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Historic Perspective on the Conversations to Restart the Kashiwazaki-Kariwa Nuclear Power Plant

Perspectiva histórica sobre las conversaciones para reiniciar la Central Nuclear de Kashiwazaki-Kariwa

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Abstract

Following the accident of Fukushima in 2011, nuclear facilities in Japan were shut down, and a new evaluation and restart process was developed. Despite the public safety concerns, the current administration expects nuclear energy to become a pillar for economic recovery in the coming years. This paper compares the historic context of restarting Kashiwazaki-Kariwa Nuclear Power Plant before and after Fukushima. The evolution is analyzed through a series of interviews in 2012 and 2013 in the community and with government officers, as well as a close follow-up of the official statements by TEPCO and the government agencies up until the end of 2020. It tackles the development in the relation between TEPCO, local authorities, and local community of this nuclear plant, before and after Fukushima. This historic relation has shown to be the key element in the restart process, even above the legal process.

Keywords: Japan, nuclear energy, Kashiwazaki-Kariwa, energy mix, energy policy.

Resumen

Después del accidente de Fukushima en 2011, las instalaciones nucleares fueron cerradas y un nuevo proceso de evaluación y reinicio fue desarrollado. A pesar de la preocupación pública por cuestiones de seguridad, la administración actual busca retomar la energía nuclear como pilar para la recuperación económica. El presente artículo compara el contexto histórico para reiniciar actividades en la Central Nuclear de Kashiwazaki-Kariwa, antes y después de Fukushima. La evolución se analiza a través de una serie de entrevistas entre 2012 y 2013 en dicha comunidad y con oficiales de gobierno, así como mediante el seguimiento de las declaraciones oficiales de TEPCO y las agencias gubernamentales hasta finales de 2020. Se aborda el desarrollo en la relación entre TEPCO y las autoridades y comunidad local antes y después de Fukushima. Esta relación histórica ha mostrado ser el elemento clave en el proceso de reinicio, aun por encima del proceso legal.

Palabras clave: Japón, energía nuclear, Kashiwazaki-Kariwa, mezcla energética, política energética.

Introduction

On December 27, 2017, Tokyo Electric Power Company Holdings Inc. (TEPCO) was been given approval on the first round of revisions of the restart process for two of its nuclear reactors, shut down since 2012 (Ishii, 2017).

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These reactors are located in the Kashiwazaki-Kariwa Nuclear Power Plant (KKNPP), the largest in the world in capacity, with seven nuclear reactors. The permission comes from the governmental agency Nuclear Regulation Authority (NRA), however the local authorities are still to decide whether they will support the restart or not. The current situation is part of the aftermath of the Fukushima accident.

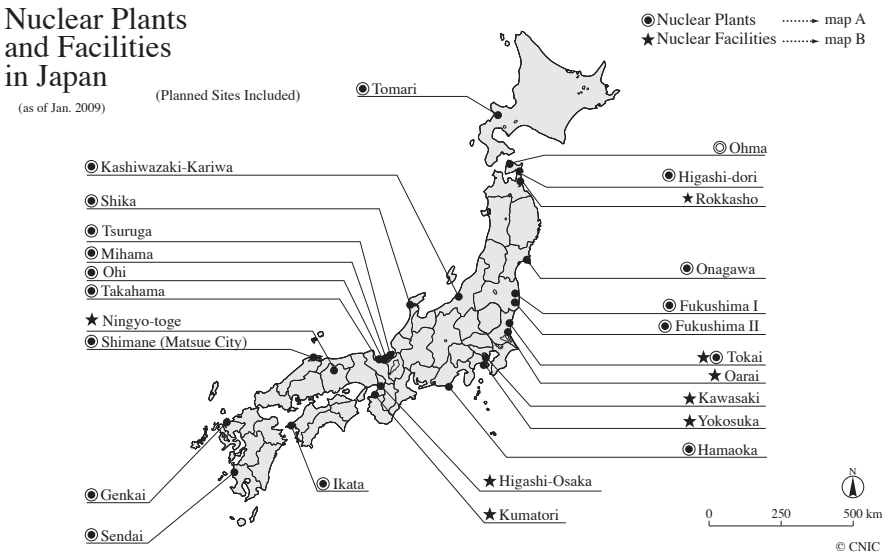
On March 11, 2011 a 9.0 magnitude earthquake occurred in Japan, the Great East Japan Earthquake, followed by a tsunami on the northeast coast. One of the nuclear power plants (NPP) operated by TEPCO was among the areas hit by the waves. Fukushima Daiichi NPP had its power supply and cooling system affected, resulting on the melting of the cores. The release of the nuclear material to the environment led to an evacuation of people living within a radius of 50 km from the NPP, and it has made the area of 20 km around the nuclear facility to be uninhabitable (Greenpeace International, 2013). The death toll in Fukushima prefecture was of 13,895 people, and more than 400,000 had to be evacuated (Cabinet Secretariat, 2011). In 2016, the total cost of the accident amounted 21.5 trillion Japanese yen (about 204 billion US dollars) in decontamination and retribution to affected communities (Ministry of Economy, Trade and Industry [METI], 2016).The decision to shut down all the NPPs in Japan came as a result of the local and international pressure that followed this incident.

Before 2011, nuclear power has established itself as a key element of the energy mix in Japan, representing 30% of the electricity production. By 2011, there were 55 nuclear reactors, six facilities for research or reprocessing purposes, three reactors that already terminated operations, two reactors under construction, one on trial operation, nine approved, and three more proposed (World Nuclear Association, 2020) (Figure 1). After the general shutdown, in order to avoid shortcuts and cover the demand of energy, Japan had to increase the imports of fossil fuels.

Covering the country energy needs was already costly: in 2010, 22% of Japan's total imports were of crude oil and natural gas; the number went up to 27% in 2012 (The Observatory of Economic Complexity, 2019). In addition to the energy costs, the damage relief and reconstruction costs turned the economy into a bigger concern than the threat of a nuclear accident in the future at a national level. While the antinuclear protests were still taking place, the urban areas quickly felt the economic impact. Tighter measures were applied for saving energy; houses had a maximum amount of energy

that could be consumed at once, while larger buildings were not allowed to use cooling systems until summer had started. Electricity costs soared, especially in Tokyo, which was mostly served by TEPCO (Fackler & Onishi, 2011).

Figure 1
Nuclear Plants and Facilities in Japan



Source: Citizens' Nuclear Information Center (2009, p. 7).

KKNPP is not the only nuclear facility currently undergoing an attempt to restart activities. However, it does stand out from the rest because of three main reasons: first, it underwent a natural disaster followed by a restarting process in 2007-2009; second, it is the largest NPP in Japan; and third it is owned by the same operator as Fukushima Daiichi NPP. The scope of this paper covers the issue of restarting NPPs from the national and the local perspective. It aims to understand the local and national factors that have

jeopardized the restart process for KKNPP for the last seven years,[2] and provide a plausible scenario for the close future. The first section explains the history of KKNPP that has shaped the relation of the community with TEPCO. The second section follows the changes brought by Fukushima's accident in 2011 to the nuclear policy, and the steps that have taken into achieving the approval for restarting two of KKNPPs reactors. On the conclusions section, the current state of the NPP will be wrapped up with a possible outcome based on the arguments previously explained.

The analysis regarding the local community includes the conclusions brought through two fieldworks which took place in Kashiwazaki City from 2012 to 2014. The subjects were divided into three main categories: government officials, affiliated citizens,[3] and TEPCO officials. Additionally, a series of interviews to government officials took place in Tokyo in 2013, for a perspective on the national level policy making. The restarting process has been followed from 2012 through the media and published literature. The online newspapers consulted were mainly *Asahi, Yomiuri Shimbun* and *Japan Times*. Regarding the literature for the national perspective, three topics were selected for covering the issue: first, Japanese nuclear policy before 3/11; second, civil society in Japan; and third, the socio-political effects of 3/11. The Japanese agencies in charge of related matters have also served as a source for the official documents on relation to the agency and the current process of restart.

Kashiwazaki-Kariwa nuclear history before 2011

After the Second World War (WWII), Japan entered the so-called economic miracle (Francks, 2015). Having close to zero sources of oil and natural gas, and in order to keep up with the economic growth, the policy makers opted for nuclear technology as the ideal solution to cover the energy demand. This came with its own set of challenges. As the only country that has suffered the aftermath of nuclear weapons, Japan struggled with the strong antinuclear sentiment. Nevertheless, Japan pushed to improve the image of nuclear power, and started its nuclear program in 1954.

2. After Fukushima's accident, NPPs were allowed to apply for restart since 2013.
3. Citizens affiliated to either antinuclear movements, study groups focused on understanding the NPP, and pronuclear groups.

When establishing a NPP, the company requires the approval of the local government, and holding public hearings in the communities was a common practice. In order to avoid high resistance, most NPPs were located in rural areas with low political participation, ensuring that the projects would not face delays (Funabashi & Takenada, 2011). Despite the immediate rejection, these projects eventually went through as they were presented as an economic asset, and even perceived as safe. In 1966 Japan's first nuclear reactor, Tokai 1, started operations.

The biggest NPP in Japan and in the world is located in Kashiwazaki City and Kariwa Village, Niigata Prefecture (Figure 2). In 1969 the construction of the NPP was proposed; approved in 1978, the construction started on the same year. The seven reactors are fueled with enriched uranium, producing over 8 million kW at full capacity (Table 1).

Figure 2
Kashiwazaki-Kariwa Nuclear Power Plant Map

Source: Google (n.d.); Tokyo Electric Power Company (TEPCO) (2015).

Table 1
Kashiwazaki-Kariwa Nuclear Power Plant Reactors Main Features

Reactor	*Beginning of Operations*	*Reactor Type*	*Manufacturer*	*Capacity (thousand kW)*
No. 1	1985	Boiling Water Reactors	Toshiba	1,100
No. 2	1990	Boiling Water Reactors	Toshiba	1,100
No. 3	1993	Boiling Water Reactors	Toshiba	1,100
No. 4	1994	Boiling Water Reactors	Hitachi	1,100
No. 5	1990	Boiling Water Reactors	Hitachi	1,100
No. 6	1996	Advanced Boiling Water Reactors	Toshiba, Hitachi and General Electric	1,356
No. 7	1997	Advanced Boiling Water Reactors	Toshiba, Hitachi and General Electric	1,356
Total				8,212

Source: Kashiwazaki City (2020a). *Kashiwazaki Kariwa Genshiryokuhatsudenjo no Setsubi Gaiyou* [Kashiwazaki-Kariwa Nuclear Power Station Facility Overview].

The economic reliance to the NPP is undeniable. Kashiwazaki City, which hosts medium sized factories and a local production of rice and fish (Kashiwazaki Frontier Park, 2010), estimates that 2,000 people work in the NPP as subcontracted staff besides the 5,400 registered workers (Tokyo Electric Power Company [TEPCO], 2015). Kariwa Village, an agricultural area, has attracted small companies, mostly service providers to the NPP (Industrial Policy Division, 2011). Same as other nuclear towns in Japan, they are compensated for hosting a NPP. Annually, each household receives a subsidy of 18,912 yen (about 175 USD), and the companies 9,456 yen (about 88 USD) per kW contracted (Miida, 2013); these subsidies are paid by Tokyo tax payers (Fackler & Onishi, 2011).

For KKNPP, TEPCO consults Kashiwazaki, Kariwa, and Niigata's governments each time a reactor is shut down for its annual revision and is about to be restarted. Although not legally obliged, the electric power company requests the approval of the local authority before restarting it. This is considered a way to show respect and consideration to the local community, and it has been strongly advised by the respective regulatory agencies throughout the years. Additionally, the companies might suffer economically by not being in good terms with the local government, as taxes and access to local

resources depend directly on the local government (Suzuki, 2014). There is no established procedure for the local authority to make the decision, and to what degree involve local community.

In 2000, TEPCO decided to try Mixed Oxide Fuel[4] (MOX) on reactor No. 3, concurring with the required shut down for its annual revision in May 2001. TEPCO had MOX fuel shipped to Niigata from Europe (Citizens' Nuclear Information Center, 2001), and the Ministry of Economy, Trade and Industry (METI) informed the community through flyers; also, debates took place between government, academic community and antinuclear movement.[5] Two years before, Tokaimura NPP suffered an accident,[6] and its reminiscence echoed in a referendum organized by the Kariwa Village government: with a turnout of 88%, 53% of the votes were against the use of MOX (Citizens' Nuclear Information Center, 2001). Kashiwazaki City did not pursue a referendum or another way to measure the public opinion, but the mayor and Niigata's governor joined in rejecting the project (Citizens' Nuclear Information Center, 2001).

TEPCO, despite having the approval of the agency in charge of authorize the changes on the NPPs, decided not to proceed this time. It was expected that TEPCO would submit for local approval in the future, however the plan was forgotten as it faced a big scandal the following year. On August 29, 2002, it was declared that inaccurate data has had been provided by General Electric, working alongside TEPCO, regarding the safety management of its facilities. According to the press release, 8 reactors of Kashiwazaki-Kariwa, Fukushima Daiichi, and Fukushima Daini, had 29 cases identified as of submitting false information during the periodic revision between the late 80's and 90's. Nuclear and Industrial Safety Agency (NISA)'s[7] assessment showed that the omitted information did not pose a serious risk, but TEPCO's public of image was seriously damaged. Until the whole issue was clarified, all TEPCO's boiling water reactors stopped operations; in KK, reactors No. 1, 2, 3, and 5 remained closed until late 2003.

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4. Manufactured from plutonium recovered from used reactor fuel (World Nuclear Association, 2013a).
5. Open Debate on the Plu-Thermal Program.
6. A batch of uranium enriched to a relatively high level was fed into a reactor. The procedure was done without any previous training or preparation, despite being the first time using uranium at those levels. The operation resulted in 119 people being exposed to high levels of radioactive material; three of them were above permissible limits, resulting in the death of two of them (World Nuclear Association, 2013b).
7. Absorbed into the NRA in 2012.

To avoid future occurrences in KKNPP, TEPCO engaged in creating an internal audit function plus strengthened the areas of quality assurance, corporate ethic and corporate culture, the Technical Committee on the Safety Management of Niigata Prefecture Nuclear Power Plant (Kuroda, 2003). The prefectural government of Niigata also created a committee with local members,[8] and representatives of TEPCO, the governments of Niigata, Kashiwazaki and Kariwa, METI and the Nuclear Regulatory Commission (NRC)[9] as observers or presenters (Niigata Prefecture, 2019).

The safeness of the NPP was questioned again on July 16, 2007, when the Chuetsu Offshore Earthquake hit the west coast of Japan. The epicenter was 16 km away from KKNPP; the facility had three reactors in operation[10] which shut down immediately. Reactor No. 3 was caught on fire due to collateral damage and was not extinguished until an hour later. The International Atomic Energy Agency (IAEA) offered to visit the site in order to assess the causes and the lessons from the accident. The central government initially rejected the offer; however, the mayor of Kashiwazaki, Hiroshi Aida, and the governor of Niigata, Hirohiko Izumida, demanded the inspection, pushing NISA to accept it (Ministry of Economy, Trade and Industry [METI], 2007; Aida, 2009).

IAEA visited the area on three occasions,[11] and determined that despite having some nuclear material leaked, the facilities were in condition to perform safely (Jamet et al., 2008). The lack of standardized safety procedures against fires led to the update of seismic response parameters to reach the current international standards.[12] In between the visits by the IAEA, national and local groups expressed their concern about the use of nuclear power. The Japan Atomic Industrial Forum, the Japan Nuclear Technology Institute and the Central Research Institute of Electric Power Industry organized a series of local informative sessions about the safety of the NPP.[13]

8. Members of the civil society of Kashiwazaki and Kariwa, most of them belonging to legally established associations in the area, including anti and pronuclear. List of members available in http://www.tiikinokai.jp/area/member.html
9. Absorbed into the NRA in 2012.
10. No. 3, 4 and 7. No. 2 was on start-up, and No. 1, 5 and 6 were through their annual revision.
11. August 2007, January 2008 and December 2008.
12. On-site brigade; and Earthquake and Ground Condition, Equipment Integrity, Earthquake Resistance and Safety Subcommittee.
13. The session took place under the Symposium on Seismic Safety of Nuclear Power Plants (Japan Nuclear Technology Institute, 2008).

Following the inspections and recommendations by the IAEA, TEPCO applied for restarting the NPP in 2009. NISA and Nuclear Safety Commission (NSC)[14] set their own committee,[15] and on February granted their approval for restarting reactor No. 7. Alongside with this committee, the prefectural teams ran tests and brought up their own conclusions. TEPCO's president met with the governor and the two mayors in order to decide whether the community was going to accept the NPP back in operation. After what was called a "gentlemen agreement" (Miida, 2013), on May 8 the permission for restarting reactor No. 7 was granted. The reactor was restarted on December of that year; reactors No. 1 and 5 were restarted in 2010, and No. 6 in 2011, just two days before Fukushima's accident.

Restarting NPPs after Fukushima's accident

When the accident in Fukushima occurred, TEPCO and the Japanese government failed to address the issue as fast as people shared information all over the world. Fear and frustration was expressed by the Japanese people, and Japan witnessed an uncommon mobilization of people, rallying for an answer that prioritizes safety. In Tokyo, masses of people were often seen outside of the Diet building, demanding to stop the use of nuclear power. The government was facing three big issues: first, the nuclear contamination crisis; second, the antinuclear demands; and third, the overall economic cost.

Following the heavy criticism, Prime Minister Naoto Kan entrusted METI with providing a national policy regarding the energy policy. The answer that the ministry offered was the creation of the Energy and Environmental Council (ENECAN). Kan resigned as Prime Minister, and Yoshiko Noda took the position on September 2011. Noda took office in the middle of one of the largest crisis for the Japanese government. Facing pressure from inside and outside, Noda's administration requested the NPPs not be restarted until a new legal framework is established. The reactors still working remained that way until their next scheduled revision. KKNPP had at the moment four reactors working, No. 1, 5, 6, and 7; by March 2012 they had all shut down (Government of Kashiwazaki City, 2013). On September 2012, ENECAN released the "Innovative Energy and Environment Strategy", which proposed

14. Absorbed in 2012 into the NRA.
15. Research Committee on Nuclear Facilities in the Chuetsu Offshore Earthquake.

to phase out from the nuclear energy reliance. This proposal, however, had not been advanced to policy level when Noda resigned as prime minister. At the moment, the economic effects from the Fukushima accident continued to affect the people, and the memory of the accident itself started to fade. On December 2012, facing these economic effects, the Liberal Democratic Party (LDP) won the elections with the Abenomics project.

Abe was upfront regarding the cost of having to import fossil fuels to cover the energy needs. By 2010, nuclear energy was one third of the total energy produced in Japan; after shutting down the reactors, Japan's energy self-sufficiency fell from 18% to 6% (Ministry of Economy, Trade and Industry [METI], 2018). One of the proposed pillars for reactivating the economy was the restart of the NPPs. Abe took office with a void on whether the NPPs should be restarted, and if so, how should it be done to secure their safety.

Until then a double check system had been applied. Annually, NSC and NISA would visit the shutdown reactor, run a revision, and address any performance or safety issues. NISA would visit and revise the safety regulatory standards. The results of the inspection would be sent to NSC, which in return would provide guidelines and recommendation, and approve the results as per the observations by NISA. NISA would then grant the legal permission to restart the NPP. Although the energy companies had been strongly advised to consult with the local governments, this was not legally required, therefore never standardized. In the same manner, the way the local government would give their approval based on their own interpretation of the public opinion.

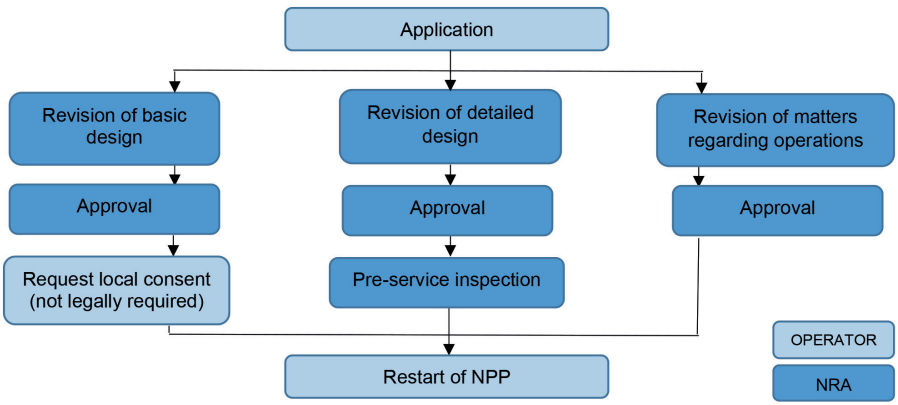
This system proved to be inadequate as it was concluded that the Fukushima accident was manmade. The accident was caused by the "organizational and regulatory systems (…) rather than issues relating to the competency of any specific individual" (Kurokawa et al., 2012). The report put under evidence that the nuclear agencies and TEPCO did not perform as per the established norms. On one hand, TEPCO did not put in action several of the recommendations, given the unlikeliness for certain scenarios to happen.[16] On the other hand, despite the unpreparedness of TEPCO, the agencies allowed the NPP to be back in operations, agreeing on the unlikeliness of these scenarios.

The proposed solution was the creation of a new system that secures the proper functioning of the NPPs according to the highest safety standards. The new regulatory system should be independent from its operators and the

16. Namely preemptive measure in the case of tsunami or electricity shortage.

government, transparent in its process and keeping open records of every meeting, include personnel that meet international standards, and be proactive on their knowledge (Kurokawa et al., 2012, p. 23). The NRA substituted the previous system, placed under the Ministry of Environment (MOE), in order to avoid a conflict of interests. In order to avoid bureaucratic lag, it was decided that this agency would absorb the previous regulatory agencies.[17] To achieve standardization, other activities related to nuclear research from other institutions[18] were also added. The normal procedure would require the NPP to have three revisions: basic design, detailed design, and operational safety program (Figure 3). In this new system, the energy companies were still strongly advised, but still not legally required, to consult with the local government before proceeding to restart any reactor.

Figure 3
Restart Process for Nuclear Power Plants as per NRA Regulations



Source: Japan Atomic Industrial Forum (2017).

17. NSC, NISA and Japan Nuclear Energy Safety Organization (JNES).
18. Atomic Energy Commission (AEC), the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Japan Atomic Energy Agency (JAEA), and the National Institute of Radiological Sciences (NIRS) (Cabinet Secretariat, 2012).

On July 8, 2013, NRA received the first batch of applications.[19] Besides reinforcing already existing requirements,[20] the process included new requirements such as suppression of radioactive materials dispersal, specialized safety facility, prevention of container ventilation failure, and prevention of core damage (Oshima, 2013). Before 2011, revisions took about two to three months per reactor when no big problems were found. Initially NRA expected the new system to take at least six months per reactor; it took over one year to complete just the basic design review. Sendai 1, the first reactor to be restarted after Fukushima's accident, took two years after the application to NRA.

Just a week before the first batch's deadline, TEPCO expressed its interest of submitting KKNPP for approval, given the economic loss that they had been suffering since Fukushima's accident. The costs not only included the damage control in Fukushima and retribution to the victims; the company continued to provide electricity to its users,[21] relocation costs for Fukushima employees,[22] and salaries of their employees, as none were fired. Before TEPCO could apply, the governor of Niigata, Hirohiko Izumida, expressed his opposition to the restart, demanding TEPCO to clarify what happened in Fukushima. The mayors of Kashiwazaki City and Kariwa Village expressed support towards Izumida; while not against restarting the NPP, they expected more information from TEPCO regarding Fukushima. Naromi Hirose, president of TEPCO, attempted unsuccessfully to gain the favor of the governor through negotiation. TEPCO decided to back down in the application, and instead focus on convincing the local community and government.

Local groups[23] became considerably more active (Uchiyama, 2013), demanding to secure both safety and economic growth. Compared to the Chuetsu Earthquake, the NPP was also shut down, but the local economy did not slowed down. At that time, during the months following the earthquake, the service sector kept very active because of the reconstructions works and the visits to assess the NPP. Shutting down the NPP after Fukushima's accident

19. Ten reactors from Tomari NPP (Hokkaido Electric Company), Takahama NPP and Ohi NPP (Kansai Electric Company), Ikata NPP (Shikoku Electric Company), and Sendai NPP and Genkai NPP (Kyushu Electric Company).
20. Resistance to natural phenomena, fire, reliability of power supply, ultimate heat sink, function of other safety certificate contractors, and seismic and tsunami resistance.
21. Electricity cost was increased from 8.6 JPY/kWh to 19.9 JPY/kWh from 2010 to 2019.
22. Employees were relocated to other TEPCO offices across Japan, namely Kashiwazaki City.
23. Antinuclear, pronuclear, and non-affiliated study groups.

caused an economic vacuum; rather than being labeled as pronuclear, those demanding the restart preferred to be called pro-economy.

After months following of hosting explanatory sessions, on September 26, 2013, the governor of Niigata informed that he would not be against TEPCO applying for restart. TEPCO did apply for restarting the reactors No. 6 and 7 on September 27. It was calculated that this would generate a profit of almost 170 million yen (around 1.6 million US dollars) for the fiscal year. TEPCO expected that in the best case scenario KKNPP would restart on July 2014; the process, has taken much longer due to unexpected events. On the first batch of applications, all the reactors were Pressurized Water Reactors (PWR), and these two reactors are Advanced Boiling Water Reactors (ABWR). This required NRA to come up with a whole new procedure for this type of reactor.[24] On October, new information on radioactive water leaking from the damaged plant in Fukushima further slowed down the process; NRA decided to halt all the revisions and focus on this issue. Throughout the following months, NRA worked along TEPCO addressing the doses of radioactive material in Fukushima area. TEPCO issued a roadmap for decommissioning of Fukushima Daiichi on June 2015 (Ishii, 2015).

As TEPCO handling proved to be achieving the expected results, NRA decided to continue revising the reactors set to be restarted. This decision was in great measure due to the economic toll from Fukushima's accident, and the energy goals of the Abe administration. METI released in December 2016 a revised amount of the estimated expenses of the Fukushima accident. Three years before the same document calculated about 11 trillion yen (around 105 billion US dollars), jumping up to 21.5 trillion yen (around 204 billion US dollars) in the new estimate (Table 2). In the same year, METI released the "Strategic Energy Plan", which aims for a 40% of energy coming from non-fossil fuel power sources by 2030, considering an energy mix with a 20 to 22% of nuclear power (METI, 2018) (Figure 4).

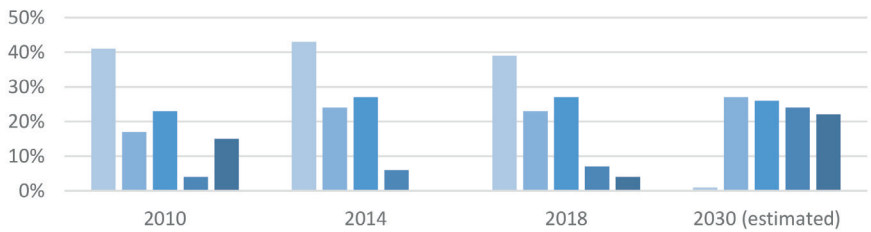
24. Additionally, the NPPs of Shimane and Onagawa, which also applied on the second batch, are Boiling Water Reactors (BWR); adding more procedure that the NRA must tackle before moving forward to ABWR.

Table 2
Estimated Expenses Generated by the Fukushima Accident (trillion yen)

	2013			*2016*		
	TEPCO	*Other energy companies*	*Government*	TEPCO	*Other energy companies*	*Government*
Decontamination	2.5			4		
Storage of contaminated soil			1.1			1.6
Compensation to Victims	2.7	2.7		3.9	4	
Decommission / Contaminated water	2			8		
Total	7.2	2.7	1.1	15.9	4	1.6
Country total	11			21.5		

Source: METI (2016).

Figure 4
Energy Supply in Japan by Source
(%)



Source: International Energy Agency (2018); METI (2018).

On the meantime, TEPCO invited the IAEA's Operational Safety Review Team (OSART) and Emergency Preparedness Review (EPREV) missions to visit the applying reactors. In June and July 2015, OSART visited the reactors in KKNPP and issued six recommendations, nine suggestions, and nine good practices.

Despite already been receiving visits from NRA, in June of 2017 TEPCO submitted a report explaining that they had failed to report an abnormality that did not meet the required standards. The issue was related to a compliance

fail related to seismic resistance, which had existed since the Chuetsu Earthquake, and in February of the same year was pursposely hidden from NRA. Before this, TEPCO expressed its intention on consulting the local governments on restarting the NPP. The mayor of Kashiwazaki, Masahiro Sakurai, expressed his deep disappointment on TEPCO due to this situation. He declared that he considered TEPCO not being serious enough regarding safety, despite the Fukushima accident and several lessons learnt from it. Ryuichi Yoneyama, Niigata's governor, has joined Sakurai in his concern regarding the NPP. The governor suggested to consider decommissioning other reactors in the NPP before moving towards restarting and demanded TEPCO to provide a detailed plan on how to deal with old reactors within two years. TEPCO, already dealing with the decommission costs in Fukushima, stated that before considering decommissioning more reactors they would need to secure the restart of at least two reactors in KKNPP (Tokyo Electric Power Company [TEPCO], 2019).

On December 27, 2017, NRA approved the basic design for reactors No. 6 and 7. Despite the measures taken by TEPCO on the NPP, there seemed not to be any advance on the opinion from the local governments. On August 26, 2019, TEPCO issued the "Basic Approach to the Recommencement of Operation and Decommissioning of the Kashiwazaki-Kariwa Nuclear Power Station". According to the document, TEPCO still considers the seven reactors as a key element to achieve its energy goals. Depending on the results provided once restarted, decommission would be considered at least five years later (Tokyo Electric Power Company [TEPCO], 2019). TEPCO stresses the importance of the local approval in order to take any step forward on this direction. The plan was positively received by Sakurai, considering a good start, but not enough to move towards a local consent.

The local consent has proved to be a key element for restarting the reactors as soon as possible or dragging the process even further. Looking at the reactors that are currently in operation, once the fist approval from NRA has been received, it has taken about a year to restart the reactor. Yoneyama had already stated back in 2017 that for them to consider the restart, it might take additional three or four years of negotiations and safety improvement. On April 2020, the local government ran a poll on energy policy in Kashiwazaki city, and the results are far from positive towards restarting the NPP. The responses favored a limited restart (29.2%), renewable energy over nuclear (38.2%), and gradual decomission (39.4%) (Kashiwazaki City, 2020b).

In order to get the local approval, TEPCO has moved towards a stronger safety led approach. In June 2020, along with Toshiba Energy Systems, "KK6 Safety Measures Joint Venture " was established, and started operation in July, same year. Since KKNPP reactors No.6 and 7 were the first ones on their class to be under revision of NRA, the process has been slower. In order to deal with this limitation, the new company specializes in equipment design and construction management for safety measures for BWR (Toshiba Energy Systems, 2020).

Strenghtening the safety measures at the KKNPP have remained a priority for TEPCO thoughout 2020. The Covid-19 pandemic has provided more flexiblity to work on the restart process. Initially, it was decided that the works on the NPP would be halted during the Summer Olympics, planned to take place in Tokyo 2020. With the Olympics postponed until 2021, 2020 has been used to complete the safety related construction works. Despite having confirmed cases of Covid-19 infection in April and September[25], Takeo Ishii, KKNPP local director, explained that the Covid-19 pandemic would not prevent the works to be finished on time (Tokyo Electric Power Company [TEPCO], 2020a). Following the confirmed cases in April, the facility underwent a series of countermeasures to confirm that no more workers had been infected, and to prevent contagion (Tokyo Electric Power Company [TEPCO], 2020b):

- PCR tests for people in contact with the confirmed cases.
- 80% of the facility workers[26] were put to work remotely.
- Construction workers were reduced from 1,300 to 1,200.[27]
- Prevention measures included: temperature checking, wearing masks during commuting and work, new people in the facility should provide two weeks background, and construction workers were limited to remain a the construction and their lodging.

On December 18, TEPCO submitted an updated version of safety standards to the NRA and is awaiting for their reply (Tokyo Electric Power Company [TEPCO], 2020e). The political environment by the end of 2020 does not seem to have a negative impact for the restart process. Locally, both Sakurai

25. Two employees in April 2020 (Tokyo Electric Power Company (TEPCO), 2020b), and one more in September 2020 (Tokyo Electric Power Company (TEPCO), 2020c).
26. From 4000 to 1200 (Tokyo Electric Power Company (TEPCO), 2020b).
27. Returning to 1300 by the end of May, 2 weeks after the first case in April (Tokyo Electric Power Company (TEPCO), 2020b).

(Kashiwazaki City, 2020c) and Shinada (Kariwa Village, 2020) got reelected as mayors in November and December respectively. Both of them expressed interest in restarting the NPP if safety could be assured, and won over candidates openly antinuclear. On the national level, Abe resigned and Yoshihide Suga was apointed as Prime Minister in September. Within two weeks of being elected, Suga visited Fukushima Daiichi and had been particularly critical regarding the water decontamintation and evacuation plans in the NPPs (Tokyo Electric Power Company [TEPCO], 2020d). A month later, he stated that he considered nuclear energy as one of the strategies that his government would use to achieve carbon neutrality by 2050, as per METI's "Strategic Energy Plan" (Ohno, 2020b). This resonates with the economic concerns for 2021. In 2017, with five reactors working, the electricity generation by nuclear power was only 3% of the total generated. By the end of 2020 nine reactors have restarted, with the capacity to double the generation of 2017 (World Nuclear Association, 2020). However, the Covid-19 pandemic impacted the earnings of energy producing companies and a large number of public spaces have been closed to prevent focus of infection, slowing down the economy and the electricity consumption (Ohno, 2020a).

Conclusion

Restarting KKNPP has turned into an issue of national concern, more than any of the other NPPs in Japan. The plant is operated by the same company that was in charge of Fukushima Daiichi, which was found handling inadequately the accident and preemptive safety measures. Not being able to restart any of their nuclear facilities represents an economical challenge, and hinders the general trust of the same company dealing with the aftermath of Fukushima. TEPCO has been investing in reinforcing their safety standards in order to secure local and national trust and currently waiting for NRA's approval on the recommend safety measurements.

Any additional delay becomes in another fiscal year lost for the restart process, deepening TEPCO's economic losses. Just in KKNPP, the company keeps investing on the restart process of reactors No. 6 and 7, while the remaining five reactors have not been submitted for revision. The rest of the reactors owned by TEPCO[28] are either under decommission or have not yet applied

28. In Fukushima (shut down) and Higashidori.

for revision. So far, the proposal that has been better received by the local government considers an exhaustive decommission plan for Fukushima, and decommission in KKNPP within a relatively short term. TEPCO has not been able to fully embrace this proposal due to huge amount of money that has already been spent in dealing with the Fukushima accident. Promising a soon decommission would not benefit the company for long, and would eventually require an additional investment in the decommissioning of KKNPP itself.

It has been almost 10 years since the accident, and for TEPCO these years have accounted huge economic losses. This situation increased the import of fossil fuels and the price of electricity at national level. KKNPP could have been the example of a learned lesson, as well as a direct acknowledgement of the importance of nuclear generated energy for the Japanese economy. METI has established the goal of having 20-22% of nuclear energy in the energy mix by 2030. If the 16 reactors currently applying were to be restarted, the total electricity would achieve about 17% of the current consumption. It must be noted, however, that 7 of these have not even completed the first step of the restart process[29] (World Nuclear Association, 2020). In paper, TEPCO has gone above and beyond the issues that brought the accident in Fukushima; and there is no doubt that having the NPP back into operation meets several goals of the current administration.

It seems the importance of building rapport has proven bigger than establishing a legal and safety framework. In the past, the distrust from the local government has been overcome through lobbying and reaching an agreement "between gentlemen". This time it seems that the only message from the local authorities is a negative one; an example of this is a recent poll on energy policy. These polls usually tend to have a larger participation from the antinuclear factions; somehow showing that the authorities are building an argument not to support the restart of the NPP. This is not the first time, however, that relation between TEPCO and the local government appears tense and pointing towards an undetermined halt of operations.

The latest poll echoes with the referendum that took place back in 2001. At the time TEPCO decided to take more time to build a stronger stance before requesting again for local approval. It must be noted that the reason why TEPCO abandoned the plan to use MOX was not because of the negative response. The scandal of 2002 turned their attention to a different issue, with

29. KKNPP reactors No. 6 and 7 are currently undergoing the second step.

bigger impact to their reputation at the national level. In this occasion, as well as the following encounters with the local authorities, there has been a larger involvement between the community and the operator, the so-called "Niigata Method" (Yamaguchi, 2011). The success behind this method is a win-win situation between the operator, the government, and the civil society:

- TEPCO gets its facility back in operation, generating profit.
- The community believes that private interests have not undermine the safety, and the economy keeps moving.
- The government manages to secure both a source of economic revenue for the area, and the political support from the community.

This last point must not be seen lightly. As proven with the position of prime minister, the public opinion is a very powerful tool to change the political landscape in Japan. The backlash of how the accident in Fukushima was managed caused two prime ministers to quit, and a change on the ruling political party. Abe stayed in power for seven years in part due to his Abenomics approach. Following Abe steps, the recently elected Suga does not deny the economic importance of nuclear energy. In a similar fashion, to the governor of Niigata and the mayors of Kashiwazaki and Kariwa, Suga must prove that the Japanese government is protecting the best interest of the community in order to secure their own positions. All four of them have questioned the safety of the NPP, while recognizing TEPCO's efforts and avoiding rejecting the restart process. TEPCO, as well, is moving towards presenting a trustable image in handling nuclear energy, making the best out of the Covid-19 pandemic. There is an opportunity for TEPCO to be allowed to restart in time if they manage to bring a storyline that fits the Niigata Method. In other words, the proposal to be presented to the local government must highlight the joint efforts of the operator and the government to protect the community. There is no denying that the community is economically dependent of the NPP, and a stronger presence of nuclear power is needed to achieve the national energy goals. A political decision that promotes economic growth would not be rejected by the public as long as the government manages to convey a sincere interest and involvement in securing the safety of the people.

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