptet zu mindestens teilweise, dass sie

weiter Kernenergie betreiben will, aber wenig tun. Wir haben die osteuropäischen Länder, die weiter Kernenergie mitmachen wollen. Tschechien, Slowakei und wir haben die Länder, die im Prinzip sich verabschiedet haben. Da gehört noch Österreich dazu, Italien, Deutschland, Holland, Schweden wahrscheinlich auch ja, so die lassen es jetzt auch auslaufen. Also es gibt unterschiedliche Lager innerhalb Europas und ich glaube, die die stärkste Polarität besteht sogar zwischen Frankreich und Deutschland und man will also Frankreich hat über 70% Atomstrom heute im Netz, das können die auch nicht so schnell aufgeben. Belgien hat etwas 86%, gut Belgien ist klein die brauchen nur 2 Kernkraftwerke damit sie damit das gesamte Land versorgen. Und dann haben wir eben Tschechien und Slowakien und so weiter die weiterhin Kernkraftwerke haben und die auch weiter betreiben wollen und auch zumindestens wenn die ihre Laufzeit Ende erreicht haben, dann auch zumindestens die bestehenden erneuern.

00:10:31 Interviewer

Mhm und so, wenn man, wenn man denkt an die gesamt EU-Institutionen sehen sie da eine bestimmte Strategie auf dem EU Level oder ja den Flickenteppich, den sie gerade erwähnt haben.

00:10:41 Respondent II

Ja, also die EU tut sich sehr schwer, weil eben Länder sehr unterschiedlich sind. Also das haben wir gesehen beim Green deal auch Kernenergie sozusagen als Green eingestuft wird oder nicht. Frankreich, ganz dafür, Deutschland eher dagegen, Österreich sehr dagegen, also die EU hatte ja jetzt im wesentlichen gesagt, dass sie bei der Kernenergie Strategie es den Ländern überlässt also sie hat keine europäische Politik in Richtung aufgehängt. Und da kann man sagen das war klug, weil die Länder sich nicht einigen können, dann auch sagen, das ist eine vertane Chance, da hätte Europa irgendwie zusammenstehen können. Ich glaube nicht, dass es eine Einigkeit in Europa zu dem Thema gibt.

00:11:24 Interviewer

Und ist das eine Strategie, die Europa schon länger verfolgt, das den Ländern zu überlassen oder ist das, hat sich das mit der Zeit entwickelt

00:11:31 Respondent II

Naja gut, es gab ja EURATOM also damals 60 70er Jahren war da gab es natürlich noch EWG statt EU, da war natürlich Kernenergie Gesetz für Europa, ja und auch in den 70er, 80er Jahre hat man zwar jetzt keine, gab sehr wohl europäische Initiativen auch Richtung auf gemeinsamen Brennstoffkreislauf und so weiter. Aber als dann Einzelländer abbrachen, hat die EU zunehmend

dieses Thema aus ihrer Zuständigkeit zusammen in die Länder hinein, also in die einzelnen Länder der EU hinein zurück, eigentlich, delegiert, und hat sich dazu nicht mehr intensiv geäußert. Es gibt immer mal wieder Energie Szenarien, die auch von der EU betrieben werden. Da wird aber davon ausgegangen, dass die Länder die Kern irgendwie haben sie weiter betreiben und ausbauen und die, die es nicht haben es nicht tun, aber sofern nimmt man auf den Staat nicht so Rücksicht.

00:12:30 Interviewer

Sie hatten eben bei Deutschland auch Tschernobyl und Fukushima als, als nennenswerte Punkte erwähnt in denen sich die Strategie geändert hat. Sehen Sie das auf EU Ebene auch in irgendeiner Weise?

00:12:40 Respondent II

Also Tschernobyl mehr als interessanterweise Fukushima bei Tschernobyl, war tatsächlich danach ein ich sag mal auseinanderfallen der Länder sehr deutlich zu spüren. Nach Fukushima gab es da diesen europäischen Stresstest, also da mussten alle die Kernkraftwerke Stresstests unterzogen werden, die die wesentlichen dann auch gewonnen haben und in den vielen Ländern die Kernenergie laufen wie Frankreich, aber selbst und England und hat man gesagt Naja, ist ja eigentlich gar nichts passiert in Fukushima, das war ja ne große Welle, die Menschen umgebracht hat, also Tsunami auf Fukushima, selber war ja eher, also marginal im Vergleich zu den 15000 oder noch mehr toten durch den Tsunami. Das, während in Deutschland natürlich Fukushima im Vordergrund stand und der Tsunami fast gar keine Rolle spielte. Ja, das kann man auch bei Medien Analysen sehr schön sehen also wenn man England, Deutschland, Frankreich vergleicht. Medien in Deutschland, jedes dritte Wort war Fukushima und jedes dritte Wort in Frankreich in Deutsch- ne in England, war Tsunami, ja. So dass das eigentlich nicht zu einer Veränderung eigentlich der Nuklearpolitik wesentlich beigetragen hat. Also es gibt Länder, wie Spanien, da ist man skeptischer geworden zur Kernenergie, aber das hat nicht zu einer völligen Veränderungen der Politik geführt.

00:14:08 Interviewer

Mhm und auch hier nochmal den Blick in die Zukunft sehen Sie da nochmal eine Änderung des Kurses auf europäischer Ebene oder denken sie auch, dass es da ähnlich bleibt?

00:14:18 Respondent II

Naja, das kommt so ein bisschen an, wie sie mit dem Green Deal weiterkommen also ich hab so den Eindruck, dass die Dekarbonisierung sicherlich ein großes Ziel ist, dass wenn sie damit nicht weiterkommen wird der Druck von Europa doch mehr Kernenergie zu setzen zunehmen könnte, weil das vor allem dann, wenn Franzosen, Engländer, weniger Franzosen, Belgier und die Osteuropäer die stärker durchsetzen werden. Glaub aber nicht das ist eine EU weite Kernenergie aus der Politik werden wird, sondern höchstens, dass die EU das noch weiter für einzelne Länder, die das wollen, fördert.

00:14:57 Interviewer

Und jetzt noch mal so ein bisschen einen Vergleich zwischen zwischen der EU und Deutschland sehen Sie da Übereinkünfte mit der deutschen Strategie oder der und der EU Strategie? Oder sehen Sie da eine Diskrepanz?

00:15:10 Respondent II

Also ich denke, die ist schon ziemliche Diskrepanz. Es gibt natürlich Dinge also EU will natürlich ein sicheres Endlager. Deutschland will das auch, wir wollen alle die größtmögliche Sicherheit also ich sag mal, viele Ziele sind natürlich ähnlich, aber im Ausbau der Kernenergie ist da halt die EU zurück, wobei ich denke, dass die CGT Energy gerne, dies ist auch sehr stark französisch ich sag mal von vielen französischen und Franzosen sind dort im Beschäftigungsverhältnis, die ist eher kernenergiefreundlich, also wenn man mit den Ministerialbeamten da spricht ja in der CTG von der Energie. Die sind eher Kernenergiefreundlich aber wissen politisch gesehen geht das nicht und deshalb halten sich zurück.

00:15:56 Interviewer

Mhm und würden Sie persönlich für mehr oder weniger Harmonisierung in der EU Kernenergiestrategie plädieren?

00:16:03 Respondent II

Die Harmonisierung wird nicht funktionieren, weil es ja in Frankreich und Deutschland, werden sich nicht einigen da also ich glaube, das wird nicht gehen, also was gut ist, ist die Harmonisierung Richtung auf gleiche Sicherheitsstandards und natürlich Harmonisierung auf beispielsweise Endlagerung und da könnte ich mir einiges gut vorstellen. Das müssen alle machen egal ob sie ausgestiegen sind oder nicht brauchen wir deutsche wohl ein Endlager also da seh ich Harmonisierungspotential, beim Ausbau nicht.

00:16:33 Interviewer

Alles klar, das war auch schon meine letzte Frage, wenn sie noch Fragen oder Rückmeldungen haben, ich hab ihrer ihre Assistentin, der Jutta das zukommen lassen, das Kontaktformular auch wo alle Daten drauf sind, genau da können sich natürlich jederzeit gerne bei mir melden.

00:16:50 Respondent II

Okay, alles klar wenn wir also wie gesagt, ich denke, die wichtigen Dinge haben sie angesprochen, das ist gut, ich hoffe ich Ihnen da ein bisschen weiterhelfen können und dann wünsche ich Ihnen. Guten Erfolg das wäre.

00:17:00 Interviewer

Vielen Dank.

00:17:02 Interviewer

Wiedersehen, Tschüss.

### D-3: Respondents 3 and 4 46:15 Minutes

00:00:00 Interviewer

So, thank you so much I'm not really sure on how we want to do this with interviewing 2 people. You're the first set of colleagues I've interviewed, but my first question is how does your work relate to nuclear energy? I'm not sure, do you have like different fields where you work on or you do basically the same thing?

00:00:20 Respondent III

OK, well maybe I can start, and we work in the Joint Research Center of the European Commission, as I mentioned to you, the Joint Research Center provides scientific evidence and support which is used in various stages of our policy: policy definition, policy implementation, policy monitoring, by other services of the European Commission in we work in the Directorate for Nuclear Safety and Security, which is one of the Directories of JRC, and it's entirely dedicated to nuclear research and this nuclear research is defined in its main goals and objectives in the EURATOM research and training program. This is typically a five years cycle. We are now in the 2021-2025 cycle. This European cycle is a little bit going in parallel with the research framework of the European Union, so the core is on EU right now. There is a little, a little mismatch in the sense that the framework programme last seven years and the EURATOM

research and training programme last five years. So at the end of these five years, there is usually a two year extension to match with the, with the overall research framework. The EURATOM research and training Program is an emanation of the European Treaty. The Euratom Treaty, in fact, is the legal basis for the existence of the Joint Research Center. And it's one of the Treaties of Rome was signed in 1957, and it's one of the founding treaties of what is now the European Union. The Euratom Treaty is dedicated to the fostering the peaceful use of nuclear technologies and nuclear energy and also making sure that these applications remain peaceful and are not misused for other applications. So that that's our historic route in the in the, in our legal mandate. So, since the beginning, we perform research on various aspects associated with nuclear energy and applications of nuclear energy. The, in fact, the EURATOM Treaty says in one of the articles it establishes the Joint Research Centre, so now we are part of the European Commission, but our origin is directly enshrined in this industry. But this is the basic, the basic let's say frame. What we do is we operate laboratories in which we perform research. We work on various aspects associated with the nuclear energy lifecycle. In particular, we'll look into nuclear safety aspects, so safety related components of the operation of nuclear reactors of the treatment of spent nuclear fuel removed from the reactors, the management of the waste all the way up to the disposal. In addition to the safety but not less important there is also the safeguards and security component. So these two is based on research and expertise but dedicated to making sure that the tools are properly implemented to monitor and make sure that there is no hijacking or misuse of nuclear materials and I am within within this, I work on the safety component and [Respondent IV] works on the safeguards and Security Code. So you got the mix of some of our basic basic activity. And uhm, OK. Other, other aspect is nuclear energy. In the US, this was considered in the 50s as one of the way to help integration and help the economy of the European Member States. But there is one basic consideration that applies also to many of your questions. Energy, so which form of which energy source is used by the Member States is not something decided at European level. This is competence of each Member State so somehow to say look at the energy strategy of the EU might be misleading because the nuclear strategy is by each Member States. So each Member State decides if they want to have nuclear energy in their portfolio or not. In some countries, they used it and now they want to phase it out like Germany for example. Other countries never used it and other countries did not use it, but now they are interested in in using it in the future, so there is quite a variety of strategies in the in the Member States. We are a European organization, so in a sense we try to cater to provide support to the Member States irrespective of what their strategy is. And there is work to be done in nuclear safety and nuclear safeguards. And for all these countries, the countries that have nuclear energy, the countries that want to exit nuclear energy and the countries that want to enter nuclear energy, so our research portfolio is

also diversified to be useful as much as possible to for different Member States. And OK, I stopped here. This was just a very basic introduction. I don't know. If [Respondent IV] wants to add something. Especially on the safeguards part, yeah.

00:07:40 Respondent IV

Yeah, well the safeguards part is not, uh, it's not strictly speaking, a component of the energy policy. I mean, where whenever nuclear energy is used, it must be safeguarded. That's the that's mandatory under the EURATOM Treaty for Europe. And also, the additional agreements that Europe has signed with the IAEA on the international level, so that's to cut it short when up whenever nuclear energy is used, the safeguards agreements in place at the European and at the international level must be complied with. And that my, that's my job here in [City]. Uhm, with regard uhm, maybe just to complement what [Respondent III] just said on the German energy policy, uh, I think we both are informed laymen, so to speak, because we have no job-related activity with regard to the German energy policy. So my knowledge is from reading the newspaper basically. That's one thing. But at the European [Phone rings] It's fine. I will look later. At the European level, the only director general that I can think of which has some kind of but activity in its post portfolio is DG energy, they have developed a couple of years ago. I don't know if you followed that on an energy road map, well, also nuclear energy is part of because simply some of the EU Member States use nuclear energy so. But the Commission simply reflects the fact that in the EU, on the territory of the EU, nuclear energy is used, it does not, it does not advocate or promote nuclear energy to countries who do not wish to use it. So I'm I don't know if you have contacted people in DG ENERGY, but for your, for your project, I think it would really be very useful to have also people used to speak with in Luxembourg. Basically, maybe in Brussels, but certainly in Luxembourg.

00:10:17 Interviewer

Yeah, that sounds really interesting and relevant as well. Do you know anyone, like, by name, who I could contact there?

00:10:24 Respondent IV

Well, I would, I would contact [name redacted]. I'm not sure he knows he's the right person but he may be able to direct you.

00:10:33 Interviewer

Yeah, that's fine fine.

00:10:35 Respondent IV

I can dig out the e-mail address quickly and send it to you.

00:10:44 Interviewer

That would be great, yeah, because I'm always interested in getting more professional opinions on that.

00:10:50 Respondent IV

And there is another one I have to, she was a student in our... I may send you another, another name.

00:11:06 Interviewer

Right, But yeah, in your statement right now, you both mentioned, like, the discrepancy of Member States in the EU when it comes to like nuclear energy strategies. And I'm really interested to know. Uhm, would you say that that there's no strategy on the EU level when it comes to nuclear energy? Or like what goals or plans does the EU pursue when looking at nuclear energy?

00:11:35 Respondent III

But there is some the the answer is yes and no in the sense that since each member state decides not only for nuclear, but uh, also for the other sources of energy, besides what their mix is, there is not what what would normally be considered a strategy meaning a binding, a strategy that fits all. However, there are some common and agreed tools which are in use. One is, for example the European directives. The European directives exist, and they've been ratified by all the Member States which regulate the for example, they would nuclear waste management they regulate the safety, the nuclear safety, they regulate the transport. And these directives set some requirements for all the Member States. For example, the Waste Directive sets requires all the Member States to define a plan or about on what to do with with their nuclear waste. And this indeed applies also to countries that do not use nuclear energy, because there are nevertheless other radioactive waste forms. For example, for from the hospitals or from other applications. And they need also to be managed according to certain criteria which are set by the by the directive, another. So these are more like laws. If you want more legislative type of a regulations, but there are also some initiatives that are more in the direction of defining, in a sense, a common approach to common problems I would mention here the the SET plan. The set in the SET Plan road map. The SET plan is an initiative that was established in 2007 and um, I'm reading now the the official statement, and the SET plan has been the core instrument helping align European and national clean energy

research priorities turning synergies into concrete projects and outcomes, bringing solutions from the lab to the market and supporting clean energy ecosystems. Uhm, it this is the the SET plan is now connected for example in the Green Deal and other more specific actions that payment decarbonizing the energy sector and our our economies in general. So this SET plan is not a nuclear energy strategy. It contains 10 key actions and one of them is about nuclear safety. As [Respondent IV] was saying, for those countries that want to want to use nuclear energy there is this common approach, as in the state plan. Other other main domains are renewable energies, consumers in the energy system, efficiency, sustainable transport, carbon capture and utilization and storage and nuclear safety. So it's a broad a set of key actions which includes also for those who want to to use nuclear energy. This set plan now is connected. To um the two more recent actions, what one of your question is how the strategy has changed. Of course, what has been changing is not so much the nuclear strategy, but the energy strategy in general. Of the European Union in the sense that the emphasis on the decarbonizing has become major and has become very important. So what for example Mrs. von der Leyen has brought since she joined, she became president of the Commission are programs like the the European Green Deal and the FIT for 55 Initiative all these set objectives to the degree of decarbonization that has to be implemented in Europe by a certain time 2030 and 2055, etc. The final goal is to arrive to a carbon neutral economy in 2050 and so we think this for the countries that decide to use nuclear energy since nuclear energy is a low carbon energy source and then there are, they are they there are there are, Let's say the requirements as defined by the directives and the and the additional requirements that are that are being defined. For the Member States now this let's say the more specific relationship with uh with energy developments. And maybe I can mention also as a new, relatively new development is the taxonomy. I don't know if you heard this name already, but the idea is in order to foster this transition to decarbonize the economy, how to provide incentives and how to support actions that go in that direction and one of them is related to financial help to implement green or greener activities. And in order to help decide if something is green or not and so deserves to be helped or not this taxonomy has been developed. The first set of technologies has been already group and now there is discussion about maybe you have you heard about approving a complementary delegated act, which would add to the first group of technologies. Also, nuclear energy and gas. For the nuclear energy, this would be subject to respecting some technical screening criteria which relate again to nuclear safety to having in place. For example, a geological repository for the high level waste, adopting state of the Art safety measures, et cetera. So this is a little bit the frame in Europe and how it has evolved in recent years. The complementary delegated acts are currently waiting for approval or not by the European

Parliament, which should vote in July on that, and if the Parliament approves, then they would become valid. This criteria for supporting also some new energy technologies, January 2023.

00:20:08 Interviewer

Yeah, very interesting, yeah.

00:20:11 Respondent III

Yeah, and I don't know [Respondent IV], you want to add something?

00:20:19 Respondent IV

Well, I must say I was just looking, uh, if I find the energy road map of DG Energy. So, uhm. Yeah, the taxonomy I would. I would also have mentioned if you hadn't done it, I mean. Maybe generally speaking, I think you planned your research a couple of months ago and I think by the political events, let's call it like that of the last four months it has been it's extremely high on the agenda. Now I mean end of December, yeah, there was this taxonomy, let's call it compromise of gas for Germany and nuclear for France. I mean to express it a bit in simple terms. And two months later it's a very much in question already. Yeah, so I think your work comes comes right, it comes out really at the right time. But, uh. Frankly, from my from my angle from the angle of my work, I can't say, I can't say much, work related because what we do is not really related to energy. Let's say to any energy security or energy policy, it's just to keep the surveillance and the monitoring running of all of all the installations which use nuclear energy. And in practical terms, folks for me from my unit, for example, we have, we deal a lot with France because France has a lot of nuclear power installations. Not only reactors also other facilities which are part of the fuel cycle from fuse application until reprocessing the so called backend. Uhm, but that is more a response to the individual policy of the of the different Member States. Oh uhm, I mean in in energy policy you always have the triangle, I think it's a triangle between energy security, security of supply. That's where Germany struggles a lot now. So security of supply, the low CO2 and the cost. That's another issue of big concern nowadays. So we see this triangle in big disequilibrium now. And that's clearly a strategic question where different Member States have had different considerations, different replies, and I'm not sure we should go much into that now, because that's more the area of personal opinions or things like that. Uhm, and not really related to our work.

00:23:50 Interviewer

But you would agree generally with your colleague to say that the Member States play a bigger role when it comes to energy policy, then the EU institutions overall.

00:23:59 Respondent IV

Oh yeah, yeah yeah every basically every country is autonomous now. And, uh, OK, there are attempts nowadays, uh, from some Member States I mean. Also that's again following the press to buy gas. On the, at the European level rather than on the individual level. So to avoid that one country offers higher prices than others and gets the gas and other things like that, so there you have a certain European element, but even that's not the that was just a proposal of some Member States, it's not something that is agreed by no means.

00:24:42 Interviewer

Yeah, yeah.

00:24:46 Respondent IV

OK, we have the, we have the interconnection of the grid. So in a certain sense. I mean there is a European or even it, it goes beyond the EU or because you also have Switzerland. For example, you have Norway, which are connected to the European grid, so there is a kind of equilibration of all the different, some elements of energy production like, like during daytime, some neighboring countries pump electricity into Switzerland to bring up the water to the mountains and, uh and later on when the water is up, Switzerland can give energy back. You know this kind of, but that's more pragmatic, pragmatic approach, and it's not, uh, it doesn't have anything to do with the choice on which methods are to be used.

00:25:52 Interviewer

But looking at the way the European Union is acting now like so the EU institutions leaving energy policy and nuclear energy policy to the Member States looking back into the past, has it always been this way or has there been a change at any time?

00:26:09 Respondent IV

I don't think so I don't see a change. No, no, no it it. It has never been European and then went back to the Member States. Definitely not, no no. I think it has always been a and there are certain, I mean, if you look at Europe as a whole, you have certain elements which are really European like for example, the export rules. Uhm, you can export certain items and you cannot export others, you cannot for example export atomic weapons like that, for example. I mean, that's a really maybe a bad example, but there are certain items which are simply regulated also on at the European level. But there are other areas which are completely national, for example nuclear

security is a national domain the Europe has no say. Energy, I mean Europe will not tell Germany or France how they have to produce energy. That's national competence.

00:27:28 Respondent III

What is available and it's also, part of the Euratom Treaty is that. When asked their choice. Is left to the Member States there are in any case some obligations. Uhm, with respect to declaring what you are going to do and providing information to make sure that what you want to build does not affect the neighboring country, et cetera. So there are procedures whenever a Member States want to develop a new installation or new activity, there are some requirements to inform the Euratom about this and then this is subject to assessment to make sure that it's safe that we fulfils our respects, let's say the criteria that applies across the boundaries of the Member States. So in this respect there is interconnection of meaning if it's Germany or the Netherlands, one or friends want to build the power station, but or even just a storage facility or other facilities that involve are managing radioactive substances they have to prepare a dossier, make a declaration, and this is then evaluated by maybe some Committees are related according to the Euratom procedure and then is approved so that the decisions are by the Member States, but there is in a sense a kind of interlinked interaction or control also by the neighboring especially by the neighboring countries. But what I was saying is aspects are then specifically related to the implementation are competence of the individual Member States and in fact and this affects also some of the procedures. Some of the procedures on how to operate certain facilities can be different from country to country and the efforts to harmonize some of these procedures have been proposed, but not fully, not really implemented. This does not affect the overall safety, but it affects specific way of dealing with substances and materials inside. The different countries.

00:30:24 Interviewer

Yeah, but speaking of harmonization I want to sum up a little bit and take a look into the future. Do you see any trends or hints of increasing harmonization in this field in the future? Or do you think it'll continue on this path?

00:30:40 Respondent III

The trend and the driving force for this is related to the fact that. If, if a company or a consortium develops something that one and they want to market it in different countries, right now they have to undergo very different authorization processes in some cases, so it would be a big help if there would be the same authorization process so you do it once and then you know that your product can be used in more than one account. So this would be a driving force to towards having a better

harmonized set up. Right? Regulatory items said that there is also resistance because. Uhm, then we which is the best norm to regulate something? It's a little bit if you want like the like the plugs, electric plugs that they all work, they are all safe. But they are different. So and and who? Who is there to decide which one is, has to be used everywhere? So, it's not a simple, it's not a simple discussion.

00:32:05 Respondent IV

I mean that there are there are the climate goals, CO2 reduction by whatever date may be, I don't know what 2035 or 2060. Uhm reductions, contributions from cars, for example. Uh, there is a European approach on legislation, but how to get there? That's national. Uh, you know France is doing that by nuclear by combination of nuclear energy and water basically I mean. Uh hydro storage. Whereas Germany is doing that by wind and solar and gas right now, and nuclear until the end of the year. So that's the bottom line, the reduction goals are clear, but how? How to get there? How to get there? That's a national legislation.

00:33:16 Interviewer

Really yeah good good. Summing up for the end. Yeah definitely. So just to reiterate a little bit. You say that there isn't really a strategy on the EU level, but rather SET plans and directives and that it's mostly national. Legislations that will energy policy in the EU and that that has been done that way since it was established and will be done that way in the future. Would that be right?

00:33:47 Respondent III

Yeah, what one can say is that and there is a common goal. This goal Decarbonizing is accepted by all the Member States and in fact they are all committed to achieving these objectives. These are started before the von der Leyen Commission, von der Leyen has put more emphasis on it and so the basic goal Is to decarbonize how to decarbonize is left to the the Member States several options are there around the table. What has been a big change since you have a question on that, a big change is being the war in Ukraine, the invasion of Ukraine. This has made, has raised the importance and the relevance of the, on the supply of the of the energy source in addition to the decarbonization, so now there is an issue not only of what's the best way to decarbonize the economy. What's the best way to keep our autonomy and not to be dependent any longer by countries like Russia for example. And so this adds an additional component that puts pressure, for example on things like gas or oil. Maybe also nuclear but nuclear does not depend on Russia to a very large extent so. And this, let's say this dynamic might generate some further changes, but we don't know what these changes would be the coming months and years.

00:35:50 Respondent IV

Uhm, I can maybe add to what [Respondent III] just said I can, I can add a small story, uh I am. I started on a professorship in Strasbourg. When was that, 1998, and when I made a it was in nuclear chemistry. And I made a tour about I mean to say hello to the other professors there, and I met an analytical chemist and we talked a little bit about energy and it was the time when it was already back then it was already uhm, it was clear, relatively clear that that was when, uh, 1998 was the year when Kohl lost the elections. I think it was still Kohl. I'm not sure who was the candidate of CDU. And uh, and Schröder won for the SPD. Uhm, so it was already clear that nuclear would, uh, was on its way down. And so the colleague was asked, yeah, but how do you think Germany will produce the baseload energy? And then I said, well, I don't know, but I guess it will be gas and coal. Uh, and where does it come from? I guess the gas to a large extent from Russia. And then he was not really convinced and said, yeah, OK, we the French, we like the Russians a lot but we would not build our energy policy on Russia and make us make us independence. Make us dependent on Russia. That was 24 years ago. I, uh, I didn't forget that that that little conversation. And of course it has no meaning in front. It was just a private conversation now, but still it was someone who was also relatively involved in, uh, in French in the French policies circle. Uhm, and if you if you want to take out differences, then I think it's also worthwhile to come. To look at France, not only for the...

[Technical difficulties ]

00:39:49 Interviewer

Sorry about that I don't know what happened there can you hear me?

00:39:52 Respondent IV

Yeah, I think. Uh, zoom shuts down after one hour.

00:39:55 Interviewer

Oh OK, sorry. Thanks for joining again. Yeah, it's the it's the university version, I'm not sure what version they have

00:40:01 Respondent IV

Yeah, yeah. What was saying is what I wanted to say is I'll be finished in a minute. To understand the French and the German position. It's one has to go back in history a bit after World War Two, when France was basically shocked that they were defeated within a couple of months

by the German army in 1940. They drew several lessons. One is independence. One is, the country needs more people because Germany had 80 million at that time and France, I don't know, maybe 60 or so. So they developed the policy to promote, to promote families with at least three children and the whole tax system is built on minimum of three children per family. So that, I think that the conclusions drawn from the Second World War in in the two countries, it's not surprising they have been really very different of course the challenges imposed by history on the conclusions to make are really different between the two countries, but I think also energy policy can be can be has to be seen in that context as well. At least the French definitely.

00:41:35 Interviewer

Yeah, that's what I'm interested in, actually I'm taking a historical view as well and that's why I ask about the changing, uh, changing strategy on the EU level because I'm really interested about how the history. He has affected the nuclear energy strategy in Germany and on the EU level, and obviously national policies play into that a lot.

00:41:57 Respondent III

Well, we looked at the recent years, but if you look at the full history the European Treaty was established to foster cooperation in integration among the Member States. To develop nuclear energy, so it was it was made to with the idea shared by the Member States that nuclear energy was an important tool to help the national economies. And then there was a big change of strategy in the in the 70s in particular, started in the 70s and then much more in the 80s with a huge turning point after the Chernobyl accident, by which more and more certain Member States became not so interested in looking at energy more and in some cases became opponents of nuclear energy. So this is, uhm, if you if you look historically to a longer to a longer timeframe then, yes, there is doing this series of turning points. So for example a country like Austria had built nuclear power plant. It was almost essentially finished and then they changed their mind, uhm, and they and they and they are now strongly opposing use use of nuclear energy so, there have been if you if you go far enough into the past, you find big changes. But now it's more or less reflected into this variety of positions on the Member States. Which in some cases allows for further changes in other cases appears very rigid, like for example in the Netherlands. I know that in, in the last couple of years, there's been a rethinking of the usefulness of nuclear energy. And there's been the announcement that maybe some new local power plant will be built. And other countries think that they can do without because the other point. That may generate changes of strategy is can the decarbonization of energy production occur without nuclear energy? This is a hotly debated topic. There seems to be quite broad opinion that without nuclear energy you cannot

really achieve fully the goals that are now set for our economies. So this this might cause some further changes in the future we will have to see how this, together with the issues related to the security of supply of our raw materials will affect our families.

00:45:32 Interviewer

Right, I think that was all the questions I had and thank you for your answers that were very insightful and helpful for my work. Do you have anything else you want to add on the topic?

00:45:46 Respondent IV

Can you send us a copy of your thesis? When it's ready.

00:45:48 Interviewer

Yeah, sure, I'll make a note of that, of course. Great then. Thank you very much again for participating. And I'll send you a copy when I'm finished, probably in August.

00:46:07 Respondent IV

OK, all the best.

00:46:09 Interviewer

Thank you. Bye bye.

00:46:13 Respondent IV

Bye bye.

#### D-4: Respondent 5 16:49 Minute

00:00:00 Respondent V

Da meine Forschung mittlerweile sich um andere Themen dreht, aber das werden wir dann gleich rausfinden, dass ich einfach bei manchen Fragen vielleicht noch passen muss, weil weil das einfach nicht mehr in meiner Kernexpertise liegt, aber das sehen wir dann.

00:00:12 Interviewer

Ach, alles gut! Ja, ganz entspannt, wir machen uns da keine Sorgen, aber grundsätzlich also mich interessiert auf jeden Fall erstmal wie ihre Arbeit denn generell mit der Kernenergie in Deutschland zusammenhängt oder zusammenhing dann wahrscheinlich eher.

00:00:26 Respondent V

Ja ja also, ich hab mich insbesondere in den Jahren 2013 bis 2016 damit stärker beschäftigt. Das war so gegen Ende meines Studiums der Politik- und Verwaltungswissenschaften in Konstanz, und ja zu Beginn meines Promotionsstudiums in St. Gallen. Mittlerweile, also die Veröffentlichen dazu sind ja glaub ich einige Zeit später dann rausgekommen oder so ab 2015, das ist halt einfach dem wissenschaftlichen Prozess geschuldet na, das dauert halt immer relativ lange, ich befasse mich immer noch...jetzt muss ich die Maske aufziehen, aber ich denke, sie verstehen mich immer noch. Jetzt befasse ich mich mittlerweile immer noch sehr stark mit der Energiepolitik, insbesondere ja auch aus Perspektive des Klimaschutzes und ja da die Atompolitik ja im Grunde in Deutschland abgeräumt wurde, oder jetzt gerade erleben wir halt nochmal interessante Diskussion aber das hat sich dann sozusagen auch mein Forschungsinteresse daran dann so ein bisschen erübrig, sagen wir mal, das ist ja auch normal glaube ich für Forscher, dass man dann auch immer mal weiterzieht und, genau, also jetzt aktuell mache ich nichts aktiv in dem Bereich aber klar, habe mich ein paar Jahre lang damit auseinandergesetzt, dann auch ein bisschen aus vergleichender Perspektive, weil ich natürlich auch diese, das wissen Sie wahrscheinlich aus meiner Arbeit, auch dann interessiert hat wieso sich das der Unfall in Fukushima so unterschiedlich ausgewirkt hat, was die energiepolitischen Strategien verschiedener Ländern angeht.

00:02:05 Interviewer

Ja, genau also wo Sie auch schon die Strategien ansprechen, also ein bisschen vor allem in dem Kontext die deutsche Strategie, was können Sie mir dann sagen wie ist generell die deutsche Strategie, was die Nutzung von Kernenergie angeht?

00:02:18 Respondent V

Nur ganz kurz gesagt jetzt ganz grob, ja? Ja, also, ich denke was wichtig ist, ist, dass man das Ganze langfristig betrachtet, also eigentlich schon seit dem Ende der 70er, Anfang der 80er Jahre muss man die Thematik eigentlich sehen. Und ähm. Insofern finde ich es ist eigentlich sehr plausibel. Aus verschiedenerlei Hinsicht, also insbesondere auch mittlerweile aus ökonomischer Sicht weil Kernkraftwerke einfach ökonomisch keinen Sinn ergeben, aber auch von der Müllproblematik, dass man irgendwann gesagt hat wir bauen jetzt andere Energiequellen aus und die fokussieren uns halt nicht mehr auf die Kernenergie, das hat man ja im Grunde schon 1990 angelegt und dann 2000 war eigentlich der große, der große Wendepunkt für die Kernenergie. Diese Scharmützel, die dann 2010/11 waren sollte man vielleicht jetzt gar nicht so hoch bewerten

meines Erachtens, auch wenn meine eigenen Arbeiten teilweise dazu führen, also wenn man das als Critical Juncture bezeichnet, dass man die Bedeutung so ein bisschen überzeichnet. Es ist halt von der vergleichenden Perspektive was 2010 2011 passiert aber jetzt mal bezogen auf Deutschland ist sie langfristige Perspektive meines Erachtens wichtiger und ja, also das stimmt. Also aus meiner Beschäftigung mit dem Thema find ichs sehr plausibel dass man diesen Weg 1990 beziehungsweise 2000 mit den beiden großen wichtigen Gesetzgebungen gegangen ist. Man kann das aus der Rückschau immer noch sehr gut nachvollziehen. Ich meine mal sehen ja aufgrund der immer noch sehr ungeklärten Fragen mit dem Atommüll der Problematik der Endlagersuche wie komplex es ist diese Technologie ja auch abzuwickeln. Und von dem her würde ich sagen unterstreicht das immer noch mal, dass es eigentlich sinnvoller ist, früher aus der Technologie auszusteigen als länger zu warten.

00:04:32 Interviewer

Sie haben gerade schon einige Zeitpunkte genannt, wo sich die Strategie verändert hat, hier 2010/11 in den Neunzigern und den Zweitausendern. Was sehen Sie da so als wichtigste Zeitpunkte?

00:04:45 Respondent V

Ja, also 1990 und 2000 im Grunde sehe ich eigentlich als wichtiger als das, was 2010/11 passiert ist einfach 1990 auch ist ja also sehr eindeutig auf die Tschernobyl Katastrophe zurückzuführen. Die Verabschiedung des Strom einspeisegesetzes damals noch keine direkte Auswirkungen auf die Kernenergie hatte aber im Grunde den Grundstein gelegt hat für ein erstes Wachstum in der zweiten Hälfte der 90er Dekade der erneuerbaren Energien und dann den Weg bereitet hat, dass in den 2000ern den Atomausstieg beschließen konnte. Ja, vor dem Hintergrund, dass man schon die enormen Kosten bei den Erneuerbaren und ja, im Grunde davon ausgehen konnte, dass das innerhalb der nächsten 2 Jahrzehnte kein Problem mehr sein sollte, also zusammen auch ökonomischer Sicht und technologisch auch war auch klar dass es funktioniert also. Das sind meines Erachtens die wichtigsten Wegmale.

00:05:43 Interviewer

Ja wen oder was sehen Sie hier als als treibende Kraft was die Veränderungen angeht?

00:05:51 Respondent V

Also 1990 war das ja ne ganz interessante Konstellation auch auf Zufälle. Die großen Energieunternehmen waren eben nicht in der Position das zu verhindern. Die haben es nicht

wirklich kommen sehen, weil sie mit der Einigung mit der mit der deutschen Einheit befasst werden. Ich weiß nicht, ob sie da rüber auch recherchiert haben oder ob sie dazu was gelesen haben zum Beispiel gibt es da ganz gutes Paper ich glaube von dem Stefels heißt er, kennen Sie das?

00:06:21 Interviewer

Ja, ist mir bekannt.

00:06:22 Respondent V

Ja, also diese historische Kontingenz sind da sehr interessant, also einerseits eben, dass die großen Energieunter- versorger halt eben nicht sozusagen das auf dem Schirm hatten, aber sie haben nach treibenden Kräften gefragt also damals durchaus schon auch die Grünen, auch wenn die damals nicht in der Regierung waren, aber die natürlich auch viel Verbandsarbeit schon seit den 80er Jahren ja mitgesteuert haben und dann halt im Grunde auch die bayerischen Wasserkraftbetreiber, die da auch relativ wichtig waren.

[Connection cuts off]

00:08:12 Interviewer

Hello, ja, bei den Grünen hat es aufgehört.

00:08:14 Respondent V

Genau ja, genau also das war natürlich dann sozusagen aus Parteidifferenztheoretischen Gesichtspunkten das Ding, was es dann ermöglicht hat, auf diesen Entscheidungen Anfang der 90er aufzubauen und dann den Atomausstieg dann da mit einzuleiten. Man muss natürlich auch sagen, dass besondere am Design des Atomausstiegs 2000 ist, dass er zusammen mit den Energieversorgernrunde erarbeitet wurde. Also im Grunde ja Kompromiss gemacht wurde gemeinsam an den sich dann also den dann alle unterzeichnet haben. Und wenn, wenn auch nicht treibende Kraft dann auch eine weiter Perspektive, dass man das halt so auf diese Art und Weise geregelt hat also, ich weiß nicht ob die Energieversorger jetzt eine treibende Kraft waren, aber sie waren daran beteiligt.

00:09:27 Interviewer

Ja also sie sehen schon parteipolitische Elemente und auch die Betreiber hier als treibende Kräfte hinter den Veränderungen?

00:09:34 Respondent V

Ja, die parteipolitische Erklärung ist durchaus sehr wichtig, muss auch sein. Wenn jetzt natürlich nicht so eine wahnsinnig große Koalition der erneuerbaren Versorger aufgebaut wurde aber dennoch ist relativ viel passiert im Bereich der Verbände und natürlich dann auch die, ja klar, jetzt also vielleicht nicht öffentliche Meinung also der Policydiskurs ein Stück weit geprägt also, da wurden weitere Ressourcen aufgebaut und das ist natürlich auch darauf zurückzuführen, dass bereits 1990 dann politisch da die Grundlage gelegt wurden die Erneuerbaren stärker auszubauen. Das hat dann schon auch da mit dazu beigetragen, dass man 2000 oder Ende der 90er Jahre dann in einer Situation, wo das Thema dann ja schon so breit diskutiert war und dann sehr viele Akteure auch zusammen, das befürwortet haben, was man da vorangeht und die gesetzlichen Grundlagen jetzt nochmal deutlich verbessern, dass das dann ja ermöglicht wurde.

00:10:40 Interviewer

Sie haben gerade auch schon einmal zur Tschernobyl erwähnt. Sehen Sie Tschernobyl und Fukushima hier auch in einer Rolle?

00:10:49 Respondent V

Tschernobyl war schon zentral, um sozusagen die Opposition zur Kernenergie die in Deutschland ja natürlich historisch noch weiter zurückreicht, aber dann so zu kanalisieren und politisch dann sozusagen daraus, ja, politisch etwas mehr zu machen als halt Bewegungen die demonstrieren und noch nicht so richtig in der wirklichen politischen Entscheidungsarenen angekommen waren. Also Tschernobyl war da sicherlich absolut zentraler Treiber gerade für Deutschland. Fukushima ist halt meines Erachtens etwas weniger zentral tatsächlich. Kann ich die Bedeutung jetzt also will ich jetzt nicht herunterspielen und das war genauso ein schlimmer Unfall, aber ich denke, der Atomausstieg wäre in Deutschland, wenn auch etwas später auch ohne Fukushima, dann gekommen, ich denke jetzt aus heutiger Perspektive auch gerade vor dem Hintergrund des Russischen Angriffskriegs gegen die Ukraine ist Fukushima nochmal mehr in den Fokus gerückt und vielleicht, das ist jetzt etwas spekulativ wir können das nicht überprüfen, weil wir das Counter Factual jetzt nicht haben, aber es könnte sein, dass ohne Fukushima im Grunde jetzt die Diskussion anders gelaufen wäre. Seit Anfang des Jahres. Und da das noch relativ präsent ist ich meine Tschernobyl ist ja unglaublich lange her mittlerweile. Da war ich zum Beispiel auch noch nicht auf der Welt, aber Fukushima ist halt immer noch sehr präsent und ich denke, das führt dann auch dazu, dass das jetzt dann also ein bisschen Baustein für eine Erklärung, dass Kernenergie, trotz allem keine wirkliche Renaissance in Deutschland erfährt.

00:12:37 Interviewer

Genau das ist nämlich meine nächste Frage also jetzt vor allem ist das ja sehr aktuell mit dem russischen Angriffskrieg und Energiesicherheit ist in aller Munde. Glauben Sie, dass sich vor allem vor dem Hintergrund die Strategie in Deutschland, was die Kernenergie betrifft, in Zukunft nochmal ändern wird?

00:12:52 Respondent V

Ne glaub ich nicht ähm, ich denke das Ding ist eigentlich gegessen. Es gibt zwar schon starke Akteure, die die darauf drängen, allerdings die Konstellation in der Regierung ja im Moment eher so, dass 2 ohnehin schon Atomkritische Partei ja in der Regierung sind und das nicht machen werden. Und ich denke auch langfristig, wenn wir mal über den Zeitpunkt hinaus sind, dass. Sie einfach weg in Deutschland, also wenn sie dann irgendwann abgeschaltet sind wahrscheinlich nicht mehr lange dauert wird es aus meiner Sicht kein revival geben, das hat aber auch vor allem ökonomische Gründe, also der Staat hat, bald eh kein Geld mehr was er für etwas ausgeben kann, sag ich jetzt mal ganz salopp und Kernenergie ist, ja nicht marktfähig, also man braucht natürlich einen super starken Staat dahinter, der wie zum Beispiel Frankreich oder Großbritannien entweder noch militärisch die Atomkraft genau noch Nutzen möchte und deswegen bereit ist da noch große Summen zu investieren. Ja, oder es funktioniert halt im Grunde nicht. Weil es sich privat halt nicht rechnet. Also von daher gehe ich davon aus, dass es in Deutschland eigentlich gegessen ist das Thema. Das ist natürlich mal interessant machen Ausland da in 10 Jahren nochmal drauf zurück kommen und sich die Aussagen nochmal anzuschauen, die sie jetzt sammeln und das ganze da vielleicht nochmal einen anderen Aufsatz drüber schreiben wie es dann wirklich gekommen ist

00:14:20 Interviewer

Ja, so Zukunftsprognosen sind ja immer so eine Sache.

00:14:23 Respondent V

Ja, genau.

00:14:24 Interviewer

Abschließend vielleicht noch einmal im europäischen Kontext sie wissen ja mit Sicherheit auch, dass Deutschland da relativ alleine da steht mit seiner aktuellen EU Kernenergie Strategie würden sie, würden sie auf der Ebene eher für mehr oder weniger Harmonisierung plädieren.

00:14:42 Respondent V

Schwer zu sagen also die die Ausgangssituation ist halt fundamental unterschiedlich. Ich teile da auch nicht die Perspektive, dass Deutschland alleine dasteht, es gibt ja schon einige Länder in der EU die zum Beispiel noch gar keine Atomkraftwerke haben und die auch keine Bauen werden und wollen. Die Schweiz ich noch ein anderes Land, ich weiß, dass das nicht in der EU ist aber was an Deutschland angrenzt und wo die Diskussion nicht genau gleich ist aber wo auch Fukushima eine wichtige Rolle gespielt hat und sozusagen die Diskussion um den Neubau der AKWs die da sehr groß war. Kurz davor im Grunde erstickt hat, also somit auch und sehr relevant und da werden auch keine neuen gebaut. Also überhaupt gar nicht mehr kann man ziemlich sicher sagen um die, na, die Frage ist, wann man jetzt die alten Stücke im Grunde weniger eindeutig geklärt als in Deutschland, weil man da keine klare Antwort. Ja mit der Harmonisierung, ich bin kein Experte für Europapolitik und denke es ist einfach super unrealistisch, dort auf der Ebene Harmonisierung zu erwarten.

00:15:51 Interviewer

Okay und ähm, abschließend würde ich gerne noch einmal ihre persönliche Meinung eigentlich wissen denken Sie dass Deutschland in Bezug auf seine Kernenergie Strategie auf dem jetzigen Weg bleiben soll oder sollte sich ihrer Meinung nach etwas ändern?

00:16:04 Respondent V

Ne, ich denke das macht sehr viel Sinn, das eben genau so zu machen wie es aktuell eben von der Regierung entschieden wurde.

00:16:17 Interviewer

Alles klar, das war auch schon meine letzte Frage.

00:16:21 Respondent V

Das ging jetzt aber doch schneller als gedacht.

00:16:24 Interviewer

Und hat auch ganz gut geklappt, mit nur einem kurzen Abbrecher, das ist in Ordnung.

00:16:28 Respondent V

Ja ok also ich tendiere normalerweise immer zu langen Antwort aber ich hab auch versucht mich kurz zu fassen also wenn wir noch irgendeine Rückfrage haben, können Sie sie gerne stellen aber sonst ist auch gut

00:16:38 Interviewer

Also, für mich ist auch alles klar ja. Da danke ich Ihnen vielmals für Ihre Zeit, obwohl Sie gerade unterwegs sind. Das hat mich sehr gefreut, dass sie trotzdem sich die Zeit nehmen, um mit mir darüber zu sprechen.

00:16:49 Respondent V

Tut mir leid, dass das so chaotisch ist aber ich bin im Moment in so einer Phase.

(Recording stopped)

## D-5: Respondent 6 14:53 Minutes

00:00:00 Interviewer

Alles klar, dann würde ich direkt mal einsteigen, und zwar wie hängt denn ihre Arbeit mit der Kernenergie in Deutschland zusammen?

00:00:06 Respondent VI

Okay. Der Zusammenhang besteht darin, dass in einer Bundestagsfraktion ja alle die Themen die zu bearbeiten sind auf Abgeordnete verteilt werden. Ich bin nur einer von 2 Energiepolitikern der jetzigen [Party] Bundestagsfraktion und habe mit dem Kollegen [name redacted] die Energiethemen unter mir aufgeteilt. Dabei ist unter anderem das Thema Kernenergie bei mir gelandet. Das ist also der Zusammenhang zu meiner Arbeit.

00:00:48 Interviewer

Ja super und generell zur deutschen Strategie für die Nutzung von Kernenergie. Das ist, was ich hier erforsche, was wissen Sie denn über die deutsche Strategie wie Kernenergie genutzt werden soll?

00:01:01 Respondent VI

Naja, die Strategie besteht ja darin, dass die Bundesrepublik Deutschland den Ausstieg aus der Kernenergie beschlossen hat. Das ist die bestehende Gesetzeslage. Heißt nach der jetzigen Gesetzeslage werden die letzten 3 sich noch in Betrieb befindlichen Kernkraftwerke in Deutschland am 31. Dezember diesen Jahres abgeschaltet. Die strategischen Herausforderungen, sollte es so bleiben, in der Zukunft bestehen darin, dass die Endlagerfrage

noch nicht gelöst ist. Ein weiterer strategischer Aspekt ist, dass sich Deutschland gleichwohl insbesondere im Rahmen der Europäischen Union ja auch weiter an der Erforschung der Kernfusionstechnologie beteiligt, aber für Deutschland selber steht gesetzlich der Ausstieg aus der konventionellen Kernenergie sag ich jetzt mal zum gegenwärtigen Zeitpunkt fest.

00:02:08 Interviewer

Fangen wir jetzt sozusagen zur aktuellen Zeit an. Für die aktuelle Legislaturperiode: Hat sich die Strategie seit dem Regierungswechsel geändert.

00:02:17 Respondent VI

Nein. Da hat sich an der Gesetzeslage nichts geändert.

00:02:20 Interviewer

Mhm zu welchem Zeitpunkt hat sich denn die Strategie geändert und sehen sie da auch bestimmte Gründe für?

00:02:27 Respondent VI

Naja, den letzten Strategiewechsel gab es ja in den frühen 2010er Jahren, wo im Gefolge des Reaktor Unfalls in Fukushima dann das Ausstiegsdatum ja, nochmal neu festgezurrt wurde und seitdem hat sich an der Kernkraftstrategie in Deutschland nichts mehr geändert.

00:02:52 Interviewer

Und sehen Sie Fukushima da als treibende Kraft hinter der Veränderung der Strategie?

00:02:57 Respondent VI

Also das war, das war sicher der Auslöser, das war sicher der Auslöser. Der quasi da nochmal zur Revidierung des Ausstiegsdatums geführt hat.

00:03:10 Interviewer

Mhm und wenn wir noch ein bisschen weiter zurückblicken vor 2010, der großen Entscheidung des Ausstiegs, sehen sie da auch noch weitere Situationen, die sich, in denen sich die deutsche Strategie verändert hat?

00:03:21 Respondent VI

Also ich selber bin Jahrgang 1977 also an den Einstieg in die Kernenergie kann ich mich selber nicht mehr erinnern. Habe aber den Gau in Tschernobyl 1986 also als Kind quasi miterlebt und

das war damals natürlich der große Auslöser, um einen Ausstieg aus der Kernenergie ins Auge zu fassen und auf diesem Pfad ist die Bundesrepublik Deutschland dann ja auch geblieben.

00:03:54 Interviewer

Ja, also Sie sehen den Pfad des Ausstiegs schon auch von Tschernobyl anlaufen, weil es gab ja auch zwischendurch Situationen, in denen auch zum Beispiel die FDP beteiligt war, als der, sozusagen der „Ausstieg vom Ausstieg“ noch mal beschlossen wurde.

00:04:09 Respondent VI

Ja, das war ja also, das war ja da, da gab es ja sozusagen vor Fukushima auch nochmal einen anderen Schwenk, der da sozusagen durch Fukushima wieder rückgängig gemacht worden ist. Ob das so wahnsinnig konsistent gewesen ist, das sei mal dahingestellt. Aber ich bin ja neu sozusagen auf dem politischen Parkett jetzt seit Oktober 2021 bin erstmalig im Bundestag dabei, und da muss man natürlich so ne politische Lager jetzt wie die Kernenergie erstmal so nehmen wie sie ist.

00:04:50 Interviewer

Also sehen Sie, wenn man so zurückblickt auf die Änderungen in der Strategie schon die Atomunfälle in Tschernobyl und Fukushima als Kraft hinter Veränderung der Strategie.

00:05:04 Respondent VI

Ich denke, man kann da oft wie in so vielen Bereichen eine gewisse Unterscheidung zwischen Ursache und Auslöser vornehmen, dass diese Reaktorunfälle hier Auslöser waren um Entwicklungen nochmal zu beschleunigen. Die tiefere Ursache dürfte schon gewesen sein, dass man die Sicherheitsrisiken, dass man die Sicherheitsrisiken dieser Energietechnologie sich immer klar gemacht hat und ja, auch wusste, mit welcher Problematik die Lösung der Endlagerfrage in Deutschland verknüpft ist naja, das spricht ja Bände dass die bis auf den heutigen Tag noch nicht gelöst ist, da ist ja auch noch politisches Konflikt potential drin.

00:05:50 Interviewer

Wo sie von politischem Konfliktpotenzial sprechen ich hab auch in meinem bisherigen Interviews öfter gehört, dass parteipolitische Aspekte in der Strategie auch eine Rolle gespielt haben, würden sie das auch so sehen oder stimmen Sie da eher nicht zu?

00:06:05 Respondent VI

Ja, da werden sie jetzt lachen, dazu bin ich noch zu frisch Politiker der FDP. Als dass ich das jetzt beurteilt könnte, sagen wir mal so, wenn ich mir die Parteiengeschichte der Bundesrepublik Deutschland seit Ende der 1970er Jahre angucke, dann ist ja klar, dass die Grünen auch aus der Anti-AKW Bewegung heraus stark geworden sind und dadurch ja auch ganz dezidiert parteipolitisch großen Input dazu geliefert haben, wie Deutschland mit der Kernenergie umgeht. Aber die Entwicklung war dann ja die, dass es durchaus auch wenn man so will, eigentlich einen gesamtgesellschaftlichen Konsens gegeben hat auch über die Partegrenzen hinweg, dass man bei dieser Energietechnologie auch nicht bleiben will.

00:07:00 Interviewer

Und Sie haben ganz am Anfang des Interviews auch schon mal die EU erwähnt und sind ja auch im Ausschuss für Angelegenheiten der Europäischen Union und deshalb würde ich Ihnen nochmal zur EU eine Frage stellen und zwar wie sehen Sie denn die deutsche Strategie für Kernenergie im Zusammenhang mit der EUStrategie sehen Sie die Übereinkünfte oder eher Konflikte?

00:07:23 Respondent VI

Dabei gilt ja zunächst zu beachten, dass die Europäische Union keine Zuständigkeit hat den Mitgliedstaaten Vorschriften zu machen wie sie ihre Energieerzeugung strategisch aufstellen das heißt, da gibt es keine einheitliche konsistente EU Strategie und das spiegelt sich darin, dass einzelne Mitgliedstaaten der Europäischen Union in ihrer Energiepolitik ja durchaus auch sehr unterschiedliche Strategien verfolgen, also gerade in diesen Zeiten können wir sehen, dass andere mitgliedstaaten der EU wesentlich stärker auf die Kernkraft setzen als es Bundesrepublik Deutschland tut und insofern gibt es da zwischen den Mitgliedstaaten durchaus auch sehr unterschiedliche Ansätze, wie man die Energieversorgung der Zukunft sichert.

00:08:21 Interviewer

Würden sie auf EU Ebene dann für mehr oder weniger Harmonisierung plädieren, was die Kernenergie angeht?

00:08:31 Respondent VI

Ich glaube, dass der Umgang mit der Kernenergie, dass der Umgang mit der Kernenergie kein fruchtbare Gegenstand einer EU Harmonisierung ist, weil das zu viel Konfliktpotenzial bergen würde also so, wie die Länder aufgestellt sind, beispielsweise in ihrer Unterschiedlichkeit Frankreich und Deutschland. Ist ja völlig absehbar, dass da auch keine Einigung zu erzielen wäre.

Weil es eben Staaten gibt die da sehr stark drauf setzen und andere da nicht drauf setzen und so gesehen wäre da sowieso auch kein Konsens herzustellen.

00:09:12 Interviewer

Ja, und jetzt noch einmal so ein kleiner Blick in die Zukunft, vor allem vor dem Hintergrund des Angriffskriegs auf die Ukraine aktuell. Glauben Sie, dass sich die Deutsche Kernenergiestrategie in Zukunft nochmal ändern könnte?

00:09:28 Respondent VI

Diese Frage hat, wie die Antwort auf diese Frage wird mehrere Dimensionen haben. In der kurzen Frist wenn ich jetzt konkret über den Winter fertig 2022/23 spreche oder vielleicht auch noch bis ins nächste Jahr hinein in der kurzen Frist haben sie mitgekriegt, sind die Freien Demokraten durchaus offen dafür eine Verlängerung der Laufzeiten der deutschen Kernkraftwerke ins Aug zu fassen. Wenn das sicher möglich ist, wenn wir dadurch keine zusätzlichen Sicherheitsrisiken eingehen und wenn auch sichergestellt wäre, dass wir die Brennstoffe entlang der quasi, die Lieferkette der Brennstoffelemente, dass wir nie auch nicht von Russland oder auch verbündeten Staaten von Russland beziehen. Also dafür sind die Freien Demokraten offen. Aus meiner persönlichen Perspektive ist es so, dass das wenn aber auch nur eine Übergangslösung sein könnte, und das ist jetzt für den Hintergrund vielleicht wichtig. Quasi keine Parteimeinung, sondern das ist meine persönliche Einschätzung, dass ich, für die die quasi klassische Kern Spaltung in Deutschland keine Perspektive sehe. Technologieoffenheit bedeutet für die FDP, dass wir durchaus sehr aufmerksam beobachten, welche Innovationen in der Kernenergie zurzeit in der Erforschung und Erprobung sind. Für mich persönlich gehört aber auch dazu, dass ich diese Innovationen durchaus auch sehr, sehr kritisch verfolge. Da wird zur Zeit manches angepriesen und versprochen, was sich so in der Praxis einfach nicht bewährt hat also Stichpunkt, es werden jetzt oft die Small modular Reactors herangezogen. Da muss man der Nüchternheit halt halber einfach mal feststellen bisher existieren die größtenteils auf dem Papier bis soweit zu einer Marktreife gelangen könnte, würden nochmal etliche Jahre ins Land vergehen und dann bedeutet für mich persönlich Technologiewettbewerb, auch, dass in dieser Zeit eben diese Technologien ja auch in einem Technologiewettbewerb zu weiteren Effizienzsteigerungen bei den klassischen erneuerbaren Energien stehen, das ist der eine Aspekte der andere Aspekt ist sehr inhaltlich den ich persönlich auch für einen wichtigen halte, dass die Kerntechnologie sicherlich wegen der Materialien, die sie verwendet nicht dazu beiträgt, unsere Welt sicherer zu machen. Mit anderen Worten, der ganze Sicherheitsaufwand, der dann auch betrieben werden müsste, um zu verhindern, dass dieses Materialien in Hände gerät in die es nicht geraten soll, der ist auf alle

Fälle auch zu berücksichtigen. Und ja, insofern bin ich sehr gespannt, was da in den nächsten Jahren noch passiert, aber den nächsten Jahren auch noch passiert, aber ich betrachte es auch eher nüchtern. Es ist natürlich auch sehr spannend zu beobachten, was sich noch tut in der Erforschung der Kernfusion. Gerade vor dem Hintergrund von Gesprächen, die ich mit Physikern geführt habe wage ich da keine Prognose. Das kann sehr schwer bis unmöglich werden, das umzusetzen. Vielleicht gibt es doch noch methodisch irgendwelche Wege das umzusetzen. Es ist alles andere als trivial, ich halte es für richtig, auch mit Steuermitteln, da weiter Grundlagenforschung zu finanzieren und zu betreiben. Aber wir sollten so nüchtern sein in der mittleren bis langen Sicht und jetzt nicht darauf zu verlassen, dass diese Kernfusionstechnologie irgendwann kommerzialisierbar sein wird. Solltet sie es sein, sollte dann sicher möglich sein, sollte es ungefährlich möglich sein, dann ist das eine ganz spannende Kiste. Aber wenn du denn eben nicht so ist dann sind wir gut beraten, uns bis dahin in unserer Energieversorgung anderweitig absichern.

00:13:53 Interviewer

Alles klar das waren auch schon meine Fragen, ich denke ihm vielmals für die Teilnahme wirklich sehr interessante Erkenntnisse hier noch dabei.

00:14:02 Respondent VI

Sehr schön, freut mich. Und wann, wann wird es die, Sie lassen das jetzt in der Masterarbeit einfließen eine Studie oder wo kommt das rein?

00:14:12 Interviewer

Nein, mein Masterarbeit kommt das doch rein, genau.

00:14:18 Respondent VI

Jetzt weiß ich nicht genau, ob bei Ihnen an der Hochschule diese Masterarbeit und öffentlich zugänglich gemacht werden können. Ich will Sie da auch nicht irgendeine Bredouille bringen. Aber sollte es möglich, sollte es möglich sein, dann würde mich sozusagen eine digitale Version ihrer Arbeit nach der Fertigstellung dann auch interessieren.

00:14:38 Interviewer

Alles klar, das kann ich vermerken, dann lasse ich ihn das zu zukommen sobald das fertig ist.

00:14:42 Respondent VI

Okay, und dann wünsche ich jetzt weiter noch viel Erfolg. Und gutes Gelingen seiner Masterarbeit beim Erstellen und dann ist dann auch ein gutes Ergebnis wird

00:14:46 Interviewer

Vielen Dank. Und danke für Ihre Zeit.

00:14:52 Respondent VI

Gerne doch ihnen noch schönen Tag, tschüss.

00:14:53 Interviewer

Ebenso, tschüß.

## D-6: Respondent 7 24:44 Minutes

00:00:00 Respondent VII

Sagen Sie, mit wem sie sozusagen Interviews geführt haben?

00:00:03 Interviewer

Nein, weil man dadurch ja Rückschlüsse führen kann und die Personen, mit denen ich gesprochen habe, also es kann sein, dass ich bei Ihnen zum Beispiel sagen würde von einer deutschen Behörde ein Mitarbeiter, aber weiter wird das nicht identifizierbar sein.

00:00:16 Respondent VII

Ja, ok. Ich hätte damit, also es wäre jetzt nicht mal dramatisch, also ich hab jetzt nicht das Problem, wenn sie wenn Sie das sagen dass wird ja nicht nicht, ja, eine Aussage wird ja nicht einem gleich zugeordnet wenn das dann, wenn sie mehrere beraten haben, dass sie unsere Namen auch nennen, da hätte ich nicht mal ein Problem mit, aber machen Sie das wie sie es meinen, ich bin da relativ entspannt was das angeht.

00:00:35 Interviewer

Ja, ich will in meiner Masterarbeit auch ein bisschen zeigen, dass ich weiß, dass es anonymisiert werden muss ich will zeigen, was gelernt habt, deswegen wird das hier komplett anonym behandelt. Aber gut, können wir direkt mal starten bitte erstens Frage und zwar interessiert mich, wie ihre Arbeit mit der Kernenergie in Deutschland zusammenhängt.

00:00:55 Respondent VII

Meine Arbeit erstreckt sich auf insbesondere den Teil, der nuklearen Entsorgung. Das heißt alles, was mit Forschungsthemen zu tun hat, die irgendwie relevant sind für die sichere, nuklearen Entsorgung, also Zwischenlagerung und von radioaktiven Abfällen und sind es nur dieendlagerung von radioaktiven Abfällen Partizipationsprozesse, die damit zusammenhängen usw all das sozusagen dieser der Teil der kommt nachdem praktisch sozusagen die Kernkraftwerke betrieben worden sind. Das ist sozusagen der Hauptteil meiner Arbeit. Wobei, wir machen auch Forschung zur Sicherheit von Kernkraftwerken. Das heißt, dann geht's dann wirklich auch um Frage welche Strategie verfolgen wir national, international? Das sind was bedeutet das für Sicherheitsmaßstäbe, für Regelwerke, die anzulegen sind, weil wir ja sozusagen als Regulierungsbehörde auf der Seite steht, dass wir für die Sicherheit der Anlagen die Aufsicht über die Sicherheit der Anlagen unterstützen müssen und genau und international ist auch und da kommen dann eben auch Fragen durchaus zum Umgang und zur Kernenergiestrategie an sich mit rein, also weiß nicht ob Sie das gesehen haben beispielsweise zur EU-Taxonomie. Für mich auch ein durchaus aktuelles Thema gerade haben wir zum Beispiel ziemlich intensiv gearbeitet und Stellungnahmen und auch also umfangreiche Studien nochmal sozusagen erstellt und damit auch unmittelbar sozusagen die Bundesregierung damit beraten, wie sie sich positionieren sollte in dem, in der Diskussion, um die EU Taxonomie, und das ist ja tatsächlich eine sehr strategische Frage für die für die Kernenergie auf europäischer Eben. Ich weiß nicht ob Sie das gesehen haben.

00:02:42 Interviewer

Ja, hab ich verfolgt. War ja auch gerade sehr aktuell das Thema. Sie haben gerade schon das Wort Strategie, erstmal ganz allgemein: Was wissen Sie denn über die deutsche Strategie für die Nutzung von Kernenergie?

00:02:59 Respondent VII

Was ich weiß darüber...Das ist eine sehr offene Frage.

00:03:05 Interviewer

Also erstmal ganz allgemein so als Einstieg.

00:03:08 Respondent VII

Ja ok. Naja, ich würde mal behaupten, dass ich relativ das relativ viel über die deutsche Kernenergiestrategie auf jeden Fall wie sie jetzt in den letzten 10 Jahren irgendwie dieich beruflich

tätig bin ist. Davor sozusagen gibt es geschichtliche Auseinandersetzung, historische Auseinandersetzungen damit die, die auch bei uns zum Beispiel bei der in Forschungsabteilung auch mit passieren zum Beispiel Geschichtswissenschaftliche Forschungsprojekte oder so. Aber genau also die Frage ist, Sie wollen jetzt bestimmt nicht von mir irgendwie nochmal die die Strategie irgendwie hören. Weil die kennen sie ja selbst. Die aktuelle oder wie meinen Sie das?

00:03:51 Interviewer

Also Sie können ruhig einmal, was sie, was Sie über die Strategie wissen, sagen also wie gesagt, ich hab schon ein bisschen dazu geforscht, aber es ist immer gut, das nochmal von Experten zu hören. Ob die mit meinen Erkenntnissen übereinstimmen.

00:04:02 Respondent VII

Okay, also im Bezug auf Deutschland haben wir seit 2011 ja den Ausstiegs Beschluss. Was die Beendigung der Kernenergie angeht, was die ordentliche Beendigung der Kernenergie inzwischen heißt, bis Ende diesen Jahres Ende 2022 die letzten drei Kraftwerke abgeschaltet werden vor dem Hintergrund insbesondere der Fukushima Katastrophe, ist diese Entscheidung getroffen worden. Das heißt die Kernenergie insgesamt vollständig, also die Kernenergie Nutzung verständlich zu beenden. Noch nicht oder nicht beendet ist ja die durchaus andere Tätigkeiten im Zusammenhang mit dem Brennstoffkreislauf: nukleare Versorgung, Brennelementfertigung etc. Dass findet in Deutschland noch statt, da gibt es auch noch Anlagen für. Da gibt es sozusagen nicht ein Ausstiegsbeschluss auch wenn es dort auf politischer Ebene natürlich schon seit langem Diskussionen gibt. Und man hat sich in Deutschland letztendlich ja, dann auch nachfolgend nach 2011 eben insbesondere auf die offene Aufgabe der Entsorgung konzentriert und da hat es ja auch ganz viele Veränderungen geben. Wir haben immer wieder die Diskussion natürlich auch gehabt, um Kernenergie, und jetzt ja auch gerade wieder, aber der der Beschluss sozusagen ist ja seit 2011 nicht angetastet, dass der vollständige Ausstieg besteht und dass man auf europäischer Ebene, wenn es darum geht, sich eben dafür einsetzt, dass Kernenergie zumindest nicht sozusagen als eine nachhaltige Technologie gefördert wird und sich natürlich europäisch, aber auch darüber hinaus sich die Bundesrepublik für hohe Sicherheitsstandards einsetzt, das heißt nach wie vor sich nicht aus den aus den Debatten um Kernenergie komplett verabschiedet, sondern eben weiterhin Einfluss nehmen möchte auf wenn es um Sicherheit- und Regulierungsfragen geht, aber natürlich nicht sozusagen auf Energiepolitik selbst weil das ja eine nationale Regelunge dann ist.

00:06:17 Interviewer

Sie haben gerade schon Fukushima erwähnt als Zeitpunkt, an dem sich die Strategie einmal geändert hat, sehen wir uns weiter zurückblicken noch weitere Punkte, wo sich die Strategie in Deutschland mal verändert hat.

00:06:28 Respondent VII

Ah ja, ganz viele natürlich. Also wir hatten irgendwie am Anfang immer, wenn man sozusagen die Geschichte einmal abreißen, hatten wir am Anfang tatsächlich eine insbesondere von staatlicher Seite sehr geförderte Entwicklung von Kernenergie mit den ersten Versuchskraftwerken in den in den 50er, 60er Jahren, dem ersten Atomministerium. Wir hatten ja auch durchaus ne veritable Diskussion der Bundesrepublik, die die nukleare Energieversorgung zusammen auch mit der nuklearen Bewaffnung gedacht hat. Das war ja durchaus auch unter der ersten, gerade bei Adenauer durchaus ja auch eine zeitlang verfolgte Strategie. Und davon ist man dann ja weggekommen und sozusagen mit der nuklearen Teilhabe und den der NATO Mitgliedschaft, aber die zivile Nutzung der Kernenergie trotzdem natürlich sozusagen vorangetrieben worden. Man hat das ja auch von staatlicher Seite sehr gefördert. Man hat sozusagen die Energieversorger, die sich jetzt erst zögerlich waren, haben das dann auch stark mit übernommen und eine ganze Zahl von Kernkraftwerken gebaut. Die ursprünglichen Planungen, dies gab ich meine das ist, ich glaub in den noch in den 60er und Anfang der 70er gab es glaub ich Planungen, die 500 Kernkraftwerke in Deutschland vorgesehen haben, also das heißt, wir hatten immer eine massive, in der Rückschau kann man das auf jeden Fall sagen, Überschätzung von den potenzialen von Kernenergie gehabt. Das Ganze hat sich dann natürlich gedreht mit den offenen Sicherheitsfragen, mit dem mit der Katastrophe in Tschernobyl, mit den zunehmenden Zweifeln an der Frage kann man überhaupt absehbar eine geordnete Entsorgung herstellen usw. Geschichte der Bürgerbewegungen, die dagegen vorgegangen sind. Und genau, also ich glaube, also Tschernobyl ist da natürlich eins der ganz einschlagenden Ergebnisse die dann ja auch zum Beispiel zur Gründung von Umweltministerium geführt hat. Und danach wird dann immer stärkere Bewegungen ja auch dagegen, die auch auf die Gefahren von Kernenergie hingewiesen hat und dann 2010/11 dann natürlich der erste Atomausstieg der rot-grünen Bundesregierung damals der ausgehandelt worden ist mit den Versorgern, der auch schon in 2022 den Ausstieg ausgehandelt hat zudem man ja zurückgekehrt ist ismit der Katastrophe Fukushima, ja.

00:09:11 Interviewer

Ja, also sind schon einige Veränderungen dabei gewesen zwischendurch. Können Sie mir sagen, was Sie, was sie während dieser Veränderungen als treibende Kraft sehen. Also gibt es da oft eine treibende Kraft oder sind das verschiedene Sachen die da mit reinspielen?

00:09:29 Respondent VII

Ja, es gibt natürlich immer eine ganze Menge von treibenden Kräften dabei. Es gibt die treibende Kraft sicherlich sozusagen von wirtschaftlichen Interessen. Das war immer schon so. Auch wenn man sich, also durchaus, was die, was die Wirtschaftlichkeit von Kernenergie angeht. Inzwischen ziemlich einhellig, so dass das gesehen wird, das eben nicht eine besonders billige Energieversorgung ist, aber trotzdem natürlich, wenn man erstmal Kraftwerke hat oder Bauprojekte am Laufen hat, gibt es natürlich immer sehr starke wirtschaftliche Gründe, sowsas nicht zu canceln, also das ist also die Privatwirtschaft sozusagen ist natürlich ein wichtiger Treiber, der zum Beispiel auch sehr massiv bei dem wieder Einschalten sozusagen also bei der bei der Verlängerung 2010 gewirkt hat das war ja eine sehr stark von der von den Energieversorgungsunternehmen auch getriebene Entwicklung, die es da gegeben hat. Wir haben die Frage sozusagen von sicherlich, die historisch immer eine Rolle spielt, von Energiesicherheit und Unabhängigkeit, die politisch natürlich auch eine Rolle spielt, auch wenn man das unterschiedlich bewerten kann und muss aus meiner Sicht. Ob Kernenergie tatsächlich Versorgungssicherheit und Unabhängigkeit bedeutet aber das ist ein Argument das ist auf der politischen Ebene natürlich immer sehr, sehr getrieben worden. Ja, haben natürlich die gesellschaftlichen Bewegungen die zivilgesellschaftliche Entwicklung, die eine der größten war in Deutschland in der Historie würde ich fast sagen die Auseinandersetzung die es gegeben habe in der Kernenergie um Gorleben etc. um die Asse, das heißt, das war ein sehr sehr starken treibender Faktor ohne den es sicherlich auch den Ausstieg nicht gegeben hätte ich wirklich fast sogar sagen also die Kernenergiegeschichte Deutschland zeigt ist eine der Geschichten, wo eine der größten Erfolgsgeschichten von zivilgesellschaftlicher Bewegung sicherlich von zivilgesellschaftlichem, sozusagen auch Widerstand der da geleistet worden ist. Und, ja, also die Nuklear Komponente spielt, also die nuklear-militärische Komponente auf jeden Fall auch immer eine Rolle. Nicht nur unbedingt vordergründig, aber Deutschland ist ein ist ja ein virtueller Kernwaffenstaaten man, wenn man dieser Definition folgt, das heißt, ein Kernwaffenstaat der oder einen Staat, der die Möglichkeit hätte in sehr kurzer Zeit solche Waffen zu erzeugen die Diskussion gab es ja also historisch und auch immer gibt es auch immer mal wieder. Und natürlich ist immer die immer ein Treiben der Faktor auch, dass man eine Grundkompetenz in Sachen Kerntechnik vorhalten möchte vielleicht, wenn man eben auch auch in dem Bereich zumindest mitsprechen möchte oder vielleicht auch zumindest sich Optionen offenhalten möchte, kann auch eine Rolle spielen. Die Kompetenz erhalten ist natürlich auch immer etwas, das ist das sagen auch als Argument, dass hier oft sozusagen angeführt wird, dass wir um weiter mitreden zu können international bräuchte man eigene Anlagen, bräuchte mal viele eigene Kompetenz, das

ist auch noch ein Argument, das immer wieder auch geführt wird. Also das kann man jetzt noch weitermachen, aber das sind so die treibenden Faktoren die ich dabei sehen würde.

00:12:54 Interviewer

Ja, auf jeden Fall, wir haben auch schon Fukushima und Tschernobyl erwähnt. Sehen Sie die Unfälle da auch als treibende Kraft hinter Veränderungen der Strategie?

00:13:01 Respondent VII

Ja klar, also auf jeden Fall. Tschernobyl nicht nicht unmittelbar, wobei Tschernobyl auch dazu geführt hat, dass die Ausbau Pläne die es mal gab sicherlich nicht so realisiert worden sind, auch wenn das nicht zu einem direkten Aufstieg geführt hat. Aber Tschernobyl hat ja erstmals nach Harrisburg, das auch schon relevant war, aber jetzt historisch im Rückblick sicherlich nicht so einschneidend war, hat Tschernobyl sehr stark die öffentliche Aufmerksamkeit auf die Gefahren von Kernenergie überhaupt gelenkt. Und das ist sehr einschränkend gewesen. Und Fukushima dann auch natürlich, als das das zentrale Momentum das also die neue Qualität war das eben ein westlicher, hochindustrialisierter Staat auch mit den Folgen, sozusagen die diese Art von Katastrophen auch produzieren kann und die Folgen einfach wirklich existenziell werden für Staaten also auch wenn wenn sozusagen jetzt man sich das zehn Jahre danach anschaut die Folgen die ja lange noch nicht noch nicht aufgeräumt sind und viele, viele, viele hundert Milliarden wahrscheinlich kosten werden, also das ist, das waren beides ganz einschneidende Faktoren, klar.

00:14:21 Interviewer

Sie haben gerade schon am Anfang erwähnt, dass es heute auch wieder Diskussionen gibt um die Kernkraft in Deutschland. Jetzt mal ein Blick in die Zukunft: Glauben sie, dass sich die deutsche Strategie in Zukunft nochmal ändern wird oder bleibt ihr auf dem Pfad auf dem sie jetzt ist.

00:14:39 Respondent VII

Ja, wir leben in einer Demokratie also das, ja klar, das kann sich alles ändern. Doch das ist auch gut so, weil das ein Teil von von demokratischer Auseinandersetzung ist, dass es sich ändern kann. Und wie wahrscheinlich ist das ist vermag ich, mag ich schlecht zu sagen. Also ich glaube, was ich feststelle einfach sagen wir es so ist, dass die, dass das Gedächtnis um die Risiken dieser Technologie oftmals also relativ schnell löcherig wird. Also, wenn ich, wenn ich mir anschau, einfach dann stell das mal, welche Diskussionen wir heute 10 Jahre nach, nur 10 Jahre nach

Fukushima führen, dann ist das dann werden die sozusagen die Risiken die mit dieser Technologie einhergehen, auch wenn man auf die auf die Gefahren sozusagen die sich jetzt gerade in der Ukraine zum Glück nicht realisiert haben aber wo es nah dran war zum Teil, dann wird das schnell wieder ausgeblendet und dann sind auch wieder vielleicht andere Interessenslagen da am Werk die einen Weiterbetrieb haben wollen. Ich glaube was jetzt sozusagen in Rede steht diese Frage von Laufzeit Verlängerung, das vermag ich nicht zu sagen, wie das wie das am Ende ausgehen wird. Am Ende sozusagen ist es eine demokratische Entscheidung, dann und dann müssen, wird das so umgesetzt. Das ist natürlich so sicher wie möglich die Kraftwerke noch weiter betrieben werden, was interessant sein wird, ist die Frage eben ob dann dann auch mittelfristig auch nochmal über mehr als eine Laufzeit Verlängerung nachgedacht wird und das ist ja international sehr stark, so dass das propagiert wird, die Laufzeitverlängerung, die den Neubau von Reaktoren von kleinen Reaktoren usw usw alles Sachen sozusagen, die erstmal nur auf dem Papier existieren aber das ist sozusagen ja diese diese zweite Renaissance, die ausgerufen worden ist, international, nachdem sie schon mal ausgerufen worden ist in den Zweitausendern. Die sich im Moment real nicht abbildet, aber diese trotzdem erstmal versucht wird aufrechtzuerhalten, das ist die Frage schafft es das irgendwann nochmal sozusagen in die deutsche Debatte rein und ändert das nochmal Strategien? Ich glaub es zwar eher nicht, weil ganz hart feste auch wirtschaftlicher Gründe dagegen spreche, da wieder einzusteigen, aber Energie ist diese Energie Form scheint eine doch eine gewisse Faszination auszuüben vielleicht ist das auch nochmal eine, sogar einen treibender, ein gewisser Faktor einfach sozusagen. Dass diese die klinisch reihen Anlagen dies dazu geben schreibt die alles zu sagen, denn alles kontrolliert abläuft und die sozusagen hoch technisiert sind, das hat ja auch eine Faszination für sich und das ist durchaus wirkmächtig, glaube ich, wenn es um dann auch die Frage geht, wie wird man neue Energieerzeugungsformen finden, aber wie gesagt unterm Strich glaub ich dann, wenn ich das nicht ohne massiver staatlicher Eingriffe und Subventionierung geht dann wird sich diese Frage für Deutschland auch, jetzt unabhängig von der Debatte um Laufzeitverlängerung ich glaube aus wirtschaftlichen Gründen sozusagen beantworten und zwar, dass man jetzt nicht irgendwie einschränkend eine sehr teure Technologie, während andere die Technologieformen sehr viel billiger geworden sind.

00:18:12 Interviewer

Ja, Sie hatten gerade auch schon die internationale Ebene und die EU einmal erwähnt, da würde ich gerne wissen, würden sie auf der EU Ebene für mehr oder weniger Harmonisierung plädieren, was die Kernenergie angeht?

00:18:31 Respondent VII

Bevor ich zu der Frage gehe, noch einen Aspekt zu der letzten, was vielleicht noch wichtig ist.

00:18:32 Interviewer

Ja klar.

00:18:35 Respondent VII

Ich weiß nicht inwieweit Sie sich überhaupt sozusagen mit dem Forschungsstand zu Entsorgung beschäftigen, aber das ist vielleicht noch mal eine ganz wichtige Komponente, die zusammenhängt, dass wir überhaupt in Deutschland einen, sowsas wie ein Endlagersuchprozess haben und einen Prozess der überhaupt uns jetzt ergebnisoffen eine Entsorgungsmöglichkeit bringen soll sozusagen für den ganzen angefangenen radioaktiven Abfall. Das hängt ja auch mit dem Atomausstieg zusammen. Das basiert ja sozusagen auf einem Kompromiss, dass man die Laufzeiten begrenzt hat. Das heißt wenn das fallen würde und oder gar sozusagen neue Kraftwerke geplant werden, dann sind wir in einem Modus wo wir wieder zurückfallen werden in eine Debattenlage von vor 10, 20, 30 Jahren, wo dann wieder sagen die die Entsorgung sicherlich in dem Sinne politisch aufgeladen wird. Mit der Frage Nutzen der Kerntechnik überhaupt oder nicht? Und was haben wir dann überhaupt noch von den Kraftwerken entsorgen? Das ist nochmal ziemlich, also finde ich zusagen für eine strategische Fragestellung, jetzt nochmal ziemlich wichtig, weil diese... wir werden sozusagen diese diesen breiten gesellschaftlichen Konsens und Kompromissen der geführt wird den diese Endlager suche braucht, den werden wir nicht aufrechterhalten können. Das ist meine ganz deszendierte Vermutung wenn das nicht, wenn wir sozusagen wieder über Laufzeitverlängerung oder irgendwie weiteren Bau sogar sprechen würden, das vielleicht nur als Ergänzung dazu. Mhm, genau dann würden wir wieder am Anfang stehen. Bei Endlagersuche, dann würden wir sozusagen wieder eine Blockadehaltung haben die Gefahrstoffe weiterhin für Jahrzehnte nachfolgenden Generationen oberirdisch unterlassen überlassen, was sozusagen ja nicht sein darf. Zu der internationalen Ebene naja Sie meinen jetzt Harmonisierung von der Kernenergieerzeugung oder Harmonisierung von Regelwerk, oder was?

00:20:30 Interviewer

Generell die Nutzung der Kernenergie, das ist ja auf europäischer Ebene sehr unterschiedlich, was die, was die Länder dafür Strategien fahren, sehen Sie da also würden Sie dafür mehr oder weniger Harmonisierung plädieren?

00:20:46 Respondent VII

Kann ich nur schwer beantworten weil die Energieversorgung ist eine nationale Angelegenheit. Das ist sozusagen ein Grundkonsens, den ich für nachvollziehbar und richtig halte, dass das, dass man auf gleiche Standard hinwirkt aber nicht sozusagen europäische das einzelnt sozusagen jetzt vorschreibt oder so. Von daher kann es eigentlich nur darum gehen, dass man, genau also diese Standards und insbesondere sozusagen die Frage von Sicherheit und sichere Entsorgung, dass man das so gemeinschaftlich macht, harmonisiert das da sozusagen nicht eben Löcher ausgenutzt werden oder eben Sicherheitsdefizite entstehen oder oder weiter da sind, dass das wäre mir dann, dass das wichtigere als die Frage nutze ich es? Und ich ich glaube langfristig, aber das ist dann eher eine Energiewirtschaftliche Fragestellung würde es wahrscheinlich auch Sinn machen, sich natürlich stärker abzusprechen. In einem europäischen Netzverbund wie erzeuge ich Energie und sozusagen wie mach ich das, weil das ist sowieso eine grenzüberschreitende Frage ist also das Macht für mich in der Theorie viel Sinn sozusagen, dass man da wahrscheinlich mal größere Harmonisierung kommt. Ist abber am Ende eine Energiewirtschaftlichen Fragestellungen, die ich die ich nicht beantworten kann. Da hört meine Kompetenz dann auf.

00:22:12 Interviewer

Und eine abschließende Frage habe ich noch es ist ein bisschen durchgeschielen vielleicht in Ihren Antworten, aber ich würde gern wissen, ob Sie also von der persönlichen Meinung her, denken, dass Deutschland seine Kernenergiestrategie beibehalten soll. Also sollen wir auf dem jetzigen Weg bleiben das Ausstiegs oder würden sie noch sich Änderungen wünschen?

00:22:33 Respondent VII

Ich glaub, ich habt deutlich gemacht, dass ich den Kernenergieausstieg für durchaus sehr sinnvoll erachte. Aus verschiedensten Gründen aus Gründen der Sicherheit, weil es eine gefährliche Technologie ist. Aus Gründen dieser Frage der Konzentration auf die Entsorgung, die offen und ungelöst ist weltweit und auch in Deutschland, wo wir noch weit weit davon entfernt sind, dafür sichere Lösungen zu haben. Also dauerhaft sichere Lösungen zu haben und von daher ich finde das sehr nachvollziehbar, dass man dabei bleibt. Und diese in den Ausstieg sozusagen nicht ein weiteres Mal sagen jetzt wieder zurücknimmt. Da sprechen, also jenseits von den anderen Argumenten, der Wirtschaftlichkeit, der Kosten, die das verursachen würde etc sozusagen spricht ja vieles dafür, dass das eigentlich den eingeschlagenen Weg aus Sicherheitsgründen dann weiterfährt. Und vielleicht noch sozusagen auch die Brücke sozusagen zu der internationalen Ebene, was ich dann entscheiden finde, ist wie gesagt, dass man sich das, dass man sich gerade vor dem Hintergrund des Ausstiegs und der Erfahrung für entsprechend die Sicherheitsmaßstäbe einsetzt und eben dafür, dass am Beispiel Taxonomie, dass wir eben an der Stelle, insofern eine

Harmonisierung auf jeden Fall auch anstreben als das etwas, was wir, was eine Hochrisikotechnologie ist und nicht nachhaltige Abfälle produziert, ich vereinfache es mal so weit, dass das nicht auch noch zusätzlich gefördert wird, auch wenn jeder Staat zukünftig auch in Deutschland ausgestiegen ist, eine eigene, die eigene Hoheit hat Souveränität hat, über die Energieerzeugung zu entscheiden, aber dass das nicht auch noch zusätzlich gefördert wird. Als nachhaltige Technologie würde ich da an der Stelle auch für ganz, ganz sinnvoll halten. Weil das schwerlich wissenschaftlich zu vertreten ist, dass dass nachhaltig, wie andere zum Beispiel erneuerbare Energien.

00:24:44 Interviewer

Alles klar, vielen Dank, das war auch schon meine letzte Frage. Dann beende ich die Aufnahme.

## Appendix E: Code Table

### Coding Examples

<b>Code</b>	<b>Theoretical Explanation</b>	<b>Coding Example</b>
Stasis	the maintenance of the status quo over a period of time (True et al., 2019)	"The phasing out of nuclear power, which had been agreed by the previous Red–Green coalition government, was a non-negotiable red line issue for the SPD. Its status as a pivot party in the Grand Coalition therefore ensured continuity on nuclear issues with the previous coalition government" (Wurzel, 2010)
Punctuation	interruptions in the status quo of policy maintenance where sudden larger policy changes occur (True et al., 2019)	"The decommissioning of eight nuclear power plants in Germany as a response to the events in Fukushima led to a 23% reduction in gross electricity generation capacity from nuclear" (Menzes & Houllier, 2015)
Policy Image	empirical information coupled with appeals to emotion (True et al., 2019)	
Processing	serial processing, where organizations work on one issue after the other and parallel processing, where multiple issues are handled at the same time, often by different departments (True et al., 2019)	"Bis dann Fukushima auch bei der Kanzlerin so viel Eindruck gemacht hat, dass der Ausstieg vom Ausstieg vom Ausstieg, ja dreimal genau, so zusagen verkündet worden ist, was letztlich ja bedeutet, dass man sozusagen den Ausstiegspfad, der im ersten Schritt festgelegt worden ist, dass man den

		wieder hat aufleben lassen, sicherlich zeitlich angepasst und auch an die aktuelle Situation angepasst usw. Aber dieses Hin und her, das lässt sich ja nur durch die parteipolitischen Konstellationen in der Bundesrepublik erklären anders ist das nicht erklärbar." (Respondent I)
Institutional Friction	inefficiency in the mitigation of reforms during the policy cycle (Baumgartner et al., 2009)	"das Herunterfahren einer solchen Industrie jedenfalls für Deutschland ist ungefähr genauso komplex wie das Hochfahren einer solchen Industrie" (Respondent I)
Temporalism	how stability and change are affected over time	"They have been really very different of course the challenges imposed by history on the conclusions to make are really different between the two countries, but I think also energy policy can be can be has to be seen in that context as well" (Respondent III)
Institutionalism	relating to "building blocks of social order" (Streeck & Thelen, 2005)	"The prevailing institutions did not open up to renewables advocates at first, so they established their own, competing institutional network" (Hager, 2015)
Path Dependence	Positive feedback processes in a political system that are self-reinforcing (Pierson and Skocpol, 2002)	"Aber wir hatten ja unter Rot-Grün im Bund das erste Mal ein Ausstiegsszenario, das auch auf dem Pfad war" (Respondent I)
Incrementalism	small adjustments in policy	"Bis Ende diesen Jahres gibt dem seit einigen Jahren feststehenden, seit

		Fukushima entwickelten oder beziehungsweise entwickelt worden ist er ja schon vorher, aber es gibt ja den langjährigen Plan" (Respondent I)
Problem Stream	relating to the question of why some problems get more attention than others. Kingdon answers this with three suggestions: Indicators that affect problem perception, focusing events and feedback about existing policies (Kingdon, 2013).	"a number of critical events have created high levels of enduring anti-nuclear public opposition" (Rinscheid, 2015)
Politics Stream	The politics stream describes what happens during in the political sphere, such as elections, which can have a large effect on agenda-setting (Kingdon, 2013).	"dieses Hin und her, das lässt sich ja nur durch die parteipolitischen Konstellationen in der Bundesrepublik erklären anders ist das nicht erklärbar." (Respondent I)
Policies Stream	The policies stream relates to political outcomes, for which Kingdon raises the questions of how policy alternatives are chosen. He proposes that a process similar to natural selection happens, with actors creating, criticizing, and considering ideas in their sphere of interest. Policies "survive" when they are feasible, fit values and budget and are acceptable to public and politicians (Kingdon, 2013).	"Das war jetzt zunächst mal ein rot-grüne Debatte, die dann auch zum Ausstiegsbeschluss führte, der aber wohl noch ein bisschen halbherzig war." (Respondent II)
Joined Streams	Activity in all three streams, resulting in policy change (Kingdon, 2013)	"In the meantime, Germany accelerated its Energiewende ("energy transition") efforts to usher in an era of non-nuclear,

		low-carbon renewable energy. Within six months of the Fukushima meltdowns, eight of Germany's 17 nuclear reactors had been shut down permanently and new regulations to phase out nuclear energy altogether by 2022 had come into effect." (Feldhoff, 2016)
Entrepreneurs	actors that have an agenda they want to push. If entrepreneurs take on an issue, it is likely that this issue ends up on the agenda if a suitable policy window arises (Kingdon, 2013)	"The German case shows how policy entrepreneurs can use policy windows in order to justify and promote change in political preferences and values." (Aldrich et al., 2019)
Focusing Event	events with a rare, harmful, or harm-revealing nature	"Fukushima has put an entirely new relevance on the term 'residual risk' which remains despite protective measures taken to prevent accidents" (Feldhoff, 2016)

### Code Correlations

Event	Code	Number of Correlations
<b>Germany</b>		
Atomkonsens 2000	PET-G (punctuation)	2
	PET-G (stasis)	0
	PET-G (policy image)	0
	PET-G (processing)	0
	PET-G (institutional friction)	0
	HI-G (path-dependence)	0
	HI-G (incrementalism)	1

	HI-G (institutionalism)	0
	HI-G (temporalism)	0
	Kingdon-G (problem stream)	0
	Kingdon-G (politics stream)	1
	Kingdon-G (policies stream)	1
	Kingdon-G (joined streams)	1
	Kingdon-G (entrepreneurs)	0
	Kingdon-G (focusing event)	0
Koalition2005	PET-G (punctuation)	0
	PET-G (stasis)	1
	PET-G (policy image)	0
	PET-G (processing)	0
	PET-G (institutional friction)	0
	HI-G (path-dependence)	1
	HI-G (incrementalism)	0
	HI-G (institutionalism)	0
	HI-G (temporalism)	0
	Kingdon-G (problem stream)	0
	Kingdon-G (politics stream)	0
	Kingdon-G (policies stream)	1
	Kingdon-G (joined streams)	0

	Kingdon-G (entrepreneurs)	0
	Kingdon-G (focusing event)	0
Koalition2010 / AtG2010	PET-G (punctuation)	0
	PET-G (stasis)	1
	PET-G (policy image)	0
	PET-G (processing)	0
	PET-G (institutional friction)	0
	HI-G (path-dependence)	0
	HI-G (incrementalism)	1
	HI-G (institutionalism)	0
	HI-G (temporalism)	3
	Kingdon-G (problem stream)	2
	Kingdon-G (politics stream)	1
	Kingdon-G (policies stream)	1
	Kingdon-G (joined streams)	1
	Kingdon-G (entrepreneurs)	1
	Kingdon-G (focusing event)	0
AtG 2011	PET-G (punctuation)	5
	PET-G (stasis)	0
	PET-G (policy image)	1
	PET-G (processing)	1

	PET-G (institutional friction)	0
	HI-G (path-dependence)	0
	HI-G (incrementalism)	0
	HI-G (institutionalism)	1
	HI-G (temporalism)	2
	Kingdon-G (problem stream)	3
	Kingdon-G (politics stream)	3
	Kingdon-G (policies stream)	3
	Kingdon-G (joined streams)	4
	Kingdon-G (entrepreneurs)	2
	Kingdon-G (focusing event)	5
<b>EU</b>		
CouncilDecisions	PET-EU (stasis)	0
	PET-EU (punctuation)	0
	PET-EU (policy image)	0
	PET-EU (processing)	0
	PET-EU (institutional friction)	0
	HI-EU (temporalism)	0
	HI-EU (institutionalism)	0
	HI-EU (path dependence)	0
	HI-EU (incrementalism)	0
	Kingdon-EU (problem stream)	0
	Kingdon-EU (politics stream)	0

	Kingdon-EU (policies stream)	0
	Kingdon-EU (joined streams)	0
	Kingdon-EU (entrepreneurs)	0
	Kingdon-EU (focusing events)	1
Strategy	PET-EU (stasis)	3
	PET-EU (punctuation)	0
	PET-EU (policy image)	0
	PET-EU (processing)	2
	PET-EU (institutional friction)	0
	HI-EU (temporalism)	2
	HI-EU (institutionalism)	3
	HI-EU (path dependence)	2
	HI-EU (incrementalism)	5
	Kingdon-EU (problem stream)	0
	Kingdon-EU (politics stream)	0
	Kingdon-EU (policies stream)	0
	Kingdon-EU (joined streams)	0
	Kingdon-EU (entrepreneurs)	1
	Kingdon-EU (focusing events)	1
Energy Directive 1996	PET-EU (stasis)	0

	PET-EU (punctuation)	0
	PET-EU (policy image)	0
	PET-EU (processing)	0
	PET-EU (institutional friction)	0
	HI-EU (temporalism)	0
	HI-EU (institutionalism)	0
	HI-EU (path dependence)	0
	HI-EU (incrementalism)	0
	Kingdon-EU (problem stream)	0
	Kingdon-EU (politics stream)	0
	Kingdon-EU (policies stream)	0
	Kingdon-EU (joined streams)	0
	Kingdon-EU (entrepreneurs)	0
	Kingdon-EU (focusing events)	0
Art. 194.2 TFEU	PET-EU (stasis)	0
	PET-EU (punctuation)	0
	PET-EU (policy image)	0
	PET-EU (processing)	0
	PET-EU (institutional friction)	0
	HI-EU (temporalism)	0
	HI-EU (institutionalism)	0
	HI-EU (path dependence)	0
	HI-EU (incrementalism)	0
	Kingdon-EU (problem stream)	0

	Kingdon-EU (politics stream)	0
	Kingdon-EU (policies stream)	0
	Kingdon-EU (joined streams)	0
	Kingdon-EU (entrepreneurs)	0
	Kingdon-EU (focusing events)	0
EURATOM	PET-EU (stasis)	0
	PET-EU (punctuation)	0
	PET-EU (policy image)	0
	PET-EU (processing)	0
	PET-EU (institutional friction)	0
	HI-EU (temporalism)	1
	HI-EU (institutionalism)	0
	HI-EU (path dependence)	0
	HI-EU (incrementalism)	0
	Kingdon-EU (problem stream)	0
	Kingdon-EU (politics stream)	0
	Kingdon-EU (policies stream)	0
	Kingdon-EU (joined streams)	0
	Kingdon-EU (entrepreneurs)	0
	Kingdon-EU (focusing events)	0

EEC	PET-EU (stasis)	0
	PET-EU (punctuation)	0
	PET-EU (policy image)	0
	PET-EU (processing)	0
	PET-EU (institutional friction)	0
	HI-EU (temporalism)	1
	HI-EU (institutionalism)	0
	HI-EU (path dependence)	0
	HI-EU (incrementalism)	0
	Kingdon-EU (problem stream)	0
	Kingdon-EU (politics stream)	0
	Kingdon-EU (policies stream)	0
	Kingdon-EU (joined streams)	0
	Kingdon-EU (entrepreneurs)	0
	Kingdon-EU (focusing events)	0

## Appendix F: Interview Overview

No.	Position	Date	Length
I	Member of the Bundestag and the Committee on the Environment, Nature Conservation, Nuclear Safety and Consumer Protection	09.06.2022	26:19 min
II	Sustainability researcher and member of the Ethics Commission "Future of Energy Supply" appointed by Federal Chancellor Angela Merkel in 2011	14.06.2022	17:13 min
III	Employee of the JRC, research on nuclear energy	27.06.2022	45:37 min
IV	Employee of the JRC, research on nuclear energy	27.06.2022	Joint interview w/ Respondent III
V	Researcher on Energy and Climate policy	03.07.2022	17:01 min
VI	Member of the Bundestag and Speaker of their party for nuclear energy	07.07.2022	14:57 min
VII	Department head of a German agency relating to nuclear energy	13.07.2022	24:48 min

## Appendix G: Document Overview

### Articles

Aldrich, D., Forester, S., & Horhager, E. (2018). Triggers for policy change: the 3.11 Fukushima meltdowns and nuclear policy continuity. *Environmental Politics*, 28(7), 1214-1235. doi: 10.1080/09644016.2018.1510216

Aszódi, A., Biró, B., Adorján, L., Dobos, Á., Illés, G., & Tóth, N. et al. (2021). Comparative analysis of national energy strategies of 19 European countries in light of the green deal's objectives. *Energy Conversion And Management*: X, 12, 100136. doi: 10.1016/j.ecmx.2021.100136

Benson, D., & Russel, D. (2014). Patterns of EU Energy Policy Outputs: Incrementalism or Punctuated Equilibrium?. *West European Politics*, 38(1), 185-205. doi: 10.1080/01402382.2014.936707

Benson, D., & Russel, D. (2014). Patterns of EU Energy Policy Outputs: Incrementalism or Punctuated Equilibrium?. *West European Politics*, 38(1), 185-205. doi: 10.1080/01402382.2014.936707

Breunig, C., & Schnatterer, T. (2020). Die politische Agenda Deutschlands. *Politische Vierteljahresschrift*, 61(1), 131-149. doi: 10.1007/s11615-020-00226-6

Brohmer, J. (2020). Germany's climate change agenda a critical overview. University

Chalvatzis, K., & Hooper, E. (2009). Energy security vs. climate change: Theoretical framework development and experience in selected EU electricity markets. *Renewable And Sustainable Energy Reviews*, 13(9), 2703-2709. doi: 10.1016/j.rser.2009.07.013

Cho, I. (2020). To escape or embrace reactors? the politics of nuclear phase-out in Germany and South Korea. *The Pacific Review*, 35(1), 32-58. doi: 10.1080/09512748.2020.1806341

de Menezes, L., & Houllier, M. (2015). Germany's nuclear power plant closures and the integration of electricity markets in Europe. *Energy Policy*, 85, 357-368. doi: 10.1016/j.enpol.2015.05.023

deLlano-Paz, F., Calvo-Silvosa, A., Iglesias Antelo, S., & Soares, I. (2015). The European low-carbon mix for 2030: The role of renewable energy sources in an environmentally and socially efficient approach. *Renewable And Sustainable Energy Reviews*, 48, 49-61. doi: 10.1016/j.rser.2015.03.032

deLlano-Paz, F., Martínez Fernandez, P., & Soares, I. (2016). Addressing 2030 EU policy framework for energy and climate: Cost, risk and energy security issues. *Energy*, 115, 1347-1360. doi: 10.1016/j.energy.2016.01.068

Duscha, V., Schumacher, K., Schleich, J., & Buisson, P. (2013). Costs of meeting international climate targets without nuclear power. *Climate Policy*, 14(3), 327-352. doi: 10.1080/14693062.2014.852018

Farfan, J., & Breyer, C. (2017). Aging of European power plant infrastructure as an opportunity to evolve towards sustainability. *International Journal Of Hydrogen Energy*, 42(28), 18081-18091. doi: 10.1016/j.ijhydene.2016.12.138

Feldhoff, T. (2014). Post-Fukushima energy paths: Japan and Germany compared. *Bulletin Of The Atomic Scientists*, 70(6), 87-96. doi: 10.1177/0096340214555108

Fells, I. (2005). Future of nuclear power in Europe. *International Journal Of Environmental Studies*, 62(6), 737-740. doi: 10.1080/00207230500434935

Fursch, M., Lindenberger, D., Malischek, R., Nagl, S., Panke, T., & Truby, J. (2012). German Nuclear Policy Reconsidered: Implications for the Electricity Market. *Economics Of Energy & Environmental Policy*, 1(3). doi: 10.5547/2160-5890.1.3.4

Glaser, A. (2012). From Brokdorf to Fukushima: The long journey to nuclear phase-out. *Bulletin Of The Atomic Scientists*, 68(6), 10-21. doi: 10.1177/0096340212464357

Glavind, J. (2014). Bureaucratic power at play? The performance of the EU in the International Atomic Energy Agency. *European Security*, 24(1), 19-35. doi: 10.1080/09662839.2014.970533

Glomsrød, S., Wei, T., Mideksa, T., & Samset, B. (2014). Energy market impacts of nuclear power phase-out policies. *Mitigation And Adaptation Strategies For Global Change*, 20(8), 1511-1527. doi: 10.1007/s11027-014-9558-3

Goebel, J., Krekel, C., Tiefenbach, T., & Ziebarth, N. (2015). How Natural Disasters Can Affect Environmental Concerns, Risk Aversion, and Even Politics: Evidence from Fukushima and Three European Countries. *SSRN Electronic Journal*. doi: 10.2139/ssrn.2623499

Grossi, L., Heim, S., & Waterson, M. (2017). The impact of the German response to the Fukushima Earthquake. *Energy Economics*, 66, 450-465.

Hager, C. (2015). Germany's Green Energy Revolution: Challenging the Theory and Practice of Institutional Change. *German Politics And Society*, 33(3), 1-27. doi: 10.3167/gps.2015.330301

Hake, J., Fischer, W., Venghaus, S., & Weckenbrock, C. (2015). The German Energiewende – History and status quo. *Energy*, 92, 532-546. doi: 10.1016/j.energy.2015.04.027

Hansen, K., Mathiesen, B., & Skov, I. (2019). Full energy system transition towards 100% renewable energy in Germany in 2050. *Renewable And Sustainable Energy Reviews*, 102, 1-13. doi: 10.1016/j.rser.2018.11.038

Hartwig, M., & Tkach-Kawasaki, L. (2019). Identifying the ‘Fukushima Effect’ in Germany through policy actors’ responses: evidence from the G-GEPON 2 survey. *Quality & Quantity*, 53(4), 2081-2101. doi: 10.1007/s11135-019-00857-x

Hartwig, M., Kobashi, Y., Okura, S., & Tkach-Kawasaki, L. (2014). Energy policy participation through networks transcending cleavage: an analysis of Japanese and German renewable energy promotion policies. *Quality & Quantity*, 49(4), 1485-1512. doi: 10.1007/s11135-014-0093-9

Hegelich, S., Fraune, C., & Knollmann, D. (2014). Point Predictions and the Punctuated Equilibrium Theory: A Data Mining Approach-U.S. Nuclear Policy as Proof of Concept. *Policy Studies Journal*, 43(2), 228-256. doi: 10.1111/psj.12089

Hibbs, M. (2012). Nuclear energy 2011: A watershed year. *Bulletin Of The Atomic Scientists*, 68(1), 10-19. doi: 10.1177/0096340211434470

Hocke, P., & Renn, O. (2009). Concerned public and the paralysis of decision-making: nuclear waste management policy in Germany. *Journal Of Risk Research*, 12(7-8), 921-940. doi: 10.1080/13669870903126382

Hoffman, S., & Durlak, P. (2018). The Shelf Life of a Disaster: Post-Fukushima Policy Change in The United States And Germany. *Sociological Forum*, 33(2), 378-402. doi: 10.1111/socf.12419

Hohmeyer, O., & Bohm, S. (2014). Trends toward 100% renewable electricity supply in Germany and Europe: a paradigm shift in energy policies. *Wires Energy And Environment*, 4(1), 74-97. doi: 10.1002/wene.128

Huß, C. (2014). Energy Transition by Conviction or by Surprise? Environmental Policy from 2009 to 2013. *German Politics*, 23(4), 430-445. doi: 10.1080/09644008.2014.953068

Joas, F., Pahle, M., Flachsland, C., & Joas, A. (2016). Which goals are driving the Energiewende? Making sense of the German Energy Transformation. *Energy Policy*, 95, 42-51. doi: 10.1016/j.enpol.2016.04.003

Jorant, C. (2011). The implications of Fukushima. *Bulletin Of The Atomic Scientists*, 67(4), 14-17. doi: 10.1177/0096340211414842

Kanellakis, M., Martinopoulos, G., & Zachariadis, T. (2013). European energy policy—A review. *Energy Policy*, 62, 1020-1030. doi: 10.1016/j.enpol.2013.08.008

Karapin, R. (2020). Household Costs and Resistance to Germany's Energy Transition. *Review Of Policy Research*, 37(3), 313-341. doi: 10.1111/ropr.12371

Lekarenko, O. (2018). The United States–EURATOM Agreement of 1958: The Cold War Impact. *Diplomacy & Statecraft*, 29(3), 432-454. doi: 10.1080/09592296.2018.1491445

Li, N. (2021). Experience and Enlightenment of Energy Transition in Germany. *IOP Conference Series: Earth And Environmental Science*, 621(1), 012172. doi: 10.1088/1755-1315/621/1/012172

Marr, S. (2014). Climate and Energy Policy in the eu and Germany at a cross roads. *Journal For European Environmental & Planning Law*, 11(2), 95-115. doi: 10.1163/18760104-01102003

Martinsen, D., & Krey, V. (2008). Compromises in energy policy—Using fuzzy optimization in an energy systems model. *Energy Policy*, 36(8), 2983-2994. doi: 10.1016/j.enpol.2008.04.005

Matthes, F. (2012). Exit economics: The relatively low cost of Germany's nuclear phase-out. *Bulletin Of The Atomic Scientists*, 68(6), 42-54. doi: 10.1177/0096340212464360

McCauley, D., Brown, A., Rehner, R., Heffron, R., & van de Graaff, S. (2018). Energy justice and policy change: An historical political analysis of the German nuclear phase-out. *Applied Energy*, 228, 317-323. doi: 10.1016/j.apenergy.2018.06.093

Mez, L. (2012). Germany's merger of energy and climate change policy. *Bulletin Of The Atomic Scientists*, 68(6), 22-29. doi: 10.1177/0096340212464358

Moore, J., & Gustafson, T. (2018). Where to Now?. *German Politics And Society*, 36(3), 1-22. doi: 10.3167/gps.2018.360301

Nam, H., Konishi, S., & Nam, K. (2021). Comparative analysis of decision making regarding nuclear policy after the Fukushima Dai-ichi Nuclear Power Plant Accident: Case study in Germany and Japan. *Technology In Society*, 67, 101735. doi: 10.1016/j.techsoc.2021.101735

O'Brien, G., & O'Keefe, P. (2006). The future of nuclear power in Europe: a response. *International Journal Of Environmental Studies*, 63(2), 121-130. doi: 10.1080/00207230600661619

of Western Australia Law Review, 48(1), 264-294.

Percebois, J., & Pommeret, S. (2021). Efficiency and dependence in the European electricity transition. *Energy Policy*, 154, 112300. doi: 10.1016/j.enpol.2021.112300

Rehner, R., & McCauley, D. (2016). Security, justice and the energy crossroads: Assessing the implications of the nuclear phase-out in Germany. *Energy Policy*, 88, 289-298. doi: 10.1016/j.enpol.2015.10.038

Renn, O., & Marshall, J. (2016). Coal, nuclear and renewable energy policies in Germany: From the 1950s to the “Energiewende”. *Energy Policy*, 99, 224-232. doi: 10.1016/j.enpol.2016.05.004

Rinscheid, A. (2015). Crisis, Policy Discourse, and Major Policy Change: Exploring the Role of Subsystem Polarization in Nuclear Energy Policymaking. *European Policy Analysis*, 1(2). doi: 10.18278/epa.1.2.3

Rinscheid, A., Eberlein, B., Emmenegger, P., & Schneider, V. (2019). Why do junctures become critical? Political discourse, agency, and joint belief shifts in comparative perspective. *Regulation & Governance*, 14(4), 653-673. doi: 10.1111/rego.12238

Rochette, G., & Vela, E. (2021). Is the German Nuclear strategy lawful under EU law? Article 194(2) TFEU and its limitations. *The Journal Of World Energy Law & Business*, 14(4), 277-290. doi: 10.1093/jwelb/jwab023

Rossnagel, A., & Hentschel, A. (2012). The legalities of a nuclear shutdown. *Bulletin Of The Atomic Scientists*, 68(6), 55-66. doi: 10.1177/0096340212464361

Scherwath, T., Wealer, B., & Mendelevitch, R. (2020). Nuclear decommissioning after the German Nuclear Phase-Out an integrated view on new regulations and nuclear logistics. *Energy Policy*, 137, 111125. doi: 10.1016/j.enpol.2019.111125

Schiffer, H. (2015). Europe's Road to a Sustainable Energy-Supply System. *Energy & Environment*, 26(1-2), 111-126. doi: 10.1260/0958-305x.26.1-2.111

Schnee, C. (2019). Sticking to her guns or going with the flow. *German Politics And Society*, 37(1), 24-46. doi: 10.3167/gps.2019.370102

Schneider, M., Froggatt, A., & Thomas, S. (2011). *Nuclear Power in a Post-Fukushima World*. Paris, Berlin, Washington: Woldwatch Institute.

Selosse, S., Ricci, O., & Maïzi, N. (2013). Fukushima's impact on the European power sector: The key role of CCS technologies. *Energy Economics*, 39, 305-312. doi: 10.1016/j.eneco.2013.05.013

Shim, J., Park, C., & Wilding, M. (2015). Identifying policy frames through semantic network analysis: an examination of nuclear energy policy across six countries. *Policy Sciences*, 48(1), 51-83. doi: 10.1007/s11077-015-9211-3

Simoes, S., Nijs, W., Ruiz, P., Sgobbi, A., & Thiel, C. (2017). Comparing policy routes for low-carbon power technology deployment in EU – an energy system analysis. *Energy Policy*, 101, 353-365. doi: 10.1016/j.enpol.2016.10.006

Skea, J., Lechtenböhmer, S., & Asuka, J. (2013). Climate policies after Fukushima: three views. *Climate Policy*, 13(sup01), 36-54. doi: 10.1080/14693062.2013.756670

Sovacool, B., Hook, A., Martiskainen, M., & Baker, L. (2019). The whole systems energy injustice of four European low-carbon transitions. *Global Environmental Change*, 58, 101958. doi: 10.1016/j.gloenvcha.2019.101958

Stefes, C. (2020). Opposing Energy Transitions: Modeling the Contested Nature of Energy Transitions in the Electricity Sector. *Review Of Policy Research*, 37(3), 292-312. doi: 10.1111/ropr.12381

Vigoya, M., Mendoza, J., & Abril, S. (2020). INTERNATIONAL ENERGY TRANSITION: A REVIEW OF ITS STATUS ON SEVERAL CONTINENTS. *International Journal Of Energy Economics And Policy*, 10(6), 216-224. doi: 10.32479/ijep.10116

von Hirschhausen, C. (2014). The German "Energiewende" - An Introduction. *Economics Of Energy & Environmental Policy*, 3(2). doi: 10.5547/2160-5890.3.2.chir

Winter, G. (2013). The Rise and Fall of Nuclear Energy Use in Germany: Processes, Explanations and the Role of Law. *Journal Of Environmental Law*, 25(1), 95-124. doi: 10.1093/jel/eqs031

Wood, S. (2010). Europe's Energy Politics. *Journal Of Contemporary European Studies*, 18(3), 307-322. doi: 10.1080/14782804.2010.507916

Wurzel, R. (2010). Environmental, Climate and Energy Policies: Path-Dependent Incrementalism or Quantum Leap?. *German Politics*, 19(3-4), 460-478. doi: 10.1080/09644008.2010.515838

## Policy Documents

Directive 96/92/EC of the European Parliament and of the Council, 19<sup>th</sup> December 1996

Treaty establishing the European Atomic Energy Community (EURATOM), 17<sup>th</sup> April 1957

Consolidated version of the Treaty on European Union and the Treaty on the Functioning of the European Union, 26<sup>th</sup> October 2012

Gesetz zur geordneten Beendigung der Kernenergienutzung zur gewerblichen Erzeugung von Elektrizität, 22nd April 2002

Elftes Gesetz zur Änderung des Atomgesetzes, 8th December 2010

Dreizehntes Gesetz zur Änderung des Atomgesetzes, 31st July 2011

Gemeinsam für Deutschland. Mit Mut und Menschlichkeit. Koalitionsvertrag von CDU, CSU und SPD, 11th November 2005

Wachstum. Bildung. Zusammenhalt. Der Koalitionsvertrag zwischen CDU, CSU und FDP, 26th October 2009