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Post-Fukushima Political Pressure and Nuclear Policy Divergence: A Comparative Study of Japan and Germany

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Abstract
This comparative study examines the divergent nuclear policy responses of Japan and Germany following the Fukushima Daiichi nuclear disaster on March 11, 2011. While both countries faced significant political pressure and public anxiety after the catastrophe, their subsequent paths diverged markedly. Japan initially pursued a complete reactor shutdown but gradually reverted to a cautious nuclear restart policy, influenced by the entrenched "nuclear village" coalition, a political culture favouring consensus, and pressing energy security and economic imperatives. In contrast, Germany accelerated its pre-existing anti-nuclear trajectory by committing to a swift nuclear phase-out by 2022, driven by robust environmental activism, pluralistic governance, and a strong renewable energy agenda under the *Energiewende*. By utilising the frameworks of Punctuated Equilibrium Theory, Advocacy Coalition Framework, and Path Dependency, this study elucidates how institutional structures, political cultures, and historical legacies shaped distinct responses to a shared crisis. The analysis highlights that crisis-induced political pressures translate into policy outcomes differently depending on national context, institutional openness, and energy strategy priorities, offering insights relevant to energy governance and policy design in democratic societies facing complex technological risks.

Keywords: Fukushima Daiichi disaster, nuclear energy policy, Germany, Japan, policy divergence, Punctuated Equilibrium Theory, Advocacy Coalition Framework, Path Dependency, energy transition, *Energiewende*, political pressure, energy security, nuclear phase-out, renewable energy, political culture

I. Introduction

The future of nuclear power has been a major point of political contention in numerous countries, intensifying in the aftermath of high-profile accidents and disasters. The catastrophic Fukushima Daiichi nuclear disaster on March 11, 2011 (commonly referred to as 3/11), a massive earthquake and tsunami struck northeastern Japan, leading to catastrophic failures at the Fukushima Daiichi Nuclear Power Plant. The disaster resulted in core meltdowns in three reactors, significant releases of radioactive material, large-scale evacuations, and a global re-examination of nuclear safety and energy policy (Ramana, 2011; Aldrich, 2012).

This event marked a pivotal shift in global energy debates, particularly shaping the trajectory of nuclear policies around the globe. Public anxiety and political mobilisation in the wake of Fukushima challenged longstanding assumptions about the safety, sustainability, and economic viability of nuclear energy, transforming it into a matter deeply entwined with political leadership and electoral survival (Jennings, 2013). As a consequence, the Western and Asian industrialised nations were compelled to re-evaluate their energy policies and the role of nuclear power. (Kim et al., 2013; Ramana, 2011). However, it did not lead to a uniform policy response. Instead, it exposed deep-seated institutional, political culture, economic and energy security divisions, resulting in a significant divergence in how different countries chose to proceed, especially in Japan and Germany.

Japan and Germany present especially illuminating cases within this context. Both countries, advanced democracies with historical nuclear experiences, witnessed extensive anti-nuclear protests and substantial public opposition before and after Fukushima (Aldrich, 2012; Renn & Marshall, 2016). In Japan, the disaster caused public anxiety and led the government to initially pledge to phase out nuclear power by around 2030 due to safety concerns. However, over time, Japan's political leadership shifted policy toward maintaining nuclear power as part of its energy mix, emphasising safety improvements and extending the lifespan of existing reactors to meet carbon neutrality goals (International Atomic Energy Agency, 2011; World Nuclear Association, 2019). In contrast, Germany experienced strong public and political pressure, leading to a swift policy turnaround. Within a few months post-Fukushima, Germany announced the accelerated closure of all nuclear reactors by 2022 as part of an energy transition toward renewables, with the government adopting legislation to phase out nuclear power despite economic and legal challenges.

The German approach stands in stark contrast to Japan's incremental and contentious strategies, raising critical questions about how political pressure translates into policy divergence among countries with comparable levels of development, but different institutional and energy contexts. In this background, this research paper aims to analyse and compare how political pressures following 3/11 influenced the nuclear energy policies of Japan and Germany, leading to markedly different policy outcomes. This comparative study utilises three theoretical frameworks - Punctuated Equilibrium Theory, Advocacy Coalition

Framework, and Path Dependency and comparatively analysed how public opinion, political party positions, institutional frameworks, political culture, economic and energy security considerations, drove Germany's decisive nuclear phase-out and Japan's more cautious approach to nuclear restarts after 3/11. Through this comparative analysis, the research strives to contribute to a deeper understanding of how crisis-induced political pressures shape national energy policies, offering insights applicable to broader debates on energy transition, governance, and risk management in democratic societies.

II. Review of Literature

The study of nuclear energy policy is often framed by the inherent tension between its promise as a low-carbon energy source and the catastrophic risks associated with accidents. This literature review examines key themes relevant to understanding the divergent nuclear policy responses in Japan and Germany after 3/11: the historical impact of previous nuclear accidents on global policy, the interplay between public opinion and political pressure, and the influence of pre-existing energy policies and economic and cultural contexts.

A. Global Nuclear Disasters and Immediate Impacts

The history of nuclear energy is punctuated by large-scale accidents that have shaped both public perception and political response across nations. The earliest major incident, the Three Mile Island accident in the United States in 1979, marked a turning point for the global nuclear industry. Immediate public anxiety triggered widespread protests and a re-evaluation of nuclear regulation (Joppke, 1991). Though the incident did not result in substantial casualties, the perceived risk led to delays in the construction of new reactors and a shift in U.S. regulatory standards (Wellock, 2010).

The Chernobyl disaster of 1986 in the former Soviet Union amplified these concerns internationally due to its scale and transboundary radiation effects. Its repercussions were felt throughout Europe, where countries such as Italy and Germany saw a surge in anti-nuclear protests and civil society mobilisation (Jasanoff, 1987; Bauer, 1994). Italian public referenda in 1987 resulted in the closure of all nuclear plants and a halt in future development (Bertazzi, 1991). In Germany, Chernobyl solidified and politicised the anti-nuclear movement, with the Green Party and environmental NGOs playing a critical role in pressuring governments for renewable energy transitions (Markham, 1991).

B. Political Pressure and Policy Change

Nuclear disasters have routinely escalated public concern, creating fertile ground for political pressure that shapes policy directions. In democratic societies, mass mobilisations, protest movements, and shifts in public opinion have often forced political parties to re-examine their stances. After both Three Mile Island and Chernobyl, political leaders faced mounting demands to tighten regulation, reconsider energy portfolios, and, in some cases, abandon nuclear ambitions altogether (Joppke, 1991; Bauer, 1994).

The connection between disaster and policy change, however, is not universal or straightforward. In France, despite media coverage and anti-nuclear protests post-Chernobyl, the political establishment maintained its commitment to nuclear power, citing energy independence and state-led technological prowess (Hecht, 1998; Topçu, 2008). Similarly, in the United Kingdom, while public anxiety increased, economic and energy security concerns sustained official support for nuclear programs (Pearce, 1990).

Conversely, in countries with a strong tradition of environmental activism and coalition politics - such as Germany and Italy, disasters provided the necessary impetus for fundamental policy shifts. Both countries experienced the rise of new social movements and political parties that capitalised on post-disaster pressure, using electoral channels and referenda to enact nuclear phase-outs (Bauer, 1994; Bertazzi, 1991).

C. Economic and Cultural Dimensions

Economic considerations have been central to political debates following nuclear accidents. Decisions to phase out nuclear power typically consider the cost of alternative energy sources, job creation or losses, and large-scale investment needs. The German *Energiewende*, for instance, emerged post-Chernobyl as both a response to political pressure and an economic opportunity for renewables and green tech sectors (Markham, 1991). The German *Energiewende*, meaning "energy transition," is Germany's ambitious national strategy to shift from fossil fuels and nuclear power toward renewable energy sources such as wind, solar, and hydroelectric power. Established by legislation in 2010, its goals include reducing greenhouse gas emissions by 80-95% by 2050 compared to 1990 levels and achieving a renewable energy share of around 60% by mid-century (World Nuclear Association, 2019). An essential component of the plan is the phase-out of nuclear power by 2022 and coal by 2038, although coal phase-out dates have been controversial due to concerns about energy security and emission targets (Agora Energiewende, 2019). In contrast, countries with limited alternative energy resources or higher reliance on nuclear generation were more resistant to change due to fears of negative economic fallout and energy insecurity (Hecht, 1998).

Cultural histories and societal values further complicated the relationship between nuclear disasters and policy change. Some nations, such as Japan, harboured deep-seated anxieties about nuclear risks rooted in their experiences of atomic bombings and prior incidents (Brown, 1996). This unique context contributed to a high level of public scepticism and periodic mobilisation, but did not translate into rapid policy reversals before 3/11, as established political and industrial structures favoured continuity (Schnell, 2001).

D. Nuclear Disaster and Policy Change

The literature reveals that major nuclear disasters consistently generate significant political pressure, predominantly manifested through protests, public opinion shifts, and demands for regulatory reform. However, whether this pressure leads to

substantive nuclear policy change depends on several factors, including political system openness, strength of civil society, economic alternatives, and cultural context.
Countries such as Germany and Italy, with vibrant grassroots activism and responsive democratic structures, showcased a clear pathway from disaster to political pressure to policy change. Meanwhile, nations prioritising energy security, or with centralised power and technocratic traditions (e.g., France, the Soviet Union), experienced less direct policy impact despite heightened public concern.
In sum, nuclear disasters have acted as catalysts for political mobilisation and debate, but their translation into policy transformation has varied chronologically and thematically, especially before Fukushima. Each new accident added layers of scrutiny and debate, shaping the evolving landscape of nuclear politics and energy policy.
Despite extensive studies on nuclear disasters and their political consequences, there is limited comparative research that systematically examines how post-crisis political pressures translate into divergent nuclear policy paths within similarly developed democratic countries. Specifically, the nuanced interplay of historical experiences, economic conditions, and political cultures shaping Germany's and Japan's contrasting responses to nuclear crises remains underexplored. This study attempted to fill this gap by making a detailed cross-national analysis to better understand the factors driving nuclear policy divergence following 3/11.

III. Theoretical Framework

This research paper employs a multi-faceted theoretical framework to analyse the divergent nuclear policy responses of Japan and Germany following 3/11. While the disaster served as a singular "focusing event," the distinct outcomes in each nation necessitate a nuanced understanding of how such an event interacts with existing institutional, political culture, economic, and energy security contexts. Therefore, this study will primarily draw upon Punctuated Equilibrium Theory to explain the timing and suddenness of policy shifts, complemented by the Advocacy Coalition Framework to detail the processes of political pressure and policy advocacy, and Path Dependency to account for the enduring influence of historical trajectories.

A. Punctuated Equilibrium Theory (PET)

Punctuated Equilibrium Theory, primarily advanced by Baumgartner and Jones (1993), posits that public policy typically experiences long periods of stability or incremental change (equilibrium) interspersed with abrupt, rapid shifts (punctuations). These punctuations are often triggered by "focusing events" - sudden, rare, and harmful occurrences that draw widespread public and media attention, pushing an issue onto the political agenda. Such events can fundamentally alter policy images, creating windows of opportunity for previously marginalised issues or policy solutions to gain traction (Birkland, 1997).

B. Advocacy Coalition Framework (ACF)

The Advocacy Coalition Framework (Sabatier & Jenkins-Smith, 1993, 1999) provides a robust lens for analysing how political pressure leads to policy change. ACF suggests that policy processes are best understood as interactions among "advocacy coalitions" - groups of actors (e.g., government officials, interest groups, researchers, journalists) who share fundamental policy beliefs and coordinate their activities over time to influence policy decisions. Policy changes, within this framework, can occur through various means, including learning processes within or across coalitions, external shocks (like focusing events), or internal policy subsystem dynamics.

C. Path Dependency (PD)

Path Dependency, a concept prevalent in political science and historical institutionalism, argues that "history matters" and that past choices or events can profoundly constrain or shape future options and outcomes (Pierson, 2004). Once a particular path is chosen, it becomes increasingly difficult and costly to reverse, even if new information or circumstances emerge that suggest an alternative course. This occurs due to increasing returns, learning effects, coordination advantages, and institutional investments that lock actors into existing trajectories.

IV. Research Methodology

This comparative study employed a qualitative research design to analyse the divergent nuclear policy responses of Japan and Germany following 3/11 incident. Drawing upon the theoretical frameworks of PET, ACF, and PD, this section outlined the research approach, data collection, and analytical methods.

The choice of Japan and Germany as comparative cases was grounded in their shared status as developed, democratic nations with historically high dependence on nuclear energy, yet markedly different post-Fukushima outcomes. A comparative approach allowed for the identification of both common and divergent patterns in political pressure, policy advocacy, and institutional responses. This design was particularly suited to examining how similar external shocks - such as Fukushima - resulted in divergent policy pathways according to differing national contexts.

The study relies exclusively on secondary data sources. This included government documents and policy statements (e.g., legislative records, official white papers), academic literature and research reports, news media and public archives. Additional sources include reports from non-governmental organisations, industry associations, and international bodies like the International Atomic Energy Agency and the World Nuclear Association. Data collection focused on the period immediately preceding 3/11 incident (for contextual understanding) and extended through early 2020, consistent with the literature review's scope.

The collected data were analysed using the three selected theoretical frameworks: PET, ACF, and PD. In addition, a structured comparative analysis was carried out by examining the cases side-by-side along key dimensions: institutional arrangements, political culture, economic and energy security considerations, and the interaction of the disaster with pre-existing policy trajectories. This allowed for the identification of both commonalities and divergences in how each country processed the crisis and translated it into policy change. All data employed were from publicly available sources, ensuring full compliance with research ethics standards. Translation and interpretation of foreign-language materials were conducted carefully with attention to preserving original meanings.

While rigorous, this methodology had certain limitations. Reliance on secondary data meant the research depended on existing reporting and academic interpretations. The focus on two cases, while ideal for in-depth comparison, limited the generalizability of findings to other national contexts. Further, isolating the precise impact of specific variables within complex political systems was challenging. Language barriers and restricted access to localised data were additional constraints. To address these challenges, particular attention was paid to the careful translation and interpretation of foreign-language materials, employing multiple sources where possible to cross-verify information. Triangulation through diverse data sets - including official documents, academic analyses, and media reports - enhanced the reliability of the reconstructed policy narratives despite these inherent limitations.

V. Comparative Overview of Nuclear Policy Responses in Japan and Germany Post 3/11

This section compares the pre-Fukushima nuclear contexts, political and public reactions, and the resulting policy outcomes in these two countries to highlight the factors driving these contrasting responses.

A. Pre-Fukushima Nuclear Policy Contexts

In Japan, reliance on nuclear energy was shaped by limited domestic energy resources and postwar industrial policy. Nuclear power accounted for approximately 30% of Japan's electricity supply from 54 reactors and was planned to increase this share to 40% by 2017, which was supported by a powerful network of the "nuclear village" (Aldrich, 2011; World Nuclear Association, 2019). In Japan, "nuclear village" refers to a powerful network of government bureaucrats, politicians, nuclear industry leaders, and academics that collectively promotes and protects the country's nuclear energy policy and interests (Aldrich, 2011; Kingston, 2012). It is not a physical place, but an "imagined collective" community existed since the 1950s (Kingston, 2012). Because of this "nuclear village" dominance, public opposition was comparatively muted, with nuclear energy widely accepted as essential to national energy security.

In contrast, Germany's nuclear power had long been contested and framed by environmental activism and political opposition since the 1980s. The Chernobyl disaster intensified anti-nuclear sentiment, culminating in the 2000 government agreement to phase out nuclear energy by the early 2020s (Markard, 2012). Germany produced about 25% of its electricity from nuclear energy using 17 reactors before 3/11. Although Chancellor Angela Merkel's government extended reactor lifespans in 2010 to address energy security concerns, this decision faced widespread public opposition (Wagner, 2011).

Therefore, before 3/11, Japan's dependency on nuclear energy was higher than Germany's, which was actively reducing its nuclear reliance even before Fukushima (World Nuclear Association, 2019; International Energy Agency, 2019).

B. Political and Public Reactions Post-3/11

3/11 profoundly altered political and public attitudes in both countries, but led to different policy pressures and outcomes. The role of media coverage post-Fukushima was pivotal in shaping public anxiety and political pressure. In Germany, extensive media emphasis on nuclear risk amplified environmentalist messaging and mobilised civil society (Jennings, 2013; Wittneben, 2012). In Japan, media framing was more constrained by cultural factors and institutional control, contributing to complex information dynamics that influenced public trust and policy narratives (Aldrich, 2012; Kingston, 2012).

In Japan, mounting public pressure and the anticipation of the 2012 elections prompted most political parties - except the Liberal Democratic Party (LDP) - to adopt anti-nuclear positions in hopes of appealing to voters (Kingston, 2012). Prominent political figures, such as Prime Minister Naoto Kan of the Democratic Party of Japan (DPJ), shifted from supporting nuclear energy to advocating for its ban by the 2030s (Kan, 2012). His successor, Yoshihiko Noda, also initially favoured denuclearisation, though eventually approved limited reactor restarts amidst economic and energy security imperatives (Samuels, 2013). Nevertheless, with the return to power of Shinzo Abe and the LDP - who maintained a pro-nuclear stance even after 3/11 - Japan witnessed a reorientation back toward nuclear energy, including the restart of several reactors despite persisting public opposition and ongoing safety debates (Wittneben, 2012).

Germany, meanwhile, faced similar post-Fukushima pressures leading to mass protests and increased political pressure, but chose a sharply divergent path. Leveraging its robust history of anti-nuclear activism, federal politics, and technological leadership in renewable energy, Germany accelerated its pre-existing *Energiewende* policy (Markard, 2012). Also, the Green Party and environmental groups gained significant support, pushed the government to revoke reactor lifespan extensions and recommit to a nuclear phase-out by 2022 (Helm, 2007). This policy shift was underpinned by both environmental goals and the prospect of new economic opportunities tied to renewable industries.

C. Policy Outcomes and Trajectories

In Japan, nuclear policy was adapted more cautiously. A complete shutdown of reactors was enacted temporarily alongside regulatory reforms, including the establishment of an independent Nuclear Regulation Authority. Subsequently, Japan began

phased reactor restarts that met new safety standards, balancing political pressure with economic and energy security challenges (Aldrich, 2011). In Germany, the government swiftly revoked the 2010 policy extending reactor lifespans and accelerated the nuclear phase-out, embedding this within the broader *Energiewende* strategy focused on renewables and emission reductions (Markard, 2012). This approach was institutionally supported and politically responsive to public pressure. Germany's *Energiewende* is explicitly linked to reducing greenhouse gas emissions, driving a transition to renewables while phasing out nuclear to address public safety concerns (Markard, 2012; Renn & Marshall, 2016). Similarly, Japan's gradual nuclear restarts are partially motivated by commitments to carbon neutrality and reducing fossil fuel dependence (Kariuki & Kojima, 2019). This dual imperative creates a policy tension between decarbonization goals and societal risk perceptions, shaping divergent national pathways (Hughes, 2018).

After 3/11, both countries experienced short-term energy security and supply challenges but gradually moved toward sustainable energy transitions with distinct national approaches. Japan's progress has been slower due to its energy needs and economic factors, whereas Germany's decisive policy shift positioned it as a leader in renewable energy deployment (Kariuki & Kojima, 2019).

VI. Analysis from Theoretical Frameworks Perspectives

This section applies selected theories (PET, ACF and PD) to explain why Japan and Germany responded so differently to the Fukushima nuclear disaster and highlights how sudden shocks, competing actor coalitions, and historical trajectories shaped divergent policy outcomes in each country:

A. Punctuated Equilibrium Theory: Timing and Suddenness of Policy Shifts

The Punctuated Equilibrium Theory (PET) provides a strong framework for understanding the contrasting nuclear energy policy decisions in Japan and Germany after 3/11.

Japan's Punctuated Equilibrium

Equilibrium (Pre-2011): For decades, Japan's nuclear policy was a textbook example of a policy monopoly. A powerful and stable coalition of government ministries (particularly METI), electric utility companies, and a scientific community viewed nuclear power as a cornerstone of energy security (Hughes, 2018). This "iron triangle" maintained a policy image that framed nuclear power as a safe, clean, and indispensable source of energy for a resource-poor nation. The public generally accepted this policy, despite latent anti-nuclear sentiments stemming from the historical trauma of the atomic bombings.

Punctuation (Post-2011): 3/11 was a catastrophic focusing event that completely broke the existing policy monopoly and shattered public trust in the nuclear establishment (Hughes, 2018). The images of explosions and melting reactors made it impossible for the policy elite to maintain the image of nuclear safety. All of Japan's nuclear reactors were shut down, and for a period, it seemed as if the country would pursue a full phase-out (Tokyo Foundation, 2014). This rapid, unprecedented shutdown was the moment of punctuation.

Attempted Return to Equilibrium: Unlike Germany, Japan did not establish a new, permanent anti-nuclear equilibrium. The economic and energy security consequences of the nuclear shutdown - massively increased fossil fuel imports and a huge trade deficit - were too great for the country to bear (Vovoda & Graetz, 2015). Over time, the government, led by the Liberal Democratic Party, worked to restore a modified policy monopoly. They reframed the issue away from immediate risk and back toward the long-term imperative of energy security, pushing for the restart of reactors that were deemed safe under new regulations (Tokyo Foundation, 2014). This demonstrates a PET principle where a powerful policy subsystem, after being disrupted, can work to reassert its influence and return to a new, albeit modified, form of stability.

Germany's Punctuated Equilibrium

Equilibrium (Pre-2011): Germany's nuclear policy before Fukushima was defined by a gradual phase-out plan. While there was a long history of anti-nuclear activism, the policy was a slow, managed retreat, initially agreed upon by a Social Democrat-Green coalition government in 2002. This policy was then reversed by the Christian Democrat-led government in 2010, which sought to extend the life of existing reactors (World Nuclear Association, 2018). This created a slow-moving, stable, and somewhat contested equilibrium, but it was not one of abrupt change.

Punctuation (Post-2011): 3/11 served as a powerful focusing event. It shattered the existing policy stability and brought the issue of nuclear safety to the forefront of public attention in a dramatic way. The event changed the policy image of nuclear energy from a technical issue of "energy supply" to a deeply emotional one of "catastrophic risk" (Vovoda & Graetz, 2015). Widespread public protests and a sudden shift in public opinion created a "window of opportunity" for political change (Birkland, 1998). In response to this immense pressure, the German government swiftly reversed its recent decision to extend reactor lifespans and instead committed to an accelerated phase-out by 2022, immediately shutting down eight reactors (World Nuclear Association, 2018).

New Equilibrium: The German government's radical policy shift, known as the *Energiewende*, represented the establishment of a new policy equilibrium. The new status quo is a firm commitment to phasing out nuclear power and a major investment in renewable energy technologies.

B. Advocacy Coalition Framework: Political Pressure and Policy Advocacy

The contrasting nuclear energy policies of Japan and Germany after 3/11 are explained through the Advocacy Coalition Framework (ACF), which expresses policymaking as a competition between groups of actors with shared beliefs. A major external shock, like a disaster, can validate the beliefs of one coalition while undermining the core beliefs of a rival, leading to a policy shift.

Japan's ACF
Japan's pre-Fukushima energy policy was dominated "nuclear village", which maintained the core belief that nuclear energy was essential for national energy security due to the country's lack of domestic resources (Hughes, 2018). The anti-nuclear opposition was weak and marginalised, unable to challenge the dominant coalition's narrative (Tokyo Foundation, 2014).
3/11 was an unprecedented external shock that directly attacked the dominant coalition's core belief in nuclear safety. Public trust in the "nuclear village" collapsed, forcing a policy response - the full shutdown of all reactors - that was completely at odds with its long-held beliefs (Hughes, 2018). However, this did not lead to a lasting victory for the anti-nuclear forces. The pro-nuclear coalition, driven by its deeply held beliefs about energy security, was able to use the economic consequences of the shutdown - such as soaring fossil fuel import bills - to its advantage (Vovoda & Graetz, 2015). They gradually regained control of the policy agenda, arguing that restarting reactors under stricter safety rules was a matter of national survival.

Germany's ACF
In contrast, before 2011, Germany's energy policy was a tug-of-war between two opposing advocacy coalitions. The pro-nuclear coalition, composed of utility companies and conservative political parties, believed nuclear power was a clean and reliable energy source. In contrast, the powerful and deeply rooted anti-nuclear coalition, including the Green Party, environmental groups, and much of the public, held the core belief that nuclear energy posed unacceptable risks (World Nuclear Association, 2018).
3/11 acted as a decisive external shock that overwhelmingly validated the beliefs of the anti-nuclear coalition. It provided dramatic evidence of the catastrophic risks they had long warned against, completely shattering the pro-nuclear coalition's safety arguments. This public validation allowed the anti-nuclear coalition to dominate the policy agenda, leading to a swift and definitive political decision: an accelerated nuclear phase-out (World Nuclear Association, 2018). The shock did not create a new coalition but rather tipped the existing power balance, enabling the long-standing anti-nuclear group to realise its central policy goal.

C. Path Dependency: Enduring Influence of History
As per the Path Dependency framework, the divergent responses of Japan and Germany to 3/11 were not random; they were heavily influenced by their pre-existing policy paths.

Japan's Path Dependency
Japan's path was the opposite of Germany's. For decades, the country was locked into a pro-nuclear trajectory driven by its fundamental energy insecurity. With very few domestic energy resources, policymakers saw nuclear power as the only viable way to achieve energy security and economic growth, reducing dependence on volatile fossil fuel imports (Hughes, 2018). This path was reinforced by a powerful and stable institutional arrangement between the government, electric utilities, and the nuclear industry, which invested heavily in nuclear infrastructure over decades, creating a strong sense of lock-in (Tokyo Foundation, 2014).
3/11 was a major shock that challenged this deeply entrenched path. However, the costs of deviating from it were immense. The temporary shutdown of all reactors led to a surge in expensive fossil fuel imports, a trade deficit, and a significant economic burden (Vovoda & Graetz, 2015). The country faced the choice between a new, unknown path of relying heavily on imported fossil fuels or returning to the familiar nuclear trajectory. Ultimately, the powerful economic and energy security pressures, which had shaped the original path, forced the government to revert to a modified version of its original nuclear policy. The historical path dependency proved too strong to overcome, and Japan gradually began restarting reactors, reinforcing its original trajectory despite the traumatic event.

Germany's Path Dependency
Germany was already on a well-established anti-nuclear path long before 3/11. This trajectory began in the 1970s with the rise of a powerful environmental movement and was reinforced by the 1986 Chernobyl disaster. These historical events and the political mobilisation they inspired created a strong social and political foundation against nuclear power (World Nuclear Association, 2018). Key policy decisions, such as the initial phase-out legislation in 2002, created institutional lock-in, where political parties, environmental groups, and a growing renewable energy industry became invested in this trajectory.
3/11 served as a critical juncture that did not create a new path but instead provided overwhelming justification and political momentum to accelerate the existing one. The public, already wary of nuclear power, overwhelmingly supported a rapid phase-out, making it politically easy and economically feasible to quickly shut down reactors and double down on the *Energiewende* (Konrad-Adenauer-Stiftung, 2014). The institutional and political inertia was so strong that the country was effectively locked into its anti-nuclear trajectory, demonstrating the powerful role of historical context in shaping policy outcomes.

VII. Analysis of Divergent Paths: Institutions, Culture, Economic and Energy Security
The divergent nuclear policy responses of Japan and Germany following 3/11 can be explained by the interplay of institutional structures, political cultures and public trust, and economic and energy security, which shaped how each country processed political pressure and navigated energy policy decisions.

A. Institutional Structure
Japan's centralised "nuclear village" created significant institutional inertia. This centralised power structure limited the ability of opposition groups to influence policy decisively, sustaining pro-nuclear positions despite public protests (Aldrich, 2011).

The regulatory reforms initiated post-Fukushima, including the establishment of an independent Nuclear Regulation Authority, reflect efforts to partially counterbalance this institutional rigidity.
In contrast, Germany's federal political system and pluralistic governance structure facilitated greater political responsiveness to public pressure. The presence of strong regional governments and a vibrant multi-party system allowed environmental actors and the Green Party to exert significant influence on national policymaking (Markard, 2012). This institutional openness enabled rapid policy reversal and the acceleration of the nuclear phase-out following Fukushima.

B. Political Culture and Public Trust

Japan's political culture, forged through the imperatives of postwar reconstruction and energy security, has historically framed nuclear power as both an emblem of technological modernity and a pillar of national resilience (Hughes, 2012). 3/11 significantly undermined public confidence, particularly in state regulators and utility providers; however, this erosion of trust did not culminate in the ascendancy of anti-nuclear political forces (Aldrich, 2012). Instead, Japan's deeply ingrained preference for consensus politics, risk aversion, and institutional continuity played a pivotal role in shaping its cautious policy trajectory (Hughes, 2012). This political culture favoured gradual, incremental reform over rapid transformation, reinforcing existing institutional arrangements such as the 'nuclear village' (Aldrich, 2012). Consequently, despite mounting public anxiety, the political system prioritised pragmatic economic considerations and energy security imperatives, limiting space for radical policy shifts and enabling the eventual restart of reactors under enhanced safety standards (Schreurs, 2013).
Germany's political culture, deeply informed by a legacy of environmental activism and a historically rooted sensitivity to nuclear risks - intensified by the experience of Chernobyl - has engendered enduring public scepticism toward nuclear energy. This cultural orientation not only legitimised but actively reinforced close alignments between societal actors and political parties committed to renewable energy and nuclear phase-out. As a result, political culture served as a decisive foundation for sustaining and accelerating policy change in times of crisis.

C. Economic and Energy Security Imperatives

Both nations' responses to 3/11 were shaped by a combination of pre-existing energy policies, public opinion, and differing views on economic and energy security.
Japan initially took a more hesitant approach. The government, facing a public backlash after the disaster, shut down all of its reactors by May 2012, bringing the country's nuclear power generation to a standstill for the first time in over 40 years (World Nuclear Association, 2019). However, this was not a permanent decision to phase out nuclear energy, but rather a temporary suspension for safety checks and public reassessment (World Nuclear Association, 2019).
The shutdown of Japan's nuclear fleet had significant economic consequences. Before the disaster, nuclear energy provided about 30% of Japan's electricity (World Nuclear Association, 2011). To replace this baseload power, the country was forced to import vast quantities of expensive fossil fuels, such as liquefied natural gas (LNG) and coal (U.S. Energy Information Administration, 2012). This led to higher electricity costs for businesses and consumers, a trade deficit, and a major economic burden. The need to reduce these costs was a key driver for the government to eventually push for the restart of some reactors (Japan Ministry of Economy, Trade and Industry, 2013).
Japan's energy security is intrinsically linked to nuclear power. According to the Japan Ministry of Economy, Trade and Industry, 2015, "The country has very few domestic energy resources and is heavily dependent on imports for nearly all of its energy needs (Japan Ministry of Economy, Trade and Industry, 2013). By shutting down its nuclear reactors, Japan's energy self-sufficiency plummeted from about 20% in 2010 to less than 7% in 2012, making it even more vulnerable to international market fluctuations and supply chain disruptions. Recognising this vulnerability, the government later revised its energy policy to include nuclear energy as a crucial part of its future energy mix, aiming for a 20-22% share by 2030"
Germany's response to 3/11 was to accelerate its *Energiewende* policy. From an economic standpoint, the *Energiewende* involves massive investment in renewable energy technologies, grid infrastructure, and energy efficiency. While this has been costly, Germany's government and proponents of the policy see it as a way to stimulate a new, green economy, create jobs, and foster technological innovation in sectors like wind and solar power (Konrad-Adenauer-Stiftung, 2014). However, critics argue that the policy has led to higher electricity prices for consumers and an increased reliance on fossil fuels as a temporary replacement for the lost nuclear capacity (World Nuclear Association, 2019). In particular, Germany initially compensated for nuclear shutdowns by significantly increasing coal and natural gas consumption, raising concerns about carbon emissions and import dependency (Konrad-Adenauer-Stiftung, 2014).
From an energy security perspective, Germany's phase-out decision entailed a deliberate and complex trade-off. The country prioritised the elimination of nuclear risks and the prevention of potential catastrophic accidents over short-term energy independence and cost stability. This decision heightened Germany's dependence on imported fossil fuels, notably Russian natural gas, thereby introducing new vulnerabilities linked to geopolitical supply disruptions (Konrad-Adenauer-Stiftung, 2014). Concurrently, the energy transition heightened the importance of expanding renewables, which are inherently intermittent, necessitating substantial grid modernisation and investments in backup capacities. This interplay between economic opportunity, environmental goals, and energy security constraints underscores the multifaceted nature of Germany's post-Fukushima energy strategy."

VIII. Conclusion

The divergent nuclear policy responses of Japan and Germany following 3/11 illustrate how a common focusing event can produce starkly different outcomes shaped by distinct national contexts. Germany's rapid and decisive nuclear phase-out was driven by a well-established anti-nuclear trajectory reinforced by robust public opposition, pluralistic political structures, and an existing commitment to renewable energy alternatives under the Energiewende. In contrast, Japan's incremental and

cautious approach reflected the deep institutional entrenchment of the pro-nuclear "nuclear village," a political culture favouring consensus and continuity, and acute energy security concerns due to limited domestic resources.

3/11 disrupted Japan's long-standing policy equilibrium, triggering temporary reactor shutdowns and public anxiety, but the power of the pro-nuclear coalition and the economic imperatives of energy self-sufficiency enabled a partial restoration of the nuclear pathway. Meanwhile, in Germany, the disaster acted as a critical juncture that accelerated an already entrenched anti-nuclear shift, facilitating a new policy equilibrium centred on phasing out nuclear power by 2022 and expanding renewables.

Theories of Punctuated Equilibrium, Advocacy Coalition Framework, and Path Dependency collectively elucidate these contrasting trajectories by highlighting the roles of sudden shocks, competing coalitions, and historically embedded policy paths. The institutional openness and pluralism in Germany made it amenable to rapid and transformative policy change, whereas Japan's centralised governance and energy dependence produced greater resistance to abrupt shifts.

Overall, this comparative analysis underscores that the political translation of crisis-induced pressure into policy outcomes depends not only on the nature of the disaster itself but critically on pre-existing institutional arrangements, political cultures, economic imperatives, and energy security strategies. The findings contribute to broader understandings of energy governance and democratic responsiveness in managing highly complex and risky technologies within different national frameworks.

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