

All Politics is Local: Judicial and Electoral Institutions' Role in Japan's Nuclear Restarts

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Abstract:

Since the 3/11 compounded disasters, Japanese energy policy, especially its nuclear policy, has been paralyzed. After the Fukushima disasters, public opinion turned against nuclear energy while the central government continues to push for restarts of the many offline reactors. Based on nearly thirty interviews with relevant actors and primary and secondary materials, we use qualitative comparative analysis (QCA) and five case studies to illuminate the impact of conditions influencing reactor restarts in Japan after 3/11. We investigate which local actors hold the greatest power to veto nuclear power policy, and why and when they choose to use it. Key decisions in nuclear power policy involve approval from multiple institutions with varying legal jurisdiction, making vetoes the result of multiple actors and conditions. Certain legal and political factors, such as court, regulator, and gubernatorial opposition (or support), matter more than technical factors (such as the age of the reactor or its size) and other political factors (such as town council or prefectural assembly opposition or support). Local politics can stymie a national government's nuclear policy goals through combinations of specific physical conditions and vetoes from relevant actors, rather than through the actions of local opposition or single "heroic" governors. Our findings challenge the assumption that utilities unilaterally accept a governor's vetoes, but reinforce the notion that specific judicial and electoral veto players are blocking an otherwise expected return to a pro-nuclear status quo.

Keywords: Japan, Nuclear Power, Veto Player, Contentious Politics, Restarts, QCA

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Introduction:

In the six years since the March 11, 2011 disasters and the resulting meltdowns at the Fukushima Daiichi nuclear power plant complex, Japan's energy policy, especially nuclear power policy, has been paralyzed. After the Fukushima disasters, public opinion turned against atomic energy while the central government continues to push for restarts of the many offline reactors. While then Prime Minister Naoto Kan declared his personal intention to shut down Japan's nuclear reactors, his replacement Shinzo Abe has reversed course, pushing for the restart of all reactors that clear screening by the Nuclear Regulation Authority. Despite national-level

pressure, attempts to restart Japan's remaining fleet of forty-eight reactors have stalled. In the last year, local residents have opposed restarts, legislators have all but shuttered the ailing Monju fast breeder reactor, and some local courts have sided with antinuclear activists. To date, utilities managed to receive regulatory approval and surmount legal and political obstacles to restart only three nuclear reactors: Sendai reactors 1 and 2 and Ikata reactor 3. This number is significant considering that 70 percent of Japanese citizens opposed restarts in regular opinion polls.¹ Despite widespread opposition to the restarts, large-scale demonstrations, lawsuits, and petitions, restart opponents failed to sway the minds of relevant elected officials in these communities. Even so, twenty-two reactors remain offline, with six planning on restarting. What conditions explain the pattern of failed and successful restarts remains an unanswered but critical question. To answer this, we investigate which institutions hold the power to veto nuclear policy and why and when they choose to use it.

To restart a reactor in Japan, the private utility that operates it must obtain approval from the Nuclear Regulation Authority (NRA) which was created after Fukushima due to complaints about conflict of interest in the old regulator NISA.² Beyond formal regulatory approval, local government units from the prefectural level down to the city, town, and village level hold some veto power over the process. A "gentleman's agreement" requires that the power company obtain approval from not only local and prefectural assemblies but also from mayors and governors.³ With the support of the Abe administration, Japanese utilities made costly safety upgrades in order to convince regulators and local assemblies to approve reactor restarts.

The NRA has been far stricter in its investigations of restart requests than the previous regulator. It has taken seriously potential geological characteristics, such as fault lines active within 130,000 years, in evaluating seismic risks. While Japanese geologists have long known of

various seismic faults running throughout Japan, NISA allowed plants to be built and operated for decades without such concerns. The NRA has not. In March 2015, the NRA refused to allow the restart of Tsuruga nuclear power plant 2 due to its position over a fault and may shut down the Higashidori plant in Aomori Prefecture due to seismic risk.

Meanwhile, Fukushima resulted in a range of impacts on nuclear power in Asia. In South Korea, the state initiated nuclear safety legislation, setting the agenda and successfully pacifying weak civil mobilization without significant changes to the incumbent energy regime.⁴ However, Taiwan legislated a 2025 nuclear exit this year, indicating success for a social movement that gained new life after student protests in 2008 and Fukushima in 2011 boosted a desire for public participation in nuclear policy.⁵ Likewise, combinations of civil society pressure, corruption, and transparency issues have stalled nuclear power in the Philippines, Indonesia, Thailand, and Vietnam.⁶ China's state-owned nuclear industry has continued developing new reactors, insulated from public opinion, but received criticism for lack of public participation and transparency making it vulnerable to regulatory failure.⁷ Some residents seek more public involvement and are willing to pay more for alternatives to nuclear.⁸ After 2013 protests cancelled plans for a uranium-processing complex in Guangdong, wealthy residents' opposition over safety and property concerns has made local government officials prioritize consensus building. State agencies now require public involvement in local government decisions and social stability assessments before hosting nuclear facilities.⁹ A closer look at Japan's nuclear restarts likewise demonstrates that given the right conditions, local politics can challenge implementing a consistent nuclear policy even in politically insulated energy regimes.

Below, we review the literature on Japan's nuclear restart politics and introduce new empirical evidence on local veto players in nuclear policy using extended fieldwork, case

studies, and qualitative comparative analysis. Unlike past analyses of veto players, key decisions in nuclear power policy involve approval from multiple institutions with varying legal jurisdiction, making vetoes the result of multiple actors and conditions. We find that courts, regulators, and seismic activity matter more in restart decisions than technical criteria such as reactor age or size or local political institutions, and governors' vetoes matter most when paired with delayed regulatory approval. Local politics can bar a national government's nuclear policy goals more through such conditions and vetoes than the actions of local opposition or single "heroic" governors.

Nuclear Restarts: Review of Literature

Experts have widely varied projections on which of Japan's nuclear reactors will restart based on political, judicial, and social conditions. We categorize these into flawed energy diversification efforts, embedded interests in national politics, economic dependence of local governments, diversity within host communities, safety agreements, and judicial weaknesses.

First, *flawed efforts at energy diversification*, designed to reduce reliance on nuclear and coal, have paradoxically made nuclear power plant restarts more likely. Japan's government invested deeply in energy diversification after the 3/11 accidents because Japan lost 28.6 percent of its power generation capacity when its reactors shut off.¹⁰ Supplemental coal, gas, and oil imports for thermal power plants levy extreme financial difficulties on utilities.¹¹ Policy makers sought to alleviate energy security concerns and meet greenhouse gas targets by increasing domestic renewable and nuclear generation.

Scholars argued that successful diversification required strong renewable power subsidies, market deregulation, and competition.¹² This meant upending the system of ten

private, regional companies to which the Japanese government delegated power generation, transmission, and distribution after the war.¹³ It also meant addressing problems with transmitting energy across regions, sparse competition, tight price control, and limited flexibility revealed through the meltdowns and policy responses, which had triggered increased dependence on foreign oil.¹⁴

In response, in 2012, the Agency for Natural Resources and Energy (ANRE) implemented the consumer-subsidized Feed-in-Tariff (FIT) policy, which obliged Japan's utilities to buy and pay for renewable energy at a fixed price for a fixed period of time from ANRE-approved power plants. This led to a renewables boom of 1.5 million approved projects by 2015 and new 2030 renewable power targets of 22 to 24 percent compared to 12 percent produced currently.¹⁵ Onlookers anticipated renewable power subsidies would boost rural economic revitalization.¹⁶ Additionally, the ANRE deregulated the energy market in April 2016, allowing over 400 new retail electricity providers to incorporate and service the residential and business sectors.¹⁷

However, in 2014, multiple power companies stopped accepting applications from renewable energy providers, lest the influx of generation overwhelm Japan's dated electric grid or jeopardize stable baseload power sources like nuclear. This forced the ANRE to shorten deadlines, screen projects for feasibility, and minimize costs of the FIT, jeopardizing diversification efforts.¹⁸ New projects must pay for upgrading dated grid connections themselves or lose their chance to enter the market. Further, regional monopolies remain legally joined to transmission and distribution line companies until 2020, meaning potential uneven pricing schemes could box new companies out.¹⁹ Finally, financial pressure for utilities to restart reactors and make good on sunk costs in nuclear power remains unabated. Consequently, the

current government still aims for 20 to 22 percent generation from nuclear power by 2030, down from 30 percent in 2011.²⁰

Embedded Interests in National Politics

Beyond flawed policies, scholars have viewed nuclear restart decisions as a key proxy for change or continuity after Fukushima as they represent the outcome of the struggle between politicians, regulators, and public opinion. 3/11's impact on nuclear power policy was limited to gradual institutional change, with embedded political interests at the national level leading the central government to push swift restarts of Japan's nuclear plants. Change after Fukushima remains small and gradual even though the NRA and local governments are more likely than before to act as veto players.²¹

There are several related explanations for this. Shortly after the disaster, confluent narratives dominated political rhetoric, claiming that a nuclear phaseout would be economically "suicidal" and that nuclear power's inherent risks were realistic but not insurmountable challenges.²² Others saw a dominant social coalition of industry partners and bureaucrats that deeply shape nuclear power politics, having excluded and weakened labour and the left. The pro-nuclear Liberal Democratic Party has ruled mostly uninterrupted since 1955, a feat rare among electoral democracies, embedding nuclear power policy deeply in government institutions. Anti-nuclear civil society campaigns face high hurdles to sway legislators, who rely on industry and bureaucrat support to implement policy.²³

Moreover, both governing parties since Fukushima, the Democratic Party of Japan (DPJ) (until 2012) and the Liberal Democratic Party (LDP), depended on the same coalition of business actors for financial support, limiting their possible responses.²⁴ After reforming the DPJ, in 2017,

leader Renho failed to convince her new Democratic Party to commit to a 2030 nuclear power phase-out, largely due to opposition from the Japan Trade Union Confederation (*Rengo*) and its subsidiary, the pro-nuclear Federation of Electric Power Related Industry Workers' Union (*Denryoku Sōren*). While groups such as the LDP's junior partner *Komeitō* continue advocating for a non-nuclear energy future, top-down change remains incremental because pro-nuclear utilities, bureaucrats, lawmakers, and lobbying organizations such as the Japan Business Federation (*Keidanren*) monopolize the process.²⁵

Some argued that Japan's nuclear power lobby (*genshiryoku-mura*) of pro-nuclear bureaucrats, elected officials, power company executives, academics, and politicians would, alongside Washington, exert significant pressure through their close ties to the ruling LDP to ensure that as many reactors restart as possible.²⁶ The practices of *ama-kudari* (descent from heaven) and *ama-agari* (ascent to heaven) have long aided cooperation between these actors, wherein industry members go to work in regulatory agencies and former officials in industry.²⁷

Furthermore, scholars have found that over the last fifty years, this coalition has given significant veto power to the Ministry of Economy, Trade and Industry (METI) and utilities to safeguard nuclear policy.²⁸ The LDP's return to majority in 2012 helped cement the continuity of nuclear power policy. This was in large part because of veto players' unwillingness to renegotiate past compromises lest they lose out in a potential nuclear policy reform.²⁹ In these ways, embedded interests give central government actors strong incentives to restart reactors.

Economic Dependence of Local Governments

On the other hand, these analyses do not address the significant impact of local government dependence on nuclear power plant restart decisions. While casual observers might

imagine that the towns nearest nuclear power might strongly oppose it after Fukushima, that would be inaccurate. Local host communities hope to restart Japan's reactors because of nuclear plants' financial impact on their economies through local income tax, property tax, voluntary corporate donations to public projects, and state subsidies. The ANRE compensates communities hosting controversial facilities—especially nuclear power plants—through the Three Power Source Development Laws (*Dengen Sanpō*) subsidies.

Consequently, Fukushima did not significantly affect Japan's nuclear policy because nuclear power plant host communities would approve nuclear restarts to preserve their extensive compensation packages.³⁰ Nuclear facility host communities frequently collaborate with companies to build subsequent reactors in the same town because these towns need to extend short-term energy development subsidies.³¹ Similarly, nuclear facilities have historically increased local income levels in construction, manufacturing, and retail while all other sectors have experienced negligible improvements.³² Towns hoping to retain their economic livelihood must keep the door open to build future reactors, however unlikely. Critics have compared it to a “cycle of addiction,” where communities need to keep building additional reactors to keep their budgets and spending up.³³

In Kagoshima Prefecture, for example, the nuclear industry rescued a rapidly depopulating town with the construction of two Sendai Nuclear Power Plant reactors in 1984-1985, and the government began allocating subsidies for it and surrounding towns. In 2013, over \$11.5 million (USD) went to its fire department, community health centre, public library, and roads. Kagoshima Prefecture separately received just under \$8.9 million.³⁴ The Sendai plant restart, combined with continuing subsidies, is expected to contribute \$25 million a year to its host community of Satsumasendai through tax revenue.³⁵ Similarly, in Oi-machi, Fukui

Prefecture, some 50 percent of municipal revenue comes from sources related to Kansai Electric's Oi Nuclear Power Plant; in 2003, 88 percent of the municipal gross product came from electric, gas, and water industries.³⁶

Meanwhile, scholars highlight that mergers of depopulating, rural towns at the turn of the century accentuated the boons and challenges of nuclear power-related revenue and subsidies. Ikata, Ehime Prefecture took a 54.7 percent cut in its financial capability index ratio after merging with economically troubled neighbours in 2005. Mergers made towns like Ikata more wary of losing nuclear power-related revenue and challenged their long-term economic sustainability.³⁷

Financial incentives for hosting controversial facilities motivate elected officials at all levels to support nuclear power plant restarts despite safety concerns. These economic concerns insulate public officials from public opinion polls against reactors. For example, although 59 percent of Kagoshima Prefecture residents opposed the Sendai restart, prefectural and Satsumasendai municipal assemblies approved the restart in 2014.³⁸ The LDP held 54.2 percent of prefectural assembly seats and could manage the vote.³⁹ After the NRA approved [the restart of] Kyushu Electric's Sendai reactors 1 and 2 in September 2014, the mayor and assembly of Satsumasendai publicly supported it in October 2014. Finally, in November 2014, pro-nuclear Governor Ito and the prefectural assembly approved the restart. At no point was a local or prefectural referendum conducted despite calls to do so from residents.⁴⁰

In this way, nuclear power development subsidies provide incentives to political actors to carry forward the same practices over time.⁴¹ Nuclear power plants are one of many kinds of pork-barrel projects that allow centralized, national ruling parties in liberal democracies to monopolize control of local governments.⁴² Reforming regulation of the nuclear power industry

has increased safety screening but has not changed these institutional practices at the local level. Consequently, with the near guarantee of local support in communities with jurisdiction over restarts, local political economic dependence on nuclear power should have guaranteed restarts.

Diversity within Host Communities

Furthermore, one might expect that the Fukushima meltdowns boosted opposition from NIMBY (short for Not in My Backyard) activists in nuclear power plant host communities, making restarts impossible, but recent scholarship explains why this is not a given. Nuclear plants and other controversial projects typically provide a benefit to a larger region (power, waste incineration, incarceration) while requiring host communities to accept certain externalities (health, environmental, or economic impacts, accident risk).⁴³ Nuclear restart opponents have a wide variety of reasons for fighting nuclear power, including radiation risks, the limited liability of operators, insufficient safety protocols, lack of transparency, and economic dependence on reactors.

However, residents can fluctuate between support and opposition before a project is proposed in their community, after it is proposed, and after local officials promote and endorse it.⁴⁴ Opposition movements must reconcile different goals between rural movements of residents who can vote on or veto the issue and urban protestors who have no legal standing on the issue.⁴⁵ Opponents' varied positions make it easier to augment an opposition movement but harder to construct a clear policy alternative, enabling supporters to shift the agenda, in this case, from whether or not to restart to *when*.⁴⁶

In Japan, the state typically sited power plants in locations with weak social capital, avoiding communities that could mount successful resistance and abandoning other sites for

more needy, amenable communities.⁴⁷ Further, opposition to renewable or carbon-neutral energy technologies must be understood through local context and “conflicting meanings” to residents in the community.”⁴⁸ The nuclear power industry provides a stable source of municipal income, sometimes a source of pride, a means of fighting depopulation, and financial support for local fishing and agricultural cooperatives. Supporting restarts can be about defending the community that residents see slipping away, not necessarily supporting nuclear power. As a result, the contradictions and broad spectrum of ideologies make it difficult for communities to effectively organize against a major site issue like restarts even if political clientelism and economic dependence were not involved.

Nuclear Safety Agreements

Perhaps the strongest argument for why scholars expected restarts comes from nuclear safety agreements (*anzen kyōtei*). Although every town and prefecture hosting a nuclear power plant holds a safety agreement with its operating utility, the document is not legally binding.⁴⁹ Instead, layers of norms and gentlemen's agreements govern nuclear power outside of concrete legal terms.⁵⁰ These voluntary agreements are made with communities within the government-mandated Emergency Planning Zone (EPZ) of 8 to 10 kilometres from a given reactor. Such local communities must create evacuation plans, but there are no penalties to enforce this requirement or to guarantee quality plans. Some communities have used voluntary agreements as bargaining chips to secure the financial support of utilities in public works projects.⁵¹

Safety agreements state that new construction and restarts after unexpected outages require prior consent of at least the governor before new construction and restarts, although there is no fixed procedure on how consent is obtained. In practice, this means that before operators

apply for safety review from the regulator, who makes legally binding rulings, they seek prior consent first from city councils, mayors, prefectural assemblies, and finally governors. However, in the case of restarts, utilities have sought NRA restart approval first and then used that as justification to ask for the local consent of the above-mentioned parties.⁵² Safety agreements have no legal mechanism that forces utilities to comply with public opinion after the reactor has been licensed and constructed.⁵³

Judicial Weakness

Finally, while the legal gray zone about safety agreements opens opportunities for court challenges, there is strong precedent for Japanese judges ruling in favour of the central government. Past scholarship shows that judges lost favourable career placement opportunities for ruling against the government, especially when the resulting injunction blocked government policy. Judges who participated in left-leaning political organizations saw slower pay increases than others.⁵⁴ Judge Hideaki Higuchi, for example, ruled against the restart of Takahama reactors 3 and 4 on the grounds that because “the causes of the Fukushima disaster are not yet fully known,” the safety review cannot have addressed all legal concerns. Shortly thereafter, he was relocated from his judgeship in Fukui to Nagoya Family Court in what was seen as a demotion. Kansai Electric successfully appealed to the Osaka High Court in spring 2017 for the ruling to be overturned.⁵⁵ Consequently, while left-leaning activist judges like Higuchi offer restart opponents a powerful weapon in the restart debate, the judicial system seems poised to follow through with government policy on restarts as well.

Recent scholarship highlights that in temporary restart attempts in 2011 and 2012, scientific consensus served as the primary determining factor for restart attempts. Lacking

broader consensus among scientists, scholars posited, political authority and embedded political interests determined restarts.⁵⁶ Because the NRA verdict is the only legally binding judgment in current restart debates since nuclear regulatory reform in 2012, this leaves open the question of which regional actors can successfully influence restart outcomes after utilities receive NRA approval. Given that energy diversification and democratization challenges, embedded political interests, political economic dependence, siting theory, legal gray zones, and judicial conservatism would suggest rapid restarts of Japan's reactors, we look to scholarship on actors that could be responsible for Japan's stalled nuclear restarts.

Theory

Actors who can approve or stall potential restarts serve as veto players. National nuclear politics is littered with local veto players in every host community and prefecture, although as we discuss, the effectiveness of these players' vetoes varies greatly. Tsebelis found that when reform requires consensus among veto players, more players involved in a decision increases the likelihood of maintaining the status quo over reform.⁵⁷ Recent studies highlight the importance of time and extra-institutional actors, in that large numbers of veto players may achieve reform consensus to protect their own influence in the future or by weakening special interest groups.⁵⁸ Unlike in standard veto player theory, restarting reactors and maintaining the status quo requires forming consensus among involved parties, while even only one veto can potentially keep a reactor offline as a kind of bottom-up reform of Japanese nuclear policy. Furthermore, restarts involve veto players from multiple institutions outside of any one, clear, legally binding framework with varying levels of legal power. Favorable restart conditions beg the question, which actors' vetoes explain stalled restarts and drive reform?

In reactor construction, mayors have historically served as powerful veto players. Residents could elect a new mayor or pressure them to change their stance. Kyotango, a potential host community near Kyoto, elected a new anti-project mayor after merging with surrounding towns in 2004, killing the project.⁵⁹ However, incumbent mayors often required demonstrated opposition to force them to change their stance lest they lose supporters.

Opposition movements have regularly used a variety of strategies to force a utility to abandon siting plans. These include land sharing, refusing to permit sea surveys near construction sites, the election of an anti-project community leader, and the establishment of a residents' referendum ordinance. At least one of these strategies successfully vetoed utilities' plans in each of eight potential host communities.⁶⁰

Referendums like these came into vogue in the 1990s as powerful collective veto mechanisms. Maki-Machi in Niigata Prefecture used referendums to end a decades-long struggle with Tohoku Electric Power Company over a nuclear plant, pressuring local government with unofficial referendums in 1994 to perform an official referendum. The referendum gave Mayor Sasaguchi the political authority to sell land rights to the Maki-Machi referendum group in 1999 and prevent Tohoku Electric from siting the plant.⁶¹ Because of the strength of referendums, officials have avoided any referendums on restarts in reactor host communities.

Past scholarship has emphasized that the governor's veto on a nuclear safety agreement can effectively terminate facility construction plans. Governors brought nuclear facility siting to a near halt nationwide in the mid-1990s and demanded significant side payments for their compliance.⁶² Thus, surrounding communities can pressure utilities through the governor's veto. In 2008, surrounding communities successfully pressured the Kagoshima governor to end his support for construction of a third Sendai reactor, while in 2016, towns rattled by the Kumamoto

earthquake elected anti-nuclear Governor Satoshi Mitazono.⁶³ What additional conditions trigger local actors to exercise vetoes remains unclear.

Methodology

As demonstrated above, while scholars expected pressure to force quick restarts, local actors have stalled many attempts. Below, we analyze what conditions explain stalled outcomes, focusing on physical conditions and local institutions that can act as veto players. However, standard regression struggles to distinguish causation from spurious correlations when analyzing fewer than seventy cases, especially in cases of causal complexity and equifinality. Stalled restarts demonstrate causal complexity as conditions may interact to affect an outcome. Namely, some courts and local elected officials justify their vetoes based on regulatory factors. These restarts also exhibit equifinality, where there are multiple documented combinations of conditions that have caused stalled restarts.

In studies limited by a small number of cases in existence (for example, reactors), causal configurations of multiple conditions better explain policy puzzles than single independent variables that may not accurately explain relationships in all cases.⁶⁴ Ragin's qualitative comparative analysis (QCA) remedies the problem of spurious correlation by identifying a "solution formula" that includes all possible causal configurations of conditions that lead to a given outcome (for example, a restart or stall) among a set of cases. These often take the shape of OR statements, in which the set of a given outcome 1 includes the set of one condition or some other condition(s).⁶⁵

Veto player theory is well suited to crisp-set QCA, where researchers measure conditions as 0 or 1 and assign a given value to every condition and outcome in each case.

Reducing the original group of cases to a handful of most common patterns is known as Boolean minimization. This eliminates superfluous conditions which appear in some cases but not others without changing the outcome. Minimization can be repeated multiple times to remove conditions demonstrating only spurious roles in causal configurations. Consequently, we implement small-to-medium-N qualitative comparative analysis to identify which combinations of conditions explain restart outcomes.

We consider all nuclear reactors that utilities have put forward for NRA safety inspection and regulatory approval. Our analysis includes twenty-five reactors, which in total make up fifteen nuclear power plant cases. We classify outcomes dichotomously as *restart* or *stalled*. We classify Ōi 3-4 and Genkai 3-4 in our analysis as restarted because all available data suggests that they will soon restart. Furthermore, we classify Takahama 3-4 as stalled despite Kansai Electric's recent court victory in March 2017, in which the Japanese Appeals Court overturned an earlier ruling blocking restart. We label Takahama "stalled" because the courts demonstrated in this case a unique and absolute power to stall restarts, albeit temporarily; our analysis would be incomplete without it.

We consider a series of conditions in our study because of their potential relationship with restart outcomes. These include regulatory criteria, namely generation capacity, age of reactors, seismic activity, and Nuclear Regulation Authority approval, in addition to local electoral and judicial institutions, specifically, the presence or absence of vetoes from municipal and prefectural assemblies, mayors, governors, and courts (see tables 2 and 3).

Generation capacity, which we refer to as "size" below, is relevant because utilities may push to restart reactors with high generation capacities to maximize gains from the expensive safety upgrades necessary for restarts. Age is relevant because utilities may push to restart old

reactors first to maximize gains from expensive safety upgrades before the lifetime of the reactor runs out; alternatively, actors justify delayed approval by the NRA and court vetoes by reactors being too old to restart, at least without upgrades. Seismic activity may likewise impact outcomes as a justification for denying or delaying NRA approval or local consent. NRA approval, as discussed, has the power to allow or veto a restart and has legal bearing. Local and prefectural assemblies, mayors, and governors hold votes prior to restarts and theoretically hold veto power under current norms. Finally, courts can impact restart outcomes through legally binding court injunctions that delay restarts until the case is resolved. Stalled restarts typically demonstrate a combination of these conditions.

Past research emphasizes QCA's usefulness in analyzing ordinal, interval, and even nominal data in one index; to address varying uses of QCA, scholars have quickly developed best practice standards for this increasingly popular method.⁶⁶ However, some critique CQA as being better paired with other quantitative or qualitative methods to avoid misleading conclusions about causation. For instance, standards require a solution formula of one term or more that can explain 90 percent or more of cases.⁶⁷ Configurations explain a given phenomenon, but they do not necessarily demonstrate causation; 25-case analyses demand further proof. Schneider and Rohlfing recommend tracing processes that result in each configuration in the solution formula by studying cases explained by only one configuration in that solution.⁶⁸

Consequently, we present five case studies of the Sendai, Takahama, Mihama, Tsuruga, and Hamaoka nuclear power plant host communities, drawing on data from twenty-nine interviews conducted between December 2016 and February 2017 (see table 1). The authors conducted interviews with city council members, mayors, local government officials, residents,

activists, business promotion agencies, business owners, scientists, and academics. Interviews lasted between thirty minutes and one hour on average and focused on what roles courts, governors, mayors, assemblies, and activists took in restart decisions. In some cases, we redact the identities or details about interviewees to protect their confidentiality. We utilize interview content and case studies to identify processes that connect local conditions to restart outcomes.

Table 1: Interview Participants

Name	Gender	Position	Organization	
Yu Nagatomi	Female	Analysts	Institute of Energy Economics	
Kei Shimogori	Male			
Tatsujiro Suzuki	Male	Former vice chairman	Japan Atomic Energy Commission of the Cabinet Office	
Shin-etsu Sugawara	Male	Analyst	Central Research Inst. of Electric Power Industry	
Kōki Kawasoe	Male	City Council member	Satsumasendai City Council, Kagoshima Prefecture	
Katsuhiro Inoue	Male			
Yoshiteru Kawabata	Male			
Katsuaki Tokuda	Male	Mineyama Council leader	Satsumasendai City, Kagoshima Prefecture	
Noguchi Eiichiro	Male	City Council member	Kagoshima City Council, Kagoshima Prefecture	
Noritaka Yokota	Male	City Council chairman	Takahama City Council, Fukui Prefecture	
Norihito Obata	Mail	City Council member		
Harumi Kondajji	Female	City Council member	Tsuruga City Council, Fukui Prefecture	
Jitarō Yamaguchi	Male	Mayor	Mihama Town Government, Fukui Prefecture	
(Confidential)		City Council member	Mihama City Council, Fukui Prefecture	
(Confidential)		Official	A Fukui Prefecture Local Government	
Sumio Shimizu	Male	City Council member	Omaezaki City, Shizuoka Prefecture	
Yō Saito	Male			
Ryoko Torihara	Female	Lead activist	Sendai Nuclear Power Plant opposition movement	
Fukuda Yoshinori	Male	Activists		
Teruyuki Matsushita	Male			Mihama, Fukui Prefecture
Tetsuen Nakajima	Male			Obama, Fukui Prefecture
Katsumi Miyamoto	Male	Residents	Omaezaki, Shizuoka Prefecture	
Kōichi Ikemori				
Hiroshi Nakayama				
(Confidential)				
Kanehiro Okuno	Male	Officials	Takahama City Chamber of Commerce	
(Confidential)			Nuclear Power Plant Town Economic Promotion organizations	
(Confidential)				
(Confidential)				

Analysis

Before implementing Boolean minimization, initial analysis shows that mayors, city councils, and prefectural assemblies have so far never vetoed restarts due to political economic dependence on reactors as discussed above. Current information suggests that none of these groups intend to do so assuming that reactors pass NRA inspections. Their constant support for restarts rules out these actors out as causal conditions.

We proceed using Boolean minimization on the remaining six conditions: reactor age, reactor installed capacity in megawatts of electricity (size), evidence of seismic activity, lack of NRA approval, governor's vetoes, and court injunctions. We convert reactor age and installed capacity into Boolean values by converting age and megawatts into percentiles relative to the set as a whole, and then classify values over the 50th percentile as 1.

This leaves 2^6 possible configurations of causation. Ordinarily, our analysis would be hindered by the limited diversity of our empirical evidence relative to all possible configurations of causation. However, because empirical cases considered consist of all existing Japanese nuclear reactors under consideration for restart, we exclude logical remainders from our analysis for practical purposes.

Initial attempts at Boolean minimization on the assembled cases show that while reactor age and size do appear in final reduction sets, their inclusion is not logically relevant in all cases. Subsequent Boolean minimization using the Stata program *fuzzy* excludes reactor age and size, creating three explanations for stalled restarts with 100 percent total coverage and solution consistency.

Table 2: Stalled Reactors - Medium N truth table

Case	Age (yrs)	Size (MWe)	Seismic evidence	NRA approval	Town Council oppose	Pref. Assembly oppose	Mayor oppose	Governor oppose	Court oppose	Restart vs. stall
Kashiwazaki Kariwa 6	20	1,356	yes	no	no	no	no	yes	no	stall
Kashiwazaki Kariwa 7	21	1,356	yes	no	no	no	no	yes	no	stall
Hamaoka 3	30	1,100	yes	no	no	no	no	yes	no	stall
Hamaoka 4	24	1,137	yes	no	no	no	no	yes	no	stall
Takahama 1	43	826	yes	no	no	no	no	no	no	stall
Takahama 2	42	826	yes	no	no	no	no	no	no	stall
Takahama 3	32	870	yes	yes	no	no	no	no	yes	stall**
Takahama 4	32	870	yes	yes	no	no	no	no	yes	stall**
Mihama 3	41	1,137	yes	no	no	no	no	no	no	stall
Tsuruga 2	30	1,160	yes	no	no	no	no	no	no	Stall
Higashidōri 1	12	1,100	yes	no	no	no	no	no	no	Stall
Onagawa 2	22	825	yes	no	no	no	no	no	no	Stall
Shimane 2	28	820	yes	no	no	no	no	no	no	Stall
Tokai Daini	39	1,100	yes	no	no	no	no	no	no	Stall
Shika 2	11	1,206	yes	yes	no	no	no	no	no	Stall
Tomari 1	28	579	no	yes	no	no	no	no	no	Stall
Tomari 2	26	579	no	yes	no	no	no	no	no	Stall
Tomari 3	8	912	no	yes	no	no	no	no	no	Stall

* = soon to restart. ** = court injunction recently overturned; soon to restart.

Table 3: Restarting Reactors - Medium N truth table

Case	Age (yrs)	Size (MWe)	Seismic evidence	NRA approval	Town Council oppose	Pref. Assembly oppose	Mayor oppose	Governor oppose	Court oppose	Restart vs. stall
Genkai 3	23	1,180	yes	yes*	no	no	no	no	no	restart*
Genkai 4	20	1,180	yes	yes*	no	no	no	no	no	restart*
Ōi 3	26	1,180	yes	yes*	no	no	no	no	no	restart*
Ōi 4	24	1,180	yes	yes*	no	no	no	no	no	restart*
Ikata 3	23	890	yes	yes	no	no	no	no	no	Restart
Sendai 1	32	890	yes	yes	no	no	no	yes	no	Restart
Sendai 2	33	890	yes	yes	no	no	no	yes	no	Restart

* = soon to restart. ** = court injunction recently overturned; soon to restart.

First, lacking seismic activity or any electoral or judicial veto, delayed NRA approval has stalled Hokkaido Electric's Tomari reactors 1-3. These plants will likely restart, given the near successful restart of the plant in 2012.⁶⁹ Second, court injunctions wield veto power in cases that have received NRA approval and lack a governor's veto yet demonstrate evidence of seismic activity. These cases consist of Kansai Electric's Takahama 3-4.

Third, delayed NRA approval stalls thirteen reactor restarts, facing evidence of seismic activity in the absence of court or governor's vetoes, as utilities work under NRA orders to improve safety features. This includes three subsets. Hokuriku Electric's Shika 2 and Tohoku Electric's Onagawa 2 and Higashidōri 1 are standard cases. Kansai Electric's Mihama 3 and Takahama 1-2, Japan Atomic Power Company's Tsuruga 2, Tokai Daini, and Chūgoku Electric's Shimane 2 are also among the top 50 percent oldest viable reactors. Finally, Chubu Electric's Hamaoka 3-4 and Tokyo Electric Power Company's (TEPCO) Kashiwazaki-Kariwa 6-7 were also vetoed by prefectural governors.

In contrast, as scholars expected, Shikoku Electric's Ikata 3, Kansai Electric's Ōi 3-4, and Kyushu Electric's Genkai 3-4 and Sendai 1-2 reactors have or will soon restart despite concerns about seismic activity nearby. All received NRA approval nonetheless. Ōi and Genkai are all above the 50th percentile in installed generation capacity among Japan's remaining operable reactors, making these power sources high priorities for government and utilities. Factors such as political economic dependence, utility budgets, reducing domestic coal and gas consumption, and regulatory capture are possible explanations for these restarts and offer useful future areas of research. Meanwhile, Sendai 1-2 remain online despite the opposition of the sitting governor, which calls into question whether the gentlemen's agreement actually has power. We address this further in case studies.

Our analysis reveals that courts and regulators function as the most significant veto players, while seismic activity operates as a necessary but insufficient supporting condition that motivates veto players. Courts, regulators, and seismic activity matter more in restart decisions than technical criteria (reactor age and size) and local political institutions (mayors, city council, and prefectural assemblies). Finally, governor's vetoes matter only in cases without NRA approval. Important questions remain. We further verify future court impact, delayed NRA approvals, and governors' vetoes in five case studies below.

Court Injunctions in Takahama

Courts became a major issue in Takahama, Fukui Prefecture in March 2016 when the Otsu District Court stalled the NRA approved restart of Kansai Electric's Takahama 3-4 for more than a year. Seismic activity in nearby Wakasa Bay was a necessary but insufficient condition, given that legal loopholes addressed by the court injunction threatened disaster prevention measures. The court ruled that Kansai Electric and NRA safety verdicts were incomplete because ongoing Fukushima Daiichi investigations indicated that the causes of the incident were not yet fully known, and that government holds responsibility for verifying mandatory evacuation plans prior to restarts.⁷⁰

This case has broad implications for the judiciary. New post-Fukushima requirements have empowered plaintiffs. Although new requirements that communities within thirty kilometres of reactors make evacuation plans are controversial because neither utilities nor regulators are required to verify them, these requirements gave neighboring Shiga Prefecture residents legal authority to contest restarts despite being outside of Fukui Prefecture. Furthermore, post-Fukushima regulations allow plaintiffs to appeal to courts as far as 250 km

away from nuclear facilities.⁷¹ Although on March 28, 2017, the Osaka High Court overturned the ruling, the Otsu injunction established precedent for similar suits against utilities. Takahama town council chairman Noritaka Yokota noted, “In Shikoku and Kyushu, the results of this court ruling are already having an effect.”⁷²

Given opponents’ increasingly technical means of challenging restarts, local officials are questioning the court’s responsibility in “scientific” matters. According to Mihama town mayor Jitarō Yamaguchi, “Under the current court system, judges don't rule [on reactors.] It goes to another court with technical expertise. Doesn't nuclear power belong there?”⁷³ Elected officials in Takahama and Mihama oppose the idea of courts, lacking scientific expertise, ruling on nuclear safety matters, but they also support the High Court ruling on the same scientific matters in favour of Kansai Electric.⁷⁴ Former Mihama town council member Teruyuki Matsushita, however, contends, “It is residents' inalienable right to have [the judiciary] assess whether or not the safety of nuclear power plants can be guaranteed... . Individual judges’ characteristics are bringing about just verdicts.” Judges willing to make unconventional verdicts are rare, but courts represent the strongest veto option for opponents.⁷⁵

Nuclear Regulation Authority Delays Approval in Mihama and Tsuruga

On the other hand, delayed NRA approval brings separate challenges for Mihama 3 and Tsuruga 2 in Fukui Prefecture. For Mihama, delays mean significant but not insurmountable challenges. Since 1970, the town's economic structure and depopulation countermeasures have depended on plant operations.⁷⁶ Fortunately, Mihama and Tsuruga are both well insulated from future electoral vetoes. Because Fukui is home to ten reactors that contribute strongly to the regional economy, strong consensus from a constellation of elected officials (governors, mayors,

and city council chairs) guarantees electoral approval of nuclear restarts.⁷⁷ However, court injunctions from regional courts pose Mihama's biggest potential barrier, according to a local official.⁷⁸ Its age (41 years old) has made it a target as activists prepare to file court cases over Mihama 3's controversial lifetime operation limit extension of twenty years by the NRA.⁷⁹

For Tsuruga, delays represent a near-impossible hurdle: obtaining NRA approval in spite of the potentially active fault line beneath the plant. Further delays may necessitate economic restructuring, given that 45 percent of businesses sampled by the Tsuruga Chamber of Commerce faced declining profits for the past five years; even doctors and nurses at local public hospitals allegedly depend on Three Power Source Development Law nuclear power subsidies for their paychecks.⁸⁰ Cancellation in 2016 of Tsuruga's costly, problem-laden Monju fast-breeder reactor has wide-ranging effects for the long-delayed Rokkasho nuclear reprocessing plant, which was supposed to recycle uranium into mixed-oxide fuel in a self-sustaining cycle.⁸¹ In these ways, NRA delays may open doors for future veto players and restrict future nuclear policy.

Governor's Vetoes in Satsumasendai vs. Hamaoka

Finally, comparing Sendai 1-2 and Hamaoka 3-4, our analysis suggests that in cases with seismic activity, delayed NRA approval, and a governor's veto, the regulator is more consequential than the governor in stalling reactors, although a governor's veto may have more long-term impact.

In Kagoshima, Governor Satoshi Mitazono vetoed operations at Sendai 1-2, demanding Kyushu Electric comply with new safety checks and an immediate halt to operations after magnitude 6-7 earthquakes shook Kumamoto Prefecture in April 2016. He had public backing,

having won election in June 2016 on this platform with help from a broad coalition of anti-nuclear labour unions, environmental organizations, and women's associations, channeling the energy of "bicycle citizens" who otherwise identify as non-political.⁸² However, the plant had restarted in August 2015 with regulatory and local consent, and the governor held no legal authority to shut down the plant. Consequently, Kyushu Electric overruled his veto, conducting safety checks during routine maintenance shutdowns, restarting the plants on schedule, and forcing him to accept the restart.⁸³

Nuclear power plant host community and economic promotion officials insist that a "yes" or "no" from the governor can have a big impact under the right conditions.⁸⁴ For example, opposition movement leader Ryoko Torihara argued that if Mitazono had been elected before the initial restart on August 11, 2015, his veto would have carried more weight.⁸⁵ In accordance with this theory, Governor Heiwa Kawakatsu of Shizuoka reportedly intends to veto the restart of Chubu Electric's Hamaoka 3-4 because no neighbouring municipality within 30 kilometres approves of it, and Governor Ryūichi Yoneyama of Niigata has vetoed the restart of Kashiwazaki-Kariwa 6-7 given 73 percent prefectural opposition. Even experts at the Institute for Energy Economics, Japan emphasize the governor's veto power: "Theoretically TEPCO could skip the political/social gentlemen's agreement and just go with the NRA technical agreement. [However,] the local people are kind of a god for utilities; they must take care of the people."⁸⁶

Although both governors issued their vetoes while reactors remained offline, in reality, Hamaoka and Kashiwazaki-Kariwa technically remain stalled because the need for safety improvements has delayed regulatory approval.⁸⁷ Safety agreements and the governor's consent were originally tools that communities could use to acquire compensation in exchange for

consent, but once utilities have restarted reactors, communities have nothing with which to pressure utilities. Yet by vetoing before utilities receive regulatory approval, governors can maintain the image of winning, call in the gentlemen's agreement, and potentially force utilities to meet halfway with new safety improvement assurances. Considering that neither utility has other reactors likely to restart soon, utilities benefit by cooperating and not encouraging more potential lawsuits. In this way, governors can further delay restarts by enforcing safety upgrades beyond those required by the NRA.

This is consequential, because delayed NRA approval may be only temporary. Some residents suspect the Abe administration will push for a Hamaoka restart after the Tokyo Olympics, avoiding political fallout given Hamaoka's proximity to the event.⁸⁸ Additionally, in Hamaoka, even a pro-nuclear local business advocate expressed concern that NRA inspections are moving too quickly to assuage resident concerns about significant seismic activity from the nearby Tokai fault.⁸⁹ Consequently, upcoming gubernatorial elections in late 2017 in regions hosting Hamaoka reactors 3-4, Onagawa 2, and Tokai Daini may give governors more opportunities to bargain with utilities over restarts and safety improvements. Due to these electoral and judicial battles, bottom-up pressure and cost for utilities are mounting on multiple levels. Opportunities to redefine relationships with Japan's energy system may be closer than ever for governors.

Conclusion

Despite significant pressure from the central government and local host communities to restart Japan's nuclear reactors, courts and regulators function as significant veto players, influenced by concern over seismic activity. We demonstrated through QCA analysis on all available restart attempts that courts, regulators, and seismic activity matter more in restart

decisions than technical criteria such as reactor age or size or local political institutions. Specifically, town and city council, prefectural assembly, and mayor vetoes have yet to play a role in delaying Japanese restarts due to the political and economic fallout a veto would cause. Furthermore, governor's vetoes matter most when paired with more legally binding vetoes, namely delayed regulatory approval, making utilities more open to bargaining over safety improvements or shutdowns. These findings highlight the importance of causal complexity in veto player theory, in that multiple institutions and conditions can serve as veto constellations and counter national technology policy by barring implementation at the local level. Involvement of multiple institutions in a policy process increases the likelihood of vetoes among the parties least directly involved financially. Our findings challenge the assumption that utilities unilaterally accept governors' vetoes but reinforce the notion that specific judicial and electoral veto players can and are blocking an otherwise expected return to a pro-nuclear status quo.

Delayed nuclear reactor restarts in Japan have wide-reaching impacts not only on local, prefectural, and national elections, not only on Japanese power consumption and energy diversification, but also on international agreements and trade, as Japan struggles to meet its Paris commitments of GHG reductions and nuclear industry giant Toshiba struggles financially, the future of its reactor construction deals abroad in doubt. Japan's experiences after Fukushima have revealed the weaknesses of the global nuclear renaissance predicted some decades ago. However, for local politicians abroad looking to veto national policies to resolve policy contestation, Japanese stalled restarts stand as a cautionary tale, as successful vetoes against energy industries require more than just "local heroes" to change the course of a regime.

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