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Risk and Rationalities in Japan Among Residents of Nuclear Plant Areas

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ABSTRACT

The thesis examines the complexity of risk understandings among residents of nuclear power plants (NPP). It focuses on the local communities living in a setting similar to, but not the same as, the Fukushima Daiichi nuclear power plant (NPP) site, Omaezaki City in Shizuoka Prefecture, where the Hamaoka Nuclear Power Plant is located. Through the lens of 3.11 and its aftermath, the thesis seeks to provide a detailed description of how residents of such communities have been making sense of living close to such facilities before, and several points in time after the 3.11 disaster. The thesis investigates residents' viewpoints on the nearby nuclear power plant, notions of trust and responsibility, sense of place, and the factors associated with community acceptance of the facility.

The thesis argues that nuclear-related issues simply cannot consume the residents' everyday concerns, thereby dissipating the significance of the nuclear risk. The risk of having the plant in the vicinity is merely part of the wide range of risks touching upon the multidimensional concerns of the residents' everyday life. The thesis shows how there are complex workings related to financial, communal, familial and other concerns, which make the residents' partisan choices (pro or anti- nuclear) almost mute. To the extent that the plant brings "fringe" benefits to the communities, the fundamental choice of pro- or anti- nuclear plays a secondary role in dictating the residents' outward stance toward the presence of the nuclear power plant.

Theoretically, the thesis integrates economic behavioral and sociological theories of decision-making under risk(s) and uncertainty, as developed by Daniel Kahneman, Ulrich Beck and Anthony Giddens, among others, with an ethnographic reconceptualization of individual and community security and refines these in relation to residents' lived experiences. Overall, this qualitative study argues for the value of shifting our gaze from a sole focus on the nuclear risk as a research object as well as the reduction of residents' risk calculation to a simple gains and losses to wider processes and

contexts in which residents' specific meaning-making activities and everyday practices of negotiating risk(s) and in/securities are situated and embedded. Theoretical and applied implications are discussed in the context of recent Japan energy policy.

Key Word: Nuclear Power, Risk, Host Community, Fukushima, Hamaoka

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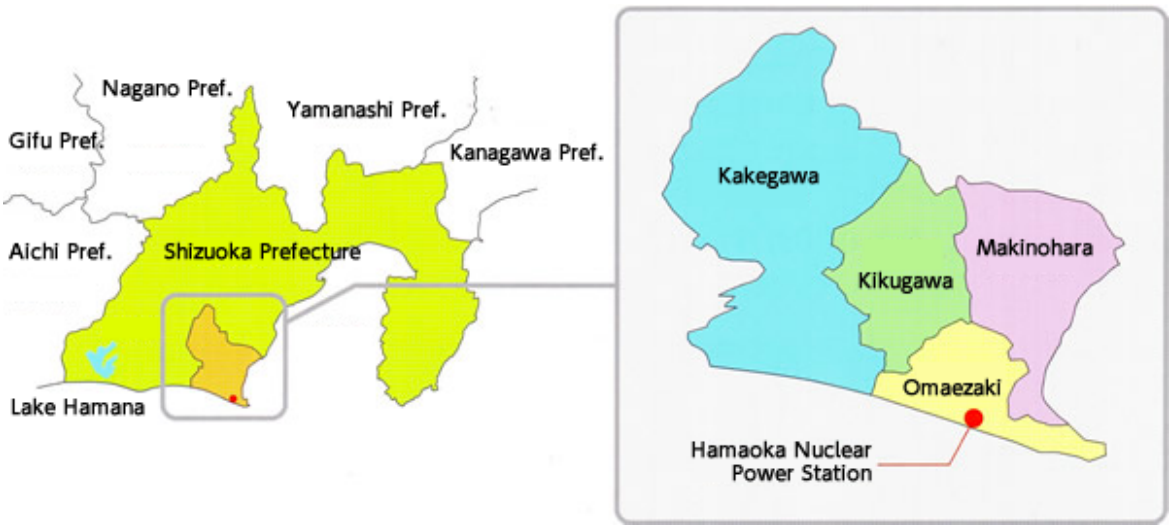
CHAPTER 1

Introduction

The triple disaster — a 9.0-magnitude earthquake, a devastating tsunami, and a resulting meltdown at the Fukushima Daiichi Nuclear Power Plant (NPP) — in the spring of 2011 took the lives of 19,074 people and displaced more than 300,000 from their homes. In the wake of this calamity, Japan was facing its worst crisis since World War II. The communities in the devastated Tohoku region have indisputably been the most immediately affected as the local population had to face the loss of lives, livelihoods and hope.

While the aftermath of the disaster has loomed large over Japan, it has triggered a different, unanticipated crisis for some communities not living in the vicinity of the Fukushima Daiichi NPP. Around four hundred kilometers away from Fukushima, in the City of Omaezaki (Omaezaki-shi), which is located in Shizuoka Prefecture, at the tip of the Omaezaki Peninsula on Japan's Pacific coast, local residents were suddenly faced with a dilemma that touched upon the survival of their own community. The residents of Omaezaki did not experience any of the horrifying sequence of events on 11 March 2011. There was no tsunami and no radiation fallout from Fukushima, besides the brief panic among local green-tea farmers and fishermen in Shizuoka prefecture over the slightly higher measurements of radioactive cesium in their local products following the disaster.

Omaezaki City, however, a locality in which challenges of depopulation and weak economic foundations persist, is not just a traditional fishing and farming community in rural Japan. In a strikingly similar setting to Okuma and Futaba towns where the Fukushima Daiichi NPP is located, Omaezaki City hosts the Hamaoka Nuclear Power Plant, operated by Chubu Electric Power Company (Chubu Electric) since 1976 (See figure 1).



Map 1. The Location of Hamaoka NPP

In the wake of the Fukushima nuclear disaster, the operation at the Hamaoka NPP was suspended and since has remained so upon a request from the government on 9 May 2011. The decision was based on the possibility that an earthquake of 8.0 magnitude or higher might hit the Tokai region within the next 30 years (*Japan Times*, *BBC News*, *Bloomberg*, 08/05/2011). This sudden attention from the government was not limited to the Hamaoka NPP, as all of Japan's fifty nuclear reactors were closed, and/or their operations suspended for maintenance and safety inspection, within a year following the disaster.

To many Hamaoka residents, including the municipality and pro-nuclear lobbyists, the suspension of the Hamaoka NPP was a *source of disruption* in the everyday lives of the local community. While the Fukushima nuclear disaster highlighted the danger of living in the shadow of a nuclear facility sited in the community's backyard, the immediate threat happened to stem more from the widespread uncertainty caused by the suspended nuclear industry, on which the community has been structurally dependent for decades. In other words, local residents were reminded how vulnerable their lives have been. As one restaurant owner (50s) who lives and works less than 1 Km away from the Hamaoka NPP told me, 'I am worried about living near the [Hamaoka nuclear] plant, but I will be more worried about my life if the plant is not restarted again.'[1]

Furthermore, the central government's decision made this local community a topic for conversation and media attention at both the national and international level. Besides highlighting the role of anti-nuclear activists emerging inside and around Omaezaki City, national media intently focused on the municipality's mayoral election in April 2012, which was framed as a battle between an anti-nuclear candidate and the pro-nuclear incumbent. However, framing of this sort poses an underlying problem. It significantly ignores the more complex position of the ordinary local resident who is caught up between the two campaigns and has to *make a decision* (such as, voting for a specific candidate) *under risk(s) and uncertainty(s)*. Therefore, not only the voices of the anti-nuclear activists, but also those of local residents and

[1] Interview 2012.

pro-nuclear lobbyists are equally significant in order to contextualize the rigid dichotomy of 'for' or 'against' the nuclear program. In particular, the anxious and uncertain voices of local residents who support pro-nuclear politicians deserve our attention after the Fukushima disaster.

Indeed, in the aftermath of the Fukushima nuclear disaster, there has been understandably a vast amount of media coverage and academic literature on the anti-nuclear movements around Japan, while little attention has been paid to local residents who maintain their pro-nuclear stance. And yet, support does not seem to dwindle on the side of residents living in the shadow of such nuclear facilities, despite their lives and environment being under threat of a potential Fukushima-like disaster. Therefore, in order to understand the role of the nuclear facilities in Japan after 3.11, asking why the residents accept and support the restart of these facilities is as important as to ask why and how people oppose them. How indeed are we to come to terms with the paradox that people who would be the most directly affected by a failure of the nuclear facility do not unanimously and unambiguously wish for its closure and ultimately its removal? It is only by making space for the local residents' viewpoint and by hearing their voices that the paradox can be addressed. This dissertation is an attempt to answer the question.

The ongoing crisis of Omaezaki is not simply a result of the tragic events that happened in the spring of 2011. These have only intensified an unaddressed situation that goes back to the 1960s, when the Sakura district in Hamaoka town (Hamaoka-cho) emerged as the targeted site for the construction of the Hamaoka NPP. At the time, the dream of development or "*machi-zukuri*" (town-making) was framed for local residents in terms of a set of risks such as continuing depopulation and loss of identity.

In the wake of the Fukushima nuclear disaster, the same risks have risen up to the surface again but this time with more intensity, due to the unprecedented nature of the nuclear accident. Such risks played out again in the decision-making process of the voters ahead of the mayoral election of 2012, in which local residents casted their vote to reelect the pro-nuclear incumbent (on a 76.69% turnout).

It is important to note that this was not *only* a vote on the local nuclear program as the media and other outsiders tend to frame it. It was rather about

bringing life back to normal. While most outsiders are justifiably spawning their criticisms against the post-Fukushima mismanagement by the closely tied nuclear industry and central government, the residents in a nuclear city like Omaezaki have still been unable to pay attention to such failures that are almost insignificant in comparison to the deep-running concerns of everyday life. Renewed risks, such as the depopulation and ageing chronically affecting Omaezaki residents, the loss of local identity, and the ghost of rising unemployment — sustained by persistently weak socio-economic structures that threaten the locals with poor living conditions and deterioration of the communal life —, appear more immediately worrying than the risks of hosting a nuclear power plant.

During my research in Omaezaki, Takuya (20s), a surfer who earns his salary from unstable construction and farming works, told me he would have given anything to get a job at the Hamaoka NPP, even though he mentioned in our first meeting that he dislikes the image of his locality as a nuclear town. Takuya, approaching 30, unemployed, and recently engaged, was desperately trying to find a way that would enable him to obtain stable employment without having to move out from his hometown. I discovered that many residents of Omaezaki have actually found ways to make peace with the nuclear facility in their backyard while at the same time harboring conflicting attitudes toward it, especially after 3.11. For them, the nuclear industry often stands as a sign of personal and communal stability in an environment that lacks viable alternatives.

Another informant, Mr. Nagasawa (76), a farmer who works and lives in the Hamaoka area, told me when I brought up the possibility of an accident at Hamaoka NPP that 'while there is a possibility of an accident, it is safe now.' Mr. Nagasawa, who was at the time struggling to deal with harmful rumors of radiation affecting his farming business following the Fukushima meltdown and the subsequent suspension of the Hamaoka NPP, explained that any major changes in the town can stop people, whether they work for the plant or not, from carrying on with their lives.

This difficult cohabitation between people and nuclear industry in this provincial town raises the question of how people make sense of the nuclear risk in order to keep stable personal and communal everyday lives. Indeed,

residents of Omaezaki have to face more than the sole issue of a nuclear facility that suddenly became *risky.* The realization that a risky nuclear facility was sitting in their backyard happened amidst an array of insecurities: material, social and even existential. Residents have been caught in this wave of instabilities – job insecurity, solitude, familial estrangement and precarious[2] existence – that pervaded all part of their mundane everydayness.

Six years have passed since the catastrophe and the nuclear disaster at Fukushima is far from over. In Omaezaki City, Chubu Electric is still aiming at restarting the idled reactors of the Hamaoka NPP, and has filed a request for a safety review by the newly established Nuclear Regulation Authority (NRA).[3] Meanwhile, the municipality had its second mayoral election since the disaster. Restarting or decommissioning the Hamaoka NPP did not become a big issue in the campaign ahead of the 10 April 2016 election. Interestingly, of the two candidates, each was willing to grant a restart, after consultation with local residents, if elected.

While this mayoral election has received less attention from the media, this seemingly unanimous pro-nuclear stance still came as a surprise for outsiders, as articles failed to capture the whole picture and continued to

[2] The term *precarity* (*precarité*) came to prominence during European social and labor movements in the 1970s to demand for better work and life conditions for those are enrolled in unpredictable irregular employment. In European scholarly circles, especially that in France, there were attempts to identify precarious works as new kind political subject. In this thesis, I use the word *precarity* similarly to the way it has been employed by Judith Butler (2009) to describe not only the condition of precarious work, but also the exsitienal and social conditions of a life that feels risky and uncertain. Butler indicates that 'precarity' is differentially distributed in different segments of the society and that some are more prone to it due to reasons related to gender, class, and citizenship among others. Moreover, she defines 'precariousness' as the general state of being human in which life is vulnerable to risk. See Butler, Judith. "Performativity, precarity and sexual politics." AIBR Revista De Antropologia Iberoamericana, 4(3), 321–336. Retrieved from http://www.aibr.org/antropologia/netesp/[CrossRef], [Web of Science ®], [Google Scholar]. For more about precarity in Japan, see Amamiya, Karin. "Purekariato." *Dejitaru Hiyatoi Sedai no Fuan na Ikikata*(2007), Allison, Anne. "Ordinary refugees: Social precarity and soul in 21st century Japan." *Anthropological Quarterly* 85, no. 2 (2012): 345-370, and Allison, Anne. Precarious Japan. Duke University Press, 2013. Harvard.

[3] The nuclear Regulation Agency (NRA) (Genshiryoku Kisei Iinkai) was established on September 19, 2012 as an administrative body to ensure nuclear safety in Japan as part of the Ministry of the Environment. Until the Fukushima nuclear disaster, it was part of the Nuclear Safety Commission, which came under the Nuclear and Industrial Safety Agency (NISA), which operated under the umbrella of the Ministry of Economy, Trade and Industry (METI). In the wake of the Fukushima nuclear disaster, NRA became part of the Minister of the Environment after questions about a possible conflict of interest, as NISA was responsible for the promotion of nuclear power. For more, see *The Daily Yomiuri,* "Nuclear regulatory body faces mountain of urgent tasks," September 21, 2012. (Accessed November 28, 2016).

highlight the nuclear power as a decisive local issue. The *Chunichi Shimbun,* for example, published an article saying that the 'nuclear industry should be a point at issue in Omaezaki mayoral election,' [4] citing results from a questionnaire survey conducted locally by the same newspaper (*Chunichi Shimbun* 27/03/2016). The validity of such questionnaires becomes problematic, however, as their content focuses exclusively on nuclear technicalities, such as reprocessing spent fuel and measures for reinforcing safety at the Hamaoka NPP, and neglects other local issues. Similarly, the *Mainichi Shimbun* assumed that the Omaezaki mayoral election would be a referendum on restarting the Hamaoka NPP. When it appeared that the debates surrounding the election concerned the nuclear issue only marginally, the article lamented 'the absence of verbal dispute on the nuclear restart', and described the mayoral election merely as 'a debate between two pro-nuclear politicians, with a weak discussion around the nuclear policy, signaling a complete change from the previous election that took place the following year of the Tohoku triple disaster' (*Mainichi Shimbun* 04/04/2016).[5]

In this way, national media and outsiders seem to have a higher perception of the nuclear risk. When examining the Hamaoka NPP from afar, the perception is abstract and only dictated by the nuclear risk itself. However, when attempting to examine closely, from the context of the locals' everyday lives in Omaezaki, one starts seeing an array of other risks that are blurring the residents' view of the nuclear risk itself.

1. The Problem

In this thesis, I argue that one source of threat alone cannot consume people's concern entirely, especially if that threat is not about to happen, people tend to evaluate it only in a comparative framework where other threats are more or less equally assessed. My second argument is that the multiplicity of risks — political, economic, social, personal and nuclear among

[4] Translated from Japanese by the author.
[5] ibid

others — plays a significant role in shaping the behavior of ordinary residents. This research aims at capturing the complexity of risk understandings among local residents of nuclear power plants today, by targeting the local community in Omaezaki City. In particular, I seek to view how residents of host community make sense of living close to facilities that in the wake of the Fukushima nuclear disaster appear *risky*. Understandings depend not only upon how people have come to live alongside such a major industrial facility but also on other factors: attitudes toward the benefits to the social and economic life of the community; local identity and sense of place; trust relationships between residents and local plant operators; knowledge of the local history of incidents; and media reporting of these issues.

The thesis argues for a reevaluation of the *hidden problems* facing host communities in Japan before and after the events of 3.11. Through the case of Hamaoka, the role of the rural areas in the development of the modern Japan will be examined from a historical and contemporary perspective. The structural disparity between Japan's urban and rural areas during the postwar years of economic growth has produced an array of social, economic and political problems that for many rural communities has still had an impact in determining societal acceptance of nuclear facilities.

1-1. 3.11, in a Larger Context

Following the failure of the cooling systems and the consequent meltdown at the Fukushima Dai-ichi NPP, the Japanese government was forced to declare its first-ever nuclear emergency after near half a century of pro-nuclear policy making. This reaction contrasts sharply with the aftermaths of the Tokai nuclear disaster (Tokai, Ibaraki Prefecture), which occurred on 30 September 1999 and had been considered the worst civilian nuclear radiation accident in Japan prior to the Fukushima Daiichi nuclear disaster of 2011. At the time, the Japanese authorities advised local residents to remain indoors

and only evacuated 161 people from 39 households within a 350-meter radius from the reprocessing facility.[6]

In contrast, the three reactors' meltdown caused the evacuation of approximately 150,000 residents living within 30 km radius of the Fukushima Daiichi NPP (Gills and Steger, 2015); within the successive 12 months, all of Japan's fifty nuclear reactors were closed, or their operations suspended for maintenance and safety inspection.[7] Subsequently, Japan was producing electricity without any reliance on nuclear power for the first time since 1970.

The only country in the world to have ever experienced nuclear bombings in its recent history was thus once again placed under nuclear threat. The government's slow response to the Fukushima crisis, Tokyo Electric Power Company (TEPCO)'s inability to fully control the nuclear meltdowns of the three reactors and the uncertain future faced by evacuated communities sparked strong divisions among public attitudes toward nuclear energy.[8] While opinion polls showed a lack of consensus on the issue of restarting the suspended nuclear reactors, many Japanese expressed growing concerns towards nuclear energy, mainly over waste disposal, nuclear contamination and food safety. According to one poll as of 2011, up to 70% of the people wished to stop or reduce the reliance on nuclear power after the Fukushima incident (Penny 2012).[9]

Despite these increasing anti-nuclear sentiments at the national level, the so-called "nuclear village"[10] — the coalition of government, bureaucratic

[6] The 1999 Tokaimura accident was caused by bringing together too much uranium enriched to a relatively high level, causing a 'criticality' (a limited uncontrolled nuclear chain reaction), which continued intermittently for 20 hours. The accident resulted in two deaths and pushed radiation levels up beyond normal in Tokai, Ibaraki Prefecture. For more, see "Tokai Criticality Accident 1999", in *world-nuclear.org* (updated October 2013) http://world-nuclear.org/information-library/safety-and-security/safety-of-plants/tokaimura-criticality-accident.aspx (accessed April, 2017).

[7] Tomari-3 in Hokkaido prefecture was the last nuclear reactor to go offline on May 5, 2012.

[8] The government experts admitted only after two months that the radiation fallout affected the towns neighboring the town directly hosting the nuclear power plant and advised locals living in the 30 km radius to evacuate. This caused anger and protest from residents and the general public. See Eric Talmadge, "Japanese village's nuclear reality sets in slowly". *Associated Press*, June 8, 2011 (accessed June 8, 2016).

[9] Matthew Penney, "Nuclear Power and Shifts in Japanese Opinion", *The Asia-Pacific Journal, Japan Focus*, February 13, 2012, http://www.japanfocus.org/events/view/130 (accessed June, 8 2016).

[10] The term *genshiryoku mura* (nuclear village) was first used by Iida Tetsunari (See *Wall Street Journal*, June 12, 2012).

and industrial pro-nuclear advocates — maintained their pro-nuclear stance, arguing that keeping Japan's nuclear reactors offline would cause damage economically and environmentally. [11] Based on energy concerns, the government has been generally advocating for the restart of the nuclear reactors as well as for building new ones, its general position being that nuclear energy should play a role in the country's energy mix together with liquefied natural gas (LNG) and other low-carbon energy sources. In particular, the ruling Liberal Democratic Party (LDP), since retaking power in 2012, remains strongly supportive of nuclear energy after the nuclear meltdowns.[12] Prime Minister Shinzo Abe, in an attempt to shift attention to economic and environmental issues, declared recently that "[Japan] cannot afford to continue importing huge quantities of oil and natural gas, while the growing reliance of thermal power generation has stalled Japan's efforts to reduce greenhouse gas emissions".[13]

This stance has been reiterated among business circles that see the restart of Japan's nuclear power plants as essential to economic growth. The Japanese Business Federation (*Keidanren*) argues that 'the process for restarting nuclear power plants must be accelerated to the maximum extent possible'. [14] The same federation warned that 'by stopping nuclear power plants, national wealth of ¥3.6 trillion ($34.9 billion) per year is flowing

[11] The history of Japan's relationship to nuclear power will be presented in the following chapter. The contribution from nuclear power to Japan electricity supply steadily increased since the 1970s, from 17% in the 80s to 27% in the 90s. In the early 2011, 50 nuclear reactors generated 30% of the electrical power, according to Electricity Statistics. Agency for Natural Resources and Energy ANRE, 2011. http://www.enecho.meti.go.jp/info/statistics/denryoku/result-2.htm. (Accessed 23 June 2015). Prior to 3.11 and the consequent Fukushima nuclear disaster, the Japanese government announced plans aimed at increasing the nuclear electricity generation share to 40% by 2017 and 53% by 2030 (METI, 2010).

[12] Opposition parties have shown criticism toward the government' nuclear energy policies but they still lack the ability to undermine the LDP's control over the nuclear energy discourse. The Japanese Communist Party might be the only political party that has always showed criticism towards Japan's nuclear energy but as many observers agree, the JCP has almost no chance of winning an election. For more, see Daniel Aldrich, "Anti Nuclear Sentiments and Japan Energy Choices", *Asia Unbound*, April 4, 2016, http://blogs.cfr.org/asia/2016/04/12/anti-nuclear-sentiment-and-japans-energy-choices/ (accessed May 30, 2016).

[13] See "Japan restarts first nuclear reactor since Fukushima disaster", *The Guardian*, August 8, 2015, https://www.theguardian.com/environment/2015/aug/11/japan-restarts-first-nuclear-reactor-fukushima-disaster (accessed May 30, 2016).

[14] For more, see "A Proposal for Near-Term Energy Policy" on the Keidanren website, http://www.keidanren.or.jp/en/policy/2014/081.html#s2 (accessed May 30, 2016).

overseas" due to increased fossil fuel imports. The ongoing slump of trade balance into the negative could lead to deterioration of government credit and must be addressed "with a sense of crisis.' It further urged the government to allow the restart of nuclear power plants on which the economic growth depends.

Keidanren, jointly with two major business lobbies – the Japan Chamber of commerce and Industry, and the Japan Association of Corporate Executives (Keizai Dokyukai) – submitted a proposal to the Ministry of Economy, Trade and Indsutry (METI) seeking a nuclear restart. The proposal highlighted the top priority in energy policy in terms of low prices and stable supplies of electricity. Accordingly, the LDP's new energy proposal that called for nuclear power to supply 20-22% of Japan's energy mix by 2030 was agreed on and endorsed by a panel from the Advisory Committee for Natural Resources and Energy, a body affiliated with the Ministry of Industry, Trade and Commerce in June 2015.[15]

Such actions were not taken without controversies. Critics argue that this relative reduction in the share of nuclear power in the total energy mix is the only change since the 3.11 disaster the Japanese government has been willing to make, as it continues to pursue closed nuclear fuel cycle and to create large subsidies for local communities willing to host nuclear power plants.[16] In the summer of the same year, Japan returned to producing nuclear energy with the restart of one reactor at the Sendai NPP located in Kagoshima prefecture despite strong public opposition.[17] In February and August 2016, reactor no.3 and no.4 of the Takahama NPP and reactor no.3 of Ikata NPP were respectively restarted. At the time of the writing, four Japanese reactors are in operation: Kansai Electric's Takaham reactor no. 3,

[15] See "Plan sets out Japan's energy mix for 2030", June 3, 2015, http://www.world-nuclear-news.org/NP-Plan-sets-out-Japans-energy-mix-for-2030-0306154.html (accessed July 5, 2016).

[16] See "Long-Term Energy Supply and Demand Outlook", report at the METI website, http://www.meti.go.jp/english/press/2015/0716_01.html (accessed May 30, 2016).

[17] Public opinion polls show that a majority was opposed to restarting the Sendai NPP. The response has also been negative among many people who are willing to accept some reliance on nuclear energy for the foreseeable future. This is due to the fact that the current government is not shouldering enough responsibilities in dealing with safeties issues in restarting the plant, and instead is relying on the Nuclear Regulation Agency and utilities. See "Japan restarts first nuclear reactor since Fukushima disaster", The Guardian, August 8, 2015, https://www.theguardian.com/environment/2015/aug/11/

Kyushu Electric's Sendai reactors no.1 and 2, and Shikoku Electric's Ikata reactor no.3. Electric companies have applied for the restart of another 19 reactors (*Mainichi Shimbun* Jun 5, 2017).

Whilst the debate on nuclear energy policy has never been more polarized, the issue of restarting nuclear power plants is therefore very high on Japan's public policy agenda. This debate has highlighted the challenges and uncertainties that accompany nuclear power generation in Japan, in relation to nuclear power economics, risks of nuclear accidents and storage and management of radioactive waste. Yet, this recent public skepticism does not seem to paralyze the advancement of the government's pro-nuclear agenda as the government is willing to push for a nuclear restart as long as it has a ruling majority.[18]

1-2. Host Communities vs. Neighboring Communities: Divergent Responses

It seems clear that the general public opinion has little impact on the government's position towards nuclear power in post-Fukushima Japan. However, the government cannot ignore the changing responses of local communities embracing nuclear power plants. This is because local communities play a role in the decision-making process surrounding the operation of the nuclear power plants. Indeed, Japanese electric companies like TEPCO and Chubu Electric must seek the approval of local communities and local officials (town councils and mayors) for nuclear restarts and future siting of new nuclear reactors. These local representatives can potentially use a veto power in the decision-making process for nuclear restarts (Hymans 2011). Moreover, because all of Japan's nuclear reactors are located in coastal towns, local fishing cooperatives must support siting nuclear power plants that use water from their fishing areas (Lesbirel 1998). Accordingly, the response of elected local politicians who represent their communities is critical in implementing the energy plans in regard to nuclear power in the country.

[18] Jeff Kingston, "After 3.11: Imposing Nuclear Energy on a Skeptical Japanese Public," *The Asia-Pacific Journal*, 11 (23) (accessed 1 June 2016).

However, local communities located in a close proximity to nuclear facilities have different responses according to their geographical, administrative and economic ties to the nuclear industry. The distinction between direct or hosting communities and neighboring communities is thus crucial in order to understand the discrepancy in the local response. Direct host communities are the villages, towns and cities directly connected to Japan's nuclear program. Host communities receive vast economic benefits (jobs, tax revenues, subsidies, among others.) for accommodating nuclear facilities. Neighboring communities are located in a close proximity to nuclear facilities yet they receive far less benefits from hosting nuclear facilities. One may argue that the position adopted by neighboring communities tends to correspond to the national view on nuclear power because as the NPPs have less bearing upon their livelihood.

After the Fukushima accident, while the host community and neighboring localities similarly share the risk of exposure to a nuclear catastrophe, it is mainly the former that continues to support the nuclear program while the latter has become increasingly opposed to the industry. This shows how the economic incentives, among other factors, play a powerful role in shaping the attitudes of such communities in regard to nuclear energy. In Omaezaki, local politicians acknowledged the dependence of their local economy on the employment and taxes from the Hamaoka NPP along with the electric subsidies and grants from the central government. While the municipal council of Omaezaki City remains supportive of the plant and see it as an integral part of the local economy, the municipal council of the neighboring Makinohara City adopted a resolution that calls for a permanent shutdown of the plant. Having a strong manufacturing base with a large Suzuki Motor Corporation plant, Makinohara City is indeed not as economically dependent on the Hamaoka NPP, with nuclear related revenues at 1% compared to 40% for Omaezaki city's revenues.[19] Moreover, the Fukushima nuclear disaster has brought an unanticipated crisis to Makinohara as Suzuki Motor threatened to move part of its core plant from the city due to risks posed by the Hamaoka NPP.

[19] Goto, Ryota (2011), 'Cities at War over Need for Hamaoka Nuke Plant', *Asahi Shimbun*, 7 November 2011 (accessed 4 april 2014).

Daniel Aldrich thus underlines the discrepancy in opinion among the local communities:

> The perspectives of direct and neighboring host community leaders on this issue are strongly polarized; those representatives from communities, which have benefited most strongly continue to support nuclear power and have yet to speak out against it. Those hailing from communities, which face externalities but have fewer benefits have rallied against the technology.[20]

The statement of one of my informants, Mr. Shimizu's, a retired municipality staff (69) who lives in Hamaoka-cho, concurs with Aldrich's argument. He explained in our first conversation in late 2012 that 'Makinohara City turns its back on us [residents of Omaezaki city] because they simply are not attached to the Hamaoka nuclear facility. We are concerned that our city would lose funds from the *dengensanpo* [Three Power Source Development Laws] because of their opposition to the nuclear plant.'

Indeed, looking at regional courts rulings reveals how much local communities are divided on the nuclear issue. Many local residents of neighboring localities have filed action lawsuits to prevent the restart of suspended reactors or halt the construction of new ones. For example, the Fukui District Court ruled to prevent Kansai Electric Company from restarting two reactors at Oi NPP due to safety concerns.[21] In another case, Otsu District Court ruled to shutdown the two reactors at Takahama NPP arguing that the new safety regulations were insufficient. This follows the Hakodate City's lawsuit to halt the construction of the Oma NPP located in the Tsugaru straits.[22] Such cases and rulings are a major obstacle for the current government to restart the remaining reactors and implement the new energy

[20] Daniel P. Aldrich, "A Normal Accident or a Sea-Change? Nuclear Host Communities Respond to the 3.11 Disaster," *Japanese Journal of Political Science*14, no. Special Issue 02 (2013): 261–76, doi: 10.1017/S1468109913000066 (accessed June 21, 2014).
[21] "Fukui Court Blocks Oi Nuclear Reactor Restart, in Landmark Ruling," *The Japan Times Online* (accessed June 21, 2014).
[22] "Court Hears First Arguments in Oma Nuclear Plant Lawsuit," *AJW by The Asahi Shimbun* (accessed June 1, 2016).

plan. However, the courts rulings have not been homogenous as not all regional courts sided with anti-nuclear activists. The Fukuoka High Court ruled against a lawsuit that would have suspended the operation of the Sendai NPP in April 2016.[23]

The government and the nuclear industry realized the significance of local decision-making process well before the Fukushima accident. Since the introduction of nuclear power in Japan, both the government and business elites have created powerful tools to facilitate the siting process and lobbying local officials as an attempt to win the approval for siting nuclear facilities. Aiming at expanding the capacity of nuclear energy, the central government and nine regional-monopolistic utilities channeled billions of yen in subsidies and other economic incentives to local communities willing to host nuclear power plants since 1973.

The host communities receive billions of yen in new facilities that also create jobs and better infrastructure. Recent research suggests however that the individual economic benefits are mixed and per capita income from hosting nuclear power plants have been various (Ando 2012). A host community cannot therefore be considered as one entity with a homogeneous response to the nuclear threat. For example, my informant, Mr. Iwata, a retired teacher who has been opposed to the Hamaoka NPP since the Kobe earthquake, lives next door to another resident who is directly employed at the plant. Maintaining harmonious neighborly relations often necessitates subtle mitigations of each other's discourses regarding the nuclear facility.

Moreover, it would be a mistake to equate the community of people concerned by the Hamaoka NPP to the residents of Omaezaki strictly speaking: the community is constructed around complex social relationships that are not necessarily constricted by municipal boundaries. Indeed, many of these boundaries that define such towns and cities may conceal deep and historical relationships among local residents. For example, local residents from Omaezaki as well as its neighboring city Makinohara have mutual relatives, friends and acquaintances, who may benefit from the plant in one way or another. Such ties often weigh more, within the residents' decision-

[23] "EDITORIAL: Reactor ruling ignores lessons, anxiety from Fukushima crisis," *AJW by the Asahi Shimbun* (accessed June 1, 2016).

making process, than the “imagined community” that is created by political boundaries (Anderson 1983). This important point is often lost in the discussion regarding the attitudes of host communities, particularly in the way it is often framed as a unilateral relation between a incentive-provider (government and nuclear industry) and a incentive-recipient (host community).

Moreover, reactions to economic incentives vary according to each individual’s backgrounds and priorities. Other factors thus play an equally important role within the informants’ decision-making process: familiarity with and local knowledge related to the nuclear industry compared to the communities living further away, population shrinkage, social pressures, trust relationships, and local identity among others. Therefore, this research emphasizes the importance of paying greater attention to the attitudes of local residents living in a close proximity to a NPP rather than to the general public and the response of local government officials. In particular, analyzing the concerns local residents voice and how they shape the decision-making process for voting in local elections is of great significance for understanding the situation of nuclear host communities around Japan.

During the course of the fieldwork, residents of Omaezaki expressed many concerns beside their safety, resulting in a highly paradoxical and ambivalent attitude towards the nuclear facility. This research examines how they have developed ways to live normally — with much less deviation than expected from the way they had lived — in the shadow of the nuclear facility while addressing the more pressing demands of everyday life. This does not mean that the residents ignore or minimize the danger that a nuclear power plant in their backyard represents; I found that they make constant references to their concerns over the Fukushima crisis. However, this increasing awareness, as real as it appears, rarely if ever translates into an articulated opposition to the NPP. One of the thesis’ main purposes is thus to convey the stories of some Omaezaki residents to contextualize the usual bipolar dichotomy of being ‘for’ or ‘against’ the nuclear power plant.

1-3. Local Residents Under Risk(s)

While the safety of nuclear power plants around Japan has occupied much of the post-Fukushima disaster issues, the difficult situation of the host communities elsewhere has indeed failed to catch the attention with similar intensity. Persisting socio-economic vulnerabilities — shrinking and ageing population and corresponding weakening of economic foundations — within these communities are nevertheless a decisive factor in shaping the host communities' attitude towards nuclear power plants. For them, radioactive contamination and risks to health from a Fukushima-like nuclear accident — which has always been a potential scenario among every host community in Japan — are but *one among many* concerns acting on decisions making and everyday life choices. The Fukushima crisis has only exacerbated these unaddressed situations, suddenly highlighting a dangerous facility in their backyards. What happened to the host community of the Fukushima Daiichi NPP is acting today as a mirror reflecting the insecurities that come with living next to a nuclear facility. This fraught situation — the potential threat that the hosting communities face and the lack of attention to it in a broader context of life — can be seen as a result of decades of preoccupation with the need to accommodate national economic interests at the cost of local community life.

This thesis explores the underlying insecurities that drive the residents of host communities to neglect the nuclear threat. For an outside observer, the more obvious threat of nuclear power plant failure should easily slight the residents' other concerns in the context of everyday life. However, the insecurity emanates from not having alternatives to the way the residents have customarily led their lives, and as such is as potent as living with a possibility of nuclear power plant failure.

I make use of the qualitative data collected through more than 10 rounds of fieldwork over 4 years in the local community of Omaezaki city where the Hamaoka NPP is located. Local residents' account provides a powerful and detailed critique of current thinking in national nuclear policy and debate. In particular, the account demonstrates how the current debate of pro

and against nuclear power is too simplistic, failing to capture the complexities locals face in the decision-making process.

In my analysis, I employ the notion of human security, first presented in the 1994 United Nations Development Program, which analytical perspective has since been refined through policy practices and theoretical debates (Sen 1989,1999; Lautensach and Lautensach 2013). The perspective which particularly merits attention is its focus upon the conditions for "informed decisions" (Human Security Commission 2003), as it encourages to closely examine a particular source of threat — nuclear power plant failure — against a vast array of concerns which dictates life of any ordinary citizen. This perspective that a probable nuclear failure does not, or cannot, fully consume the life of the residents of the host community offers the basis of understanding why sometimes the residents appear to be too concerned with narrowly protecting their interests, or even ignorant of the apparent threat of nuclear power plant failure.

Human Security (Commission on Human Security 2003, 4) is further defined "to protect the vital core of all human lives in ways that enhance human freedoms and human fulfillment. Human security means protecting fundamental freedoms — freedoms that are the essence of life. It means protecting people from critical (severe) and pervasive (widespread) threats and situations. It means using processes that build on people's strengths and aspirations. It means creating political, social, environmental, economic […] systems that together give people the building blocks of survival, livelihood and dignity." What is noteworthy in this definition is the shift from a state security perspective to an individual human security one. Human security is achieved when individuals, presented with multiple equally realistic choices, can be considered free in their decision making-process.

The thesis expands the focus to encompass the idea of 'capabilities' by considering what people are actually able to do and be. The notion of 'capabilities' has been developed by Nobel-prize winner economist Amartya Sen. From Sen's perspective, we might see voting not just as a legal right, but as a much broader question which asks what people are actually able to achieve: the expansion of choices to include ever growing capabilities to

participate in the political, economic, and social life of the local community (Sen 1999).

In the case of Omaezaki, the capabilities of many people may be limited by the fact that they are economically disadvantaged, socially constrained, aging, or affected by aging. The voting system ensures that all citizens have a say in choosing their local government. But for many people their capability to expertise that right effectively is limited in various ways. Even though they have the formal right to vote for or against the nuclear power plant, for example, they are not offered with options that would represent their interests; they may lack information about the nuclear policy, and thus are unable to make informed choices; or conditions of their lives may not even allow them time to think about the nuclear issue. If we see 'choices' in terms of capabilities, it becomes clear that an informed choice is not fulfilled.

Nuclear power has brought strong social and economic benefits to host communities, but also threats produced by the complex nature of this technology. Moreover, the benefits of nuclear technology is articulated and presented by a scientific community that surpasses the social and political capacity of local residents and politicians to comprehend, analyze and act upon. Long before the Fukushima nuclear disaster, the experts, with their objective discourses and technical skills, defined an official way of dealing with the nuclear risk.

However, residents of host community cannot always act upon such prescriptions. Through my fieldwork In Omaezaki, I found out that the community is indeed affected by numerous overlapping risks with potentially unanticipated consequences for local residents. 'Risk' in this context may indeed refer to losing a source of livelihood or having to move out. It refers to the loss of an identity or social network. On an individual level, risk is thus a multifaceted, constant and changing issue. Risk operates on different levels, ranging from personal, familial and emotional ones. It is a constant threat in the lifecycle of local residents. They have to consider the multiple, short and long-term risks in their everyday lives. Consequently, this multiplicity of risk(s) leads to a surge of incapacities and insecurities among individuals, which makes the possibility of exercising one's choice limited.

One of the aims of this thesis is therefore to show how residents of a host community, in a democratic state where an individual is assumed to have a choice, manage risk(s) and uncertainties while living in an area stigmatized by its condition, and with few capacities to improve their wellbeing. The findings and interviews of this research offer the basis for a perspective that brings us closer to the life of the residents of the host community, where there is a limited freedom in exercising choices.

The host community in Hamaoka has always been somewhat divided regarding its position on the NPP in its backyard. However, after the Fukushima crisis, the reality of the nuclear threat has become impossible to ignore. Despite legitimate safety concerns, many appear to be in favor of restarting the nuclear facility, as illustrated by the result of the first and second mayoral elections, in 2012 and 2016 respectively. Interviews with the local residents show that, regardless of their preference on the nuclear facility, they seem to be lacking choices while facing an array of risks related, but not necessarily restricted, to the operation of the NPP. Destabilized employment opportunities, rise and decline of service sectors and conditions of social infrastructure, which had been financed by the nuclear facility-related subsidies, are some of the deep-running concerns among the residents.

2. Research Questions

Throughout the thesis, I address the following questions through the experiences, thoughts and feelings of the Hamaoka residents, many of whom were living in close proximity to the nuclear facility:

- How do residents see their livelihoods and narrate everyday risks? In other words, does the nuclear facility pose a major risk or is their livelihood *at risk*?
- How trust and responsibility are imagined or distributed? How are they negotiated among local residents?

- How did the Fukushima nuclear disaster affect Hamaoka residents' attitude towards the nuclear power plant?
- What are the different political subject positions available to people implicated in the debate?
- How do people imagine/narrate their political subjectivity in a way that does not fit in those political positions (pro/anti, media, election structured)?

3. **Methodology**

As mentioned above, the research is based on 10 rounds of fieldwork in the city of Omaezaki and a neighboring city and village. One fieldwork was conducted in Iitate village in Fukushima Prefecture, which allowed me to gain insight from the residents who have been living in temporary housing outside the emergency zone and been directly affected by the Fukushima Daiichi nuclear disaster. The overall fieldwork mainly consisted of two parts. First, I conducted more than 50 arbitrary interviews with many local residents in the middle of their regular activities. Second, I conducted semi-structured interviews with 20 residents who live in the vicinity of the nuclear power plant.

Period of research: April 2012- March 2016

Location	Research Site	Number of Rounds
Shizuoka Prefecture	Omaezaki City	7
	Makinohara Village	1
	Kikugawa City	1
Fukushima Prefecture	Iitate Village	1

In order to make the problem clearly distinguishable and understandable in terms of empirical observations, I have drawn and executed a research operationalization plan. The plan is important to achieve the objectives set out for this study and answer the questions formulated. This section discusses the type of research conducted and the methodology applied in the study. I will also describe the techniques employed in data gathering as well as the sources of research data.

3-1. Research Type and Methodology

In line with the objectives and questions, this study is a combination of an exploratory and descriptive research, which calls attention to the multiplicity of risk element in the site of the Hamaoka NPP.

The ubiquity of risks has become a feature of modern life. As German sociologist Ulrich Beck analyses in his seminal work *Risk Society*, '[risk] is a systematic way of dealing with hazards and insecurities induced and introduced by modernization itself. Risks, as opposed to older dangers, are consequences which relate to the threatening force of modernization and its globalization of doubt' (Beck 1992, 21). How does Beck's definition fit in the Japanese context? The modern advanced Japanese society has broadly become an example of a risk society; it is organized around the distribution of wealth, products and goods, but also is increasingly organized around risks. The profusion of risks and future-oriented uncertainties is widespread in the society, which has become according to Beck, 'a laboratory and there is absolutely no body in charge' (Beck 1998, 9). This is due to the difficulty of identifying actors and institutions responsible for the production of risks, a condition Beck calls "organized irresponsibility" (Beck 1999, 6).

The Japanese nuclear energy program is a case in point that calls attention to this paradox. The nuclear technology has extensively contributed to the economic growth and yet it has always involved a great amount of risks and uncertainties. While the danger inherent to nuclear technology is not

exclusive to Japan, the capacity of nuclear power plants to withstand the seismic activity in the world's most earthquake-prone country has always been a source of alarming concern for many. Since the start of the Japanese nuclear program in 1963, there have been numerous minor incidents, but none of them match the Fukushima nuclear disaster in terms of radiation release, worker exposure, and damage to surrounding communities. This disaster has raised an acute awareness of the notion of risk in the world we live in.

However, this stage of modern life that is defined by new risks and uncertainties such as a nuclear failure is beyond the capacity of the ordinary citizen to manage. To address this point, I employ another notion developed by Beck, *individualization*. The process of individualization involves the privatization of risks in ways that affect residents' everyday life on a large scope. In other words, within individualization, each individual is held responsible to choose among multiple risks, while simultaneously remaining dependent on conditions beyond his/her control (Lupton 1999, 70). Individuals, therefore, have no choice but to retreat into self-protection and constant negotiation among anxieties and insecurities. This leads to decision-making behaviors that are dictated by the pressing issues at hand that are visibly affecting the conduct of everyday life. Consequently, residents are caught in a complex chain of causes and effects, and are increasingly incapable of recognizing the consequences of their own action with certainty. Even when the decision for action *is* their own, they are likely to be left with insecurity, as they do not fully control the impact of their own choices.

It is the local residents who have to examine the prospect of restarting or permanently shutting down the Hamaoka NPP. Indeed, in the light of the Fukushima nuclear disaster and the suspension of the Hamaoka NPP, Omaezaki residents have to calculate the gains and losses accompanying a course of action – such as making a decision on the nuclear facility – that would affect the conduct of everyday life on many levels related to economic benefits, employment, social obligations, familiar relationships, and communal life. The multiplicity of concerns means that any gains in one area of concerns may result in losses in other areas of concerns. Moreover, depending on the scope of risks and the available resources for livelihood, a local resident may

pay more attention to the perspective cost (losses in his/her life at the time of choice) than the utility of a chosen alternative (future consequences).

In contrast to the traditional rational choice approach and its basic assumptions, this thesis shares Herbert A. Simon's rejection of the concept of perfect rationality which '[does] not even remotely describe the processes that human beings use for making decisions in complex situation' (1979, 510). This assumption stresses uncertainty and bounded rationality in the making of a decision, rather than relying on the idea of the rational man who is fully informed of all aspects of his or her decision; it suggests that in real life situations people are often constrained by limited resources (such as time and information) and therefore are not fully informed of all circumstances impinging on their decisions.[24]

Building on Simon's work, behavioral economists Daniel Kahneman and Amos Tversky were the first to empirically observe that 'the response to losses is stronger than the response to corresponding gains', and this explains why people tend to be loss averse (Kahneman 2011, 23).[25] In other words, Individuals will tend to avoid risk when faced with what appears to be a choice between gains of different size and uncertainty, but will be more prepared to take risks to avoid accepting a certain loss. Kahneman and Tversky also found that people make decisions on the basis of what they call a 'reference point' or frame of reference which highlights the conditions under which the decision-maker calculate gains and losses.[26] In this thesis, the frame of reference for local residents involve focusing on what already exists and which they do not wish to lose. The analytical framework of this thesis will rely on Kahneman and Tversky's prospect theory with its emphasis on the fact that people, when faced with a choice, react not to the potential wins or gains of their actions, but to the losses that would result from choosing an alternative.

[24] See for example, Herbert Simon, "Bounded Rationality and Organizational Learning," *Organization Science* vol. 2, no. 1, pp. 125–134.
[25] Kahneman, Daniel. 2011. *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.
[26] See Kahneman, Daniel, and Amos Tversky. 1979. Prospect theory: An analysis of decision under risk. *Econometrica* XVLII:263–292. Also, Kahneman, Daniel, and Amos Tversky. 1981. The framing of decisions and the psychology of choices. *Science* 211 (4481): 453–458.

The rationale for the study to be a qualitative research is primarily to follow an inductive line of reasoning. For this aspect, I rely on Harry Eckstein's conceptualization of case study, which can be categorized as using a combined application of his disciplined-configurative and heuristic types of case studies (Eckstein, 1975). Within disciplined-configurative case studies, case interpretations are based on established or provisional theories; heuristic studies allow for the refinement of theories applied, as new ones are encountered or new puzzles/questions surface in the process of the study. This research is disciplined-configurative in the sense that the cases encountered were interpreted and analyzed following a thinking based on research framework. It is heuristic in its analytical approach as I encountered new theories and concepts through my study and applied them to the research.

Several reasons justify the descriptive approach applied to the semi-structured interviews. Firstly, by using a descriptive approach, which echoes the conventions of normal conversations, interviewees are more at ease, thus reducing incidents of conversational reluctance, and prompting greater disclosure. Secondly, through the active, interpretive process of producing narratives, everyday lived realities can be made intelligible (Czarniawska 2004). Finally, such approach does not necessarily mean using a single question to elicit a holistic narrative; it can be combined with more focused questions to avoid the use and production of bland assessments by the informant, aiming at more succinct narratives (Flick 2006). Furthermore, a compelling reason for adopting a descriptive approach and semi-structured interviews emanates from critiques of theorizing under the broad conceptual umbrella of the risk society (Beck 1992; 1998; Giddens 1998; 1999). Tulloch and Lupton (2003) in particular underline how crucial it is for theorizing to be accompanied by empirical evidence. Thus, they suggest that people's risk accounts need to be examined in the context of their everyday lives and in regard to the different ways they experience their local and social identities.

As the findings of this study will show, using a descriptive approach, which fully integrated semi-structured interviews during my fieldwork in Hamaoka, has proven to be productive in the way the informants responded. All the interviews were thus conducted in a manner that engaged the

informants in a conversational approach, instead of a rigid question-answer format. I found that most of my informants had little reluctance to speak up their minds when asked amid a casual conversation, within familiar settings. What is more, being a foreigner seemed to grant me the status of an absolute outsider, which somewhat eased the residents' reluctance to disclose personal opinions they would refrain from expressing to their local acquaintances, constrained by the economical and social obligations towards the nuclear industry. However, this also means one should be conscious that the narratives presented here may have been shaped, to a certain extent, according to whom they were addressed.

3-2. Data Gathering

In line with a qualitative research, several data gathering techniques were used in this research. First among these are the three basic modes of qualitative data gathering: semi-structured interviews, observation and document analysis. This section briefly describes how these techniques were applied and their significance to the research. Details of the actual research conducted (i.e. fieldwork site and informant profiles, etc.) are discussed later in the thesis. The interviews that were conducted have both "ordinary" local residents and identified key informants as respondents. The interviews of residents and officials were undertaken in their natural settings, within their own communities and in the middle of what their regular activity at a specific time.

The fieldwork research sites selected had one required characteristic – being located in a close proximity to the nuclear plant. Except two out of 20, all respondents were among residents who live in the surrounding areas (within 5km radius) of the plant. This follows another emphasized trait of a qualitative research, which is to say the natural setting that maintains the context of the interviews in the respondents' realities. The key informant interviews served, among others, as a tool to verify the information gathered from the community. Key informants were selected to give different perspectives on the topic from their own experiences in their engagements in

the Hamaoka community. The interviews were in-depth and lasted no shorter than 45 minutes. The interviews were mainly conducted in Japanese.

The observation employed for the research was also of two kinds, participant and non-participant. Non-participant observation particularly took place at the same time as the interviews. Observation of physical surroundings and contextual cues and sub-textual responses served to supplement what was verbally stated. On the other hand, participant observation was accomplished as I have stayed and lived in a small business hotel and two hostels that were managed by families — among the respondents — for the duration of the interviews. This aligned the study towards being a research in human security while enriching the research as a whole. While the period of stay is admittedly not particularly extensive, it has provided me with valuable snapshots of the "life as lived" in Omaezaki City, making the research to be not just a study *of* ordinary life but a study *in* ordinary life. Moreover, the fieldworks allowed me to get close to the realities of people who live near the nuclear facility, and helped me to grasp a more precise characterization of their situation.

Document analysis involves the review/analysis of related literature that include both printed and electronic forms of published books, journals, academic studies, media reports and articles, government documents and statistics, historical documents, and presentation materials. These methodologies and techniques allowed for the process of triangulation to validate, verify, corroborate, and/or correct the information gathered to provide for credibility and conformability of the findings.

3-3. Hierarchy of Questions Method

This research is an attempt to answer the hierarchy of questions (HOQ). In this research, I employ HOQ as a tool of research design rather than of interview strategy: its purpose is to ensure a logical relationship between research aims, research questions, and methods of data collection — in this case, interview questions. The HOQ is a tool that helps me ensure

that the questions I planned to ask during the research will accomplish the research objectives. In other words, it is a way to prepare and plan for research as rigorously as possible before research begins. However, and very importantly, this HOQ should not prevent unexpected results, and I encountered unanticipated statements, which led to a readjustment of the research design or objectives.

Indeed, my use of semi-structured interviews ensures that the research aims guide my questions while still leaving room for the interviewee to change the line of questioning and introduce data not anticipated by the parameters of the research design. During the course of the research, I welcomed these kinds of findings. The semi-structured interviewing techniques further allowed me to adapt the HOQ as new research data, where conditions are dictated by those examined.

Based on the proposal of Mike Fortun and Jeanette Simmonds where this kind of hierarchy is first used, I outline a hierarchy of questions that would allow me to link the empirical data collected during the research to my primary objectives.[27] The apex of the hierarchy is purely for me to think theoretically about the research. The questions extend from overarching questions about the theoretical literature, to general questions about risk and rationalities research, to questions that I set out during the semi-structured interviews, and were answered by the examined in the fieldwork:

1. <u>How is risk assessment managed in nuclear host communities?</u>

- How do residents see their livelihoods and narrate everyday risks? In other words, does the nuclear facility pose a major risk or is their livelihood *at risk*?
    - Questions on past and current employment/age/family ties/history of local community.

[27] Fortun, Mike and Jeanette Simonds. 2003. "Symbiotic Nitrogen Fixation in the Genomics Era: An oral history and ethnographic project." NSF Research Proposal. In "Figuring Out Methods" Project, Kim Fortune ed., figuringoutmethods.wikispaces.com/An+Oral+history+and+Ethnographic+Project (accessed November 12, 2013).

- How are trust and responsibility imagined or distributed? How are they negotiated among the various stakeholders?
    - “Do you trust local politicians? How do you feel about the employees in the power plant? What is your relation to the staff? What responsibility do the plant managers and employees have in case of a disaster? Do you have (as a local resident) any responsibility in case of a disaster?”
- How did the Fukushima nuclear disaster affect the attitude of Hamaoka residents towards the NPP?
    - “Did you feel more anxious about the facility after 3.11? Could you describe your feelings about living in close proximity before and after Fukushima? How would you describe your general impression of this plant and the way it operated until the suspension?”

2. <u>How residents are framed in regard to the nuclear debate at the local, national and international scale?</u>

- What are the different political subject positions available to people implicated in the debate?
    - “Did you change your position on the nuclear power plant after the Fukushima disaster? Do you consider yourself anti or pro nuclear?”
- How do people narrate their political subjectivity in a way that does not fit in those political positions (pro/anti, media, election structured)?
    - “Why do you or do you not consider yourself anti or pro nuclear? Do you think there is any media story about the town that is not accurate? What do you think about the mayoral election? Did the candidates represent your position and feelings about the reactor?”

4. Introducing the Informants

This section introduces the main informants who agreed to participate in the semi-structured interviews conducted during the research. In the information below (see table 1), I have included information related to age, gender and occupation. Further, I added a category related to whether the informant is affiliated with the Hamaoka NPP or not. To maintain the right to confidentiality, informants have been given pseudonyms. Further details about the informants' biographies and surrounding will be added as their accounts are being presented throughout the thesis.

Name	Age	Gender	Occupation	Economic affiliation with NPP	Area
Tamura	40s	Male	Engineer	Direct	Hamaoka-cho
Kawashima	50s	Male	Technician	Direct	Hamamatsucho
Yamamoto	50s	Female	Business hotel	Indirect	Hamaoka-cho
Kato	70s	Male	Ramen	None	Omaezaki-cho
Kato	70s	Female	Ramen	None	Omaezaki-cho
Horikawa	50s	Male	Restaurant	Indirect	Hamaoka-cho
Tanaka	60s	Male	Hostel	Indirect	Hamaoka-cho
Igarashi	50s	Male	Hostel/surfer	None	Omaezaki-cho
Iwata	70s	Male	Retired teacher	None	Hamaoka-cho
Ito	70s	Male	Retired factory manager	None	Hamaoka-cho
Sugiyama	40s	Female	Nurse	None	Hamaoka-cho
Yoshimura	70s	Male	Farmer	None	Hamaoka-cho
Takuya	20s	Male	Surfer	None	Omaezaki-cho
Mana	40s	Female	NGO worker/activist	None	Kakegawa
Miki	30s	Female	Café/Surfer	None	Omaezaki-cho
Nagasawa	70s	Male	Farmer	None	Hamaoka-cho
Ozawa	40s	Female	Housewife	Indirect	Hamaoka-cho
Shimizu	60s	Male	Retired municipal staff	None	Hamaoka-cho
Watanabe	50s	Female	Coffee shop owner	Indirect	Hamaoka-cho
Tomita	60s	Male	Farmer	None	Iitate-mura (Fukushima)

Table 1. Table presenting the main informants in this study

CHAPTER 2

Toward the Hamaoka NPP: A Historical Perspective

Scholars have provided mainly two explanations for the Fukushima Daiichi nuclear accident that indicate the structures and problems that led to this situation. These explanations focus on whether the nuclear disaster was caused by a "beyond expectations" (*soteigai*) event or by the negligence of the "nuclear village" (*genshiryoku mura*), that has been in full control of the nuclear policy in Japan (Kingston 2012; Samuels 2013). The first explanation is based on the long-standing belief that nuclear power was a safe, cheap and stable source of energy that greatly benefited the Japanese economy. Business elites and politicians thus supported the view that the nuclear disaster was a result of a "black swan" event (i.e. tsunami), which was far beyond the planners' expectations.[28] They reiterated the so-called safety myth (*anzen shinwa*) and claimed that Japan's economy would be too weak without nuclear power. While attributing the cause of the nuclear disaster to nature, the pro-nuclear advocates blamed the government, in particular then-Prime Minister Kan Naoto and the Democratic Party of Japan (DPJ) for the poor management in the aftermath of the disaster.

The second explanation focused on the failure of the nuclear village to implement adequate safety measures, which resulted in the nuclear disaster in Fukushima. The term "nuclear village" has been employed by critics to describe the networks of collusive relationships that link nuclear power advocates in government, private industry, academia, and the media. As Jeff

[28] See Jeff Sommer. "A crisis markets cannot grasp". *The New York Times*, A1, 6. March 20, 2011. According to Nassim Nicholas Taleb, the black swan is an event which is 1) a surprise, 2) has a major impact, and 3) is rationalised by hindsight, as if it could have been expected. See Taleb, Nassim Nicholas. *The black swan: The impact of the highly improbable*. Vol. 2. Random house, 2007. Describing the Fukushima accident, as a black swan event is problematic as one can argue it was foreseeable and preventable if not for organizational blindness. While Taleb's characterization 2 and 3 could apply to Fukushima, the first does not: the accident was not a surprise considering Japan's east coast has suffered over the last 100 years a number of large tsunamis (>10m) associated with earthquakes; with more than one locally over 15m, larger than the 'design basis event' of 3.1m of the plant.

Kingston notes, the nuclear village is 'without boundaries or residence cards, an imagined collective bound by solidarity over promoting nuclear energy.'[29] The makeup of the nuclear village includes electric power companies that operate nuclear power plants – Tokyo (TEPCO), Kansai (KEPCO), Tohoku, Chubu (Chuden), Chugoku, Shikoku, Kyushu, Hokkaido, and Hokuriku – as well as two other companies, Japan Atomic Power Company and Japan Atomic Energy Agency (JAEA). Other members of the village are the suppliers of nuclear-related equipment and services such as Hitachi, Toshiba, and Mitsubishi. With a significant presence in Keidanren (Japan business Federation), the Japan Chamber of commerce and Industry, and the Japan Association of Corporate Executives (Keizai Dokyukai), these conglomerates have tremendous influence on the way government shapes nuclear policy.

The village also includes the central government, which is mainly represented by the Ministry of Economy, Trade and Industry (METI)[30] and the Nuclear and Industrial safety Agency (NISA). It is important to point out though that the safety agency has never been an independent agency but always operated under the umbrella of METI, the promoter of nuclear policy. The village also includes members of the Diet who maintain strong interests in nuclear policy areas. Most members belong to the Liberal Democratic Party (LDP) that has been ruling Japan since 1955 except for a brief period (2009-2012) when the DPJ was the leading ruling party.

Electric power industry uses fundraising and donations to support politicians from both parties. Such support is extended to prefectural governors and municipal mayors of host communities and local people who benefit from this industry through tax subsidies, jobs, public facilities and other generous donations. Additionally, the nuclear industry also hires and funds academics who advocate and promote the use of nuclear power. The last beneficiary of the nuclear village is the media, which receives generous revenues from electric utility companies and government agencies.

While the entire Japanese population chiefly bears the costs of nuclear power through increased taxes, the nuclear village receives direct and

[29] See Jeff, Kingston. "Japan's Nuclear Village". *The Asia-Pacific Journal* 10, no. 37(1). September 10, 2012.
[30] MITI, the Ministry for International Trade and Industry became in 2001 the Ministry of Economy, Trade, and Industry, or METI.

exclusive financial benefits from the generation of nuclear power.[31] The nuclear village is thus highly motivated to protect these interests and continue the formation of nuclear policies. Indeed, while the Fukushima Daiichi nuclear meltdown has become the most well-known nuclear disaster in Japan, a series of more obscure nuclear accidents — in Tsuruga (1981), Mihama (1991), Monju (1995), and Tokaimura (1999) — occurred in Japan since the 1980s. The nuclear village was remarkably consistent throughout all of these accidents in showing its steadfast commitment to nuclear power. The pro-nuclear coalition de-emphasized the dangers using the media as an outlet, while the electric corporate management publicly apologized or formed new committees designed to prevent future mistakes in order to win back the public's trust.

Moreover, the government and utilities companies started spending more money to convince people that nuclear power was safe, clean, and necessary for Japan's prosperity. MITI, for example, increased its public relations budget by ten times, and spent more than four billion yen in 1990 alone to promote nuclear power.[32] Following the Mihama accident (1991) at the Mihama NPP, located north of Kyoto and operated by Kansai Electric Power Company (Kanden), MITI 'made it clear that it [did] not intend to change nuclear energy [siting] targets, although since the Mihama accident it has agreed to stricter plant safety measures.' In addition to the government, the utilities companies gave their firm support to nuclear power.[33]

Tokaimura was the most critical accident prior to Fukushima, which put the nuclear village on the defensive against a growing distrust from both the public and the press. While the government of the then Prime Minister Keio Obuchi ordered emergency inspections of all Japanese NPPs and a full investigation of the events surrounding the Tokaimura accident, the behavior of the "nuclear village" including the government did not change as promotors

[31] In his classic work, *Logic of Collective Action* (1965), Mancur Olson describes how a small group can act to expand its interests by exploiting the majority. The nuclear village is a case in point in this regard. (this is not really Olson's point, which is the emergence of a free-rider in an collective action aiming at promoting collective goods.)
[32] Peter Dauvergne, "Nuclear Power Development in Japan: 'Outside Forces' and the Politics of Reciprocal Consent," *Asian Survey*. Vol. 33. no. 6 (1993), p 581.
[33] Ibid., p 583.

continued to remind the people that nuclear power was crucial to the Japanese economy and for energy security in the future.[34]

For these reasons, the explanation that focuses on the failure of the nuclear village to implement adequate safety measures, assumes that the nuclear village, with an overweening confidence, enhanced the so called "safety myth" of nuclear power development in Japan. The three meltdowns at Fukushima Daiichi NPP are seen as a result of the belief long held by pro-nuclear advocates that accidents would never happen.

This chapter focuses on the nuclear village. It provides a historical overview of the political and social discourses on nuclear power development in Japan at both national and local levels. It first traces the evolution of nuclear power development at the national level, from the period of immediate postwar up to the oil shock in the early 1970s when nuclear power generation became a national priority. This further expands to highlight the different roles played by the government and the private sector for the promotion of nuclear power.

The second half of the chapter provides an examination of the development of a NPP at the local level. In particular, it shows how the government and the nuclear industry target specific local communities, and how the local conditions of such communities influence the process of hosting a NPP. The focus will be on the Hamaoka NPP, the case study of this thesis.

1-1. Towards Nuclear Power: Historical Context

Retracing how Japan historically brought nuclear power into its territories is crucial in order to understand the current situation of the local host communities. One cannot indeed help but raise the question on how Japan, the only country to have experienced devastation by nuclear weapons during the Second World War, ended up being the third-largest user of

[34] Howard W. French, "Urgent Inspections Ordered For Japan's Nuclear Plant," *New York Time*s, October 5, 1999, A10.

nuclear power, after the United States and France.[35] The country heavily promoted the use of nuclear energy after the war mainly based on economic interests. However, though nuclear power development was a major economic and energy policy in postwar Japan, the nuclear power program was initially brought to Japan by one individual who was politically motivated, Nakasone Yasuhiro.[36] Moreover, not only the political structure, but also individual agency has initially played a significant role in establishing nuclear power policies during a period of political instability.

At the Japanese policy level in the early 1950s, any discussion of nuclear power was associated with the atomic bomb memories of Hiroshima and Nagasaki. Both policymakers and scientists were fascinated by the potential economic benefits of nuclear power but acknowledged the dreadful meaning this technology associated with. Not all politicians agreed with such argument though. One young politician in particular aspired to bring nuclear technology to Japan: House of Representative member Nakasone Yasuhiro (later to become a prime minister from 1982 to 1987). Following a failed attempt to develop a nuclear program during World War II (Dower 1993), he helped the country develop its first nuclear program. As a young naval officer, Nakasone witnessed the Hiroshima mushroom cloud from Takamatsu city, in Shikoku: 'I saw the mushroom cloud of the atomic bomb. That image will never fade from my memory. That lit a fire within me to develop atomic energy' (Nakasone 1999, 45).[37]

While Japan was banned from conducting research in the atomic development field until the San Francisco Peace Treaty went into effect in 1952 (Yoshioka 1999), Nakasone started earlier to appeal to American officials including General Douglas MacArthur and John Foster Dulles (later to become Secretary of State from 1953 to 1959) to allow the Japanese government to conduct its own nuclear research for peaceful use. Nakasone

[35] Energy Information Administration, U.S. Department of Energy. International Energy Outlook 2000. Report # DOE/EIA-0484 (2000). http://www.eida.doe.gov/oiaf/ieo/index.html (accessed 26 June 2016).
[36] See Onitsuka, Hiroshi. "Hooked on Nuclear Power: Japan State-Local Relations and The Vicious Circles of Nuclear Dependence". http://www.japanfocus.org/-Hiroshi-Onitsuka/3676 (accessed 26 June 2016).
[37] Also quoted in Morris Low, *Science and the Building of a New Japan* (New York: Palgrave Macmillan, 2005), p. 40.

worried that not being allowed to exploit 'the biggest discovery of the twentieth century,' Japan would be consigned to 'the permanent status of fourth rate power' (Ibid. 107). Nakasone was invited later to attend a conference at Harvard University organized by Henry Kissinger, where he could obtain more information about nuclear development after meeting and consulting with Japanese physicists and businessmen (Nakasone 2002, 171-72).

Nakasone therefore considered the promotion of nuclear research his personal mission in order to return Japan to its superpower status, and he believed that gaining necessary knowledge was essential to achieve this goal.[38] It remains unclear if Nakasone wanted to arm Japan with nuclear weapons. Yoshioka (2005) argues that Nakasone wanted at least to build a nuclear technology base and an institutional framework that would eventually allow the Japanese leadership to make a quick shift to develop and stockpile nuclear weapons.[39] Nakasone was also attracted to the idea of creating a "plutonium economy" because of Japan's poor indigenous energy resources.[40]

Part of Nakasone's efforts to develop nuclear program was a consequence of the US new leadership at the time. The propagation of nuclear program in Japan was indeed actively encouraged by the United States. During the Cold War, US policymakers wanted to transfer nuclear technology to countries like Japan in order to integrate them into the U.S. bloc against the Soviet Union. In particular, the prospect of Japan to embrace nuclear technology was strategically important following the rising power of Stalinist regimes in China and Korea.

Seeking to deflect the attention away from the destructive power of atomic weapons and shift the focus to the socially and economically beneficial applications of nuclear energy, President Dwight Eisenhower delivered his famous "Atoms for Peace" speech in the United Nations General Assembly on

[38] Ibid., pp. 66-67.
[39] Hitoshi Yoshioka, "Nuclear Power Research and the Scientists' Role," in Shigeru Nakayama, ed., *A Social History of Science and Technology in Contemporary Japan,* Vol. 2: *Road to Self-Reliance, 1952–1959* (Melbourne: Trans Pacific, 2005), p. 111.
[40] Motoya Kitamura, "Japan's Plutonium Program: A Proliferation Threat?" *Nonproliferation Review,* Vol. 3, No. 2 (Winter 1996), pp. 2–3.

December 8, 1953.[41] He promised that the United States would devote 'its entire heart and mind to find the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life,' and claimed that 'this destructive forces can be developed into a great boon for the benefit of all mankind.'[42] In other words, he showed his commitment to spread the benefits of atomic power in the US and abroad by promoting the construction of nuclear reactors.

However, such promises were soon to be broken as the United States continued its testing of nuclear weapons in the Pacific Ocean. On March 1, 1954, all crewmembers (23 fishermen) of the Japanese fishing vessel, Daigo Fukuryu-maru (Lucky Dragon 5), a 140-ton fishing boat out of Yaizu, Shizuoka Prefecture, were exposed to different levels of radiation following the "Bravo" hydrogen bomb test. The boat was 85 miles away from the explosion, outside the designated danger zone on the Bikini Atoll, in the Marshall Islands. The tragic event stirred the pre-existing anti-nuclear sentiments among the Japanese, the legacy of Hiroshima and Nagasaki being still fresh on the national psyche. The *Asahi Shimbun* reported that the Japanese people had experienced the suffering from atomic bombs three times. This incident thus acted as a catalyst to break the long-suppressed rage over the 1945 atomic bombings.

Only two days after this incident, on March 3, 1954, House of Representatives member Nakasone submitted on behalf of three conservative parties (Liberal Party, Progressive Party, and the Japan Liberal Party) an amendment to the draft budget of fiscal year 1954 to the Lower House Budget Committee.[43] He asked to include 235 million yen for nuclear power research under the ministry of International Trade and Industry (MITI)'s Agency of

[41] For more details, see Kuznick, Peter. "Japan's nuclear history in perspective: Eisenhower and atoms for war and peace." *Bulletin of the Atomic Scientists* 13, (2011).
[42] Dwight D. Eisenhower: "Address Before the General Assembly of the United Nations on Peaceful Uses of Atomic Energy, New York City." December 8, 1953. Online by Gerhard Peters and John T. Woolley, The American Presidency Project. http://www.presidency.ucsb.edu/ws/?pid=9774.
[43] Before the boat's return to Japan on March 14 and the hospitalization of the crewmembers, the Japanese media reported the Lucky Dragon incident the following day (this was one day before Nakasone's budget went before the National Diet) (Low, Nakayama, and Yoshioka 1999, 73). It failed to cause disturbance among the public, as details about the incident were yet to be unfolded.

Industrial Science and Technology.[44] Using the crucial swing position of his party in the Japanese Diet, Nakasone succeeded in allocating the first budget for nuclear power in the Japanese national budget despite the skepticism of Japanese scientists at the time about the "peaceful use" of nuclear power (Yoshioka 1999, 64). The legal structure for the nuclear program was established in the following months after the government launched the Preparatory Council for the Use of Atomic Energy in May, and later formed the Joint Diet Atomic Energy Committee with Nakasone taking the role of its chairman in October of the same year.

The Lucky Dragon incident incited fierce criticism in Japan. The public was appalled and anti-nuclear weapons movements broke out. The Science Council of Japan issued a statement calling for the immediate suspension of nuclear bomb experiments and the abolition of nuclear weapons (Rudolph 1954). Indeed, scientists played a prominent role in the antinuclear effort in the 1950s. 'The scramble we see around us for the production of ever bigger and more fearful atomic weapons cannot but leave us in despair,' observed the Science Council of Japan in an April 1954 declaration. 'We believe we are voicing the common feeling of the people of all the world in sincerely appealing for the suspension of the atom and hydrogen bomb experiments, the abolition of mass-destructive nuclear weapons, and the establishment of really effective international control of atomic energy.'[45]

To contain the situation and overcome anti-nuclear sentiments, the US stressed the peaceful use of nuclear power as being previously stated in Eisenhower's speech.[46] Realizing that selling the idea of nuclear power will not be easily accomplished, the US government turned to Shoriki Matsutaro, former class-A war criminal and then the president of *Yomiuri Shimbun* company and Nippon Television Network Corporation (later to become the first president of the Atomic Energy Council in 1956), who was another

[44] Nakasone boasted in his book (*The Sentient World - 50 Years of Postwar Politics*, 1996) that the amount was decided in reference to uranium 235, used as the nuclear fuel.

[45] Quoted from Wittner, Lawrence S. *The struggle against the Bomb*. Vol. 1. Stanford University Press, 1993.

[46] In an article published by the *Asahi Shimbun* after Fukushima, the same Nakasone has asserted "the world trend is undeniably toward nuclear power for the purposes of peace and energy provision." In the same article, he reflected on Eisenhower' Atoms for Peace Speech back in 1953, thinking at the time that "Japan can't fall behind. Nuclear energy is going to define the next era." (*Asahi Shimbun*, 26 April 2011).

prominent promoter of nuclear technology.[47] Using his newspaper and media network while being supported by the U.S. State Department, Shoriki financed campaigns throughout Japan that promoted the "peaceful use of nuclear energy".[48] This not only helped the US to soften their own image of a wartime enemy responsible for dropping the two atomic bombs, but also created a better climate for nuclear power and distracted the public's attention from the political issues of the time.

This simultaneous occurrence of events – the Lucky Dragon incident and the nuclear budget – has laid the ground for the polarization of Japanese society on the nuclear power program. In the wake of media coverage, a widespread opposition to both atomic weapons and nuclear power emerged at the grassroots level. In spring 1954, a group of housewives in Suginami Ward in Tokyo founded the Suginami Petition Council Against Atomic and Hydrogen Bombs. When Kuboyama Aikichi, the radio operator on the Lucky Dragon, passed away in September 1954, the same petition spread among local communities around Japan, gathering by the summer of 1955, 33 millions signatures.[49] Thanks to this campaign, public attention to nuclear-related issues dramatically increased (Yamazaki 2009, 141-142). Emerging opposition led to the formation of the national anti-nuclear movement, known in Japanese as *gensuikyo*, the Japan Council against Atomic and Hydrogen Bombs. This council founded later the Citizens' Nuclear Information Center (CNIC, *genshiryoku shiryo johoshitsu*) which has been organizing anti-nuclear

[47] According to Arima Tetsuo, professor of social science at the University of Waseda, Shoriki Matsutaro worked as a CIA agent ("Podam" was his codename) to advance the nuclear energy campaign throughout Japan. The CIA and Pentagon funded Shoriki's media conglomerate hoping to influence the implementation of Eisenhower's policy and create a better climate for nuclear power in Japan. The American policy aimed at both distracting the Japanese public from nuclear weapons development and creating a new market in Japan for the nuclear power industry sector in the United States. For more, see Tetsuo Arima, "Shoriki's Campaign to Promote Nuclear Power in Japan and CIA Psychological Warfare", unpublished paper presented at Tokyo University of Economics, 25 November 2006.

[48] President John Jay Hopkins of General Dynamics, the maker of the first U.S. nuclear submarine Nautillus, accepted Shoriki's invitation to Japan to head a U.S. mission promoting the peaceful use of atomic energy. Under this mission, Shoriki launched a platform while using "all the power and influence of the *Yomiuri Shimbun* and NTV to have the topic reported in a favorable manner in order to drastically change public opinion (Mr. Shroiki's statement, ten years in the development of atomic power, 1965)". For more, see *Japan Press Weekly*, "Espionage behind Japan's first nuclear reactor", 8 June 2011.

[49] Martin Dusinberre and Daniel P. Aldrich. "Hatoko Comes Home: Civil Society and Nuclear Power in Japan," *Journal of Asian Studies* 70, August 2011: 686–87.

campaigns and providing information to the public until this day (Yoshioka 1999).

As for the pro-nuclear campaign, many Japanese politicians backed Nakasone's proposed new budget resulting in the allocation for the first budget of nuclear power in the national budget in March 1954.[50] The budget was passed in a single day despite widespread media coverage of the Lucky Dragon incident. Within less than a year, the Diet had passed eight foundational laws that regulated nuclear power (Nakasone 1999, 110). This political lobbying also paved the way for the establishment of what later became key institutions for Japanese nuclear energy program. In 1955, the Japanese government established the Japan Atomic Energy Commission (JAEC, *Nihon genshiryoku iinkai*), the Japan Atomic Energy Research Institute (JAERI, *Nihon genshiryoku kenkyūjo*), and the influential Japan Atomic Industry Forum (JAIF, *Nihon genshiryoku sangyō kaigi*). It also passed the Atomic Energy Act, which stated that nuclear power must be promoted based on three principles – 'democratic' methods, 'independent' management, and 'transparency'.[51]

Following the approval of the first nuclear budget, a group of academics came to endorse the pro-nuclear agenda, which focuses on nuclear energy rather than weaponry. Many prominent academics such as the president of Tokyo University, Yanaihara Tadao, who became chair of a nuclear research institute in 1954, spoke on radio programs and at public lectures about the peaceful applications of the atom (Finn 1954). Other scientists such as Ariyama Tanetaka from the University of Nagoya received generous grants to visit the United States to study the aspects of nuclear reactors (Evans 1956).

This also was the period when the private sector joined the nuclear program and became an integral part of the development process. In contrast to Nakasone's goal of building a top-down, state centric nuclear structure, the businessman Shoriki aimed at including the private sector as a partner in the

[50] See Nakasone's autobiography, *Jiseiroku* (Meditations).
[51] For more, see nuclear power in Japan webpage on World Nuclear Association: http://www.world-nuclear.org/info/Country-Profiles/Countries-G-N/Japan/ (accessed 20 Feb. 2015).

nuclear program.[52] Upon becoming the first chairman of the Atomic Energy Commission in January 1956, Shoriki asked multiple private-sector actors to conduct research and provide nuclear equipment under one banner in the Japan Atomic Industrial Forum (JAIF). The list included electric utility companies such as Tokyo Electric Power Company (TEPCO) and heavy industry manufacturers such as Hitachi, Asahi Synthetic Chemical, Nippon Mining, and Mitsubishi Metal, among others. Electric utility companies, in particular, were eager to join the new state-run nuclear program as an attempt to protect the autonomy they had gained in the aftermath of the war.[53] Soon after, as major contributors to nuclear research, Shoriki and the private industry started criticizing JAERI for being "government-owned, government operated" institute.[54] This led to the reconstitution of JAERI, which was designed as a special statutory corporation under the auspices of the Science and Technology Agency (STA), with the private industry as a main partner.

Up to the early 1960s, the new coalition — comprised of the prime minister, represented by the nuclear policy expert Nakasone, the Atomic Energy Commission, headed by Shoriki, and the pro-business Japan Atomic Industrial Forum (JAIF) — shared the vision of building nuclear infrastructure and achieving the mastery of the whole nuclear fuel cycle.[55] The commercial use of nuclear technology became a reality when in 1956 Shoriki announced that Japan must produce commercial nuclear power within five years. While the decision undermined Nakasone's vision of a state-centric nuclear research, it was considered a victory for the industry, especially the electric utility companies that were seeking new energy resources. The utilities allied with the Ministry of International Trade and Industry (MITI), which saw in nuclear power the new potential source of energy to reduce Japan's dependence on energy imports and to maximize electricity production.[56] The

[52] Hymans, Jacques EC. "Veto players, nuclear energy, and nonproliferation: domestic institutional barriers to a Japanese bomb." *International Security* 36, no. 2 (2011): 154-189.
[53] Yoshioka, "Forming a Nuclear Regime and introducing Commercial Reactors," pp. 87-89.
[54] Richard J. Samuels, *The Business of the Japanese State: Energy Markets in Comparative and Historical Perspective* (Ithaca, N.Y.: Cornell University Press, 1987), p. 237.
[55] Pickett, Susan E. "Japan's nuclear energy policy: from firm commitment to difficult dilemma addressing growing stocks of plutonium, program delays, domestic opposition and international pressure." *Energy Policy* 30, no. 15 (2002): 1337-1355.
[56] Johnson, Chalmers. *MITI and the Japanese miracle: the growth of industrial policy: 1925-1975*. Stanford University Press, 1982.

new alliance between utilities and MITI helped Japan purchase more than 20 U.S.-designed light water reactors by the mid 1957s.[57]

After the 1960s, Japanese nuclear policy-makers heavily promoted the use of nuclear energy based on economic interests. Nonetheless, one cannot deny the significance of the politics of nuclear weapons in Japan after 1963. While the political vision of Nakasone to establish a state-owned nuclear program was being at the time overshadowed and increasingly diminished by the pro-business lobby, Japanese politicians found themselves in the middle of a debate to join the new Nonproliferation Treaty (NPT). Conservative politicians succeeded in delaying the ratification of the NPT until 1976 because they viewed it 'as an act of great power discrimination and as an unfair reminder of Japan's defeat in World War II.'[58]

Yet, whether Japan had ratified the NPT or had not, the diffusion of power as well as the emergence of the powerful MITI as a pro-business bureaucracy over nuclear affairs meant that there were strong domestic constraints facing any Japanese politician who might attempt to acquire nuclear weapons.[59] The fact that Japan ratified the NPT in 1976 provided an additional underpinning for its non-nuclear arm policy and for using nuclear energy for peaceful purposes.

This is how the nuclear village was born. It was based on a cozy relationship among the bureaucracy, electric power companies, manufacturers, academia and the media. The first program for the long-term development of nuclear power was established in 1961 when Nakasone Yasuhiro was the president of the Atomic Energy Authority. This paved the way for constructing NPPs in Fukushima, Hamaoka and elsewhere.

As shown above, the political climate during the immediate postwar period shaped the development of nuclear power in Japan. As the science behind nuclear power and nuclear weapons is closely tied, anti-nuclear movements and the nuclear industry formed simultaneously throughout the first two decades of postwar Japan. Moreover, individual agency represented

[57] See Yuki Tanaka and Peter Kuznick. "Japan, the Atomic Bomb, and the Peaceful Uses of Nuclear Power," *The Asia-Pacific Journal* 9, no. 18 (1), 2 May 2011.
[58] Hymans, Jacques EC. "Veto players, nuclear energy, and nonproliferation: domestic institutional barriers to a Japanese bomb." *International Security* 36, no. 2 (2011), pp. 172.
[59] Ibid.pp. 172-173.

by Nakasone and Shoriki played a crucial role in producing political structure for the country's first nuclear program. Moreover, the diffusion of power over nuclear affairs paved the nuclear program towards it commercialization. As for public attitude, anti-nuclear campaigns fused both anti-nuclear weaponry and anti-nuclear power generation up until the late 1950s. It can be said that the former overshadows the latter. However, as will be shown in the following section, the technology of nuclear energy was later dissociated from nuclear weapons, leading to substantial decrease in public attention, and consequently the construction of nuclear power as 'insignificant' in the everyday life of the ordinary citizen.[60]

1-2. The Oil Shock and the Shift to the Atom

Japan was nearly exclusively dependent on crude oil imports from the Middle East in the 1960s and 1970s. Until 1950s, Japan relied mainly on coal and hydroelectric power due to the lack of indigenous resources for generating electricity. As a result of more competitive oil prices through the 1960s, power companies sought to rely more on oil imports, which gradually replaced coal. In 1965, nearly half of electric power was generated from oil (Samuels 1987, 113, 131). Japanese electricity companies were drawn to nuclear power during the 1970s as a relatively cheaper technology compared to hydroelectricity, which required huge investment in dam constructions, or to thermal power, which depended on the oil market.

Most nuclear power plants were constructed in Japan during the late 1960s and 1970s. In 1966, Japan started its first commercial nuclear reactor, Tōkaimura in Ibaraki prefecture. It began operating three more similar reactors, including one in Fukushima prefecture, in 1970. The period between the initial planning and the start of the operation varies depending on each case, but it generally took about ten years.

Japan's first nuclear reactor, constructed in 1961 in Ibaraki prefecture, Tōkai district, began operating in 1966. Tsuruga, Fukushima Daiichi and

[60] This (in)significance of NPP in everyday life will extensively explored in the following chapter.

Mihama plant commenced operation in 1970. Takahama plant and Genkai plant in Kyūshū came after, in 1974 and 1975 respectively. Hamaoka plant in Shizuoka was initially planned in 1967 and the first reactor began operating in 1976. The expansion of the nuclear power continued to increase in the following years as many of the above-mentioned plants added new reactors. With fifty-four reactors in operation, Japan had the third largest number of reactors in the world by the mid 1990s. Prior to the nuclear crisis in Fukushima, Japan had fifty functioning reactors that generated 30 percent of its electricity.

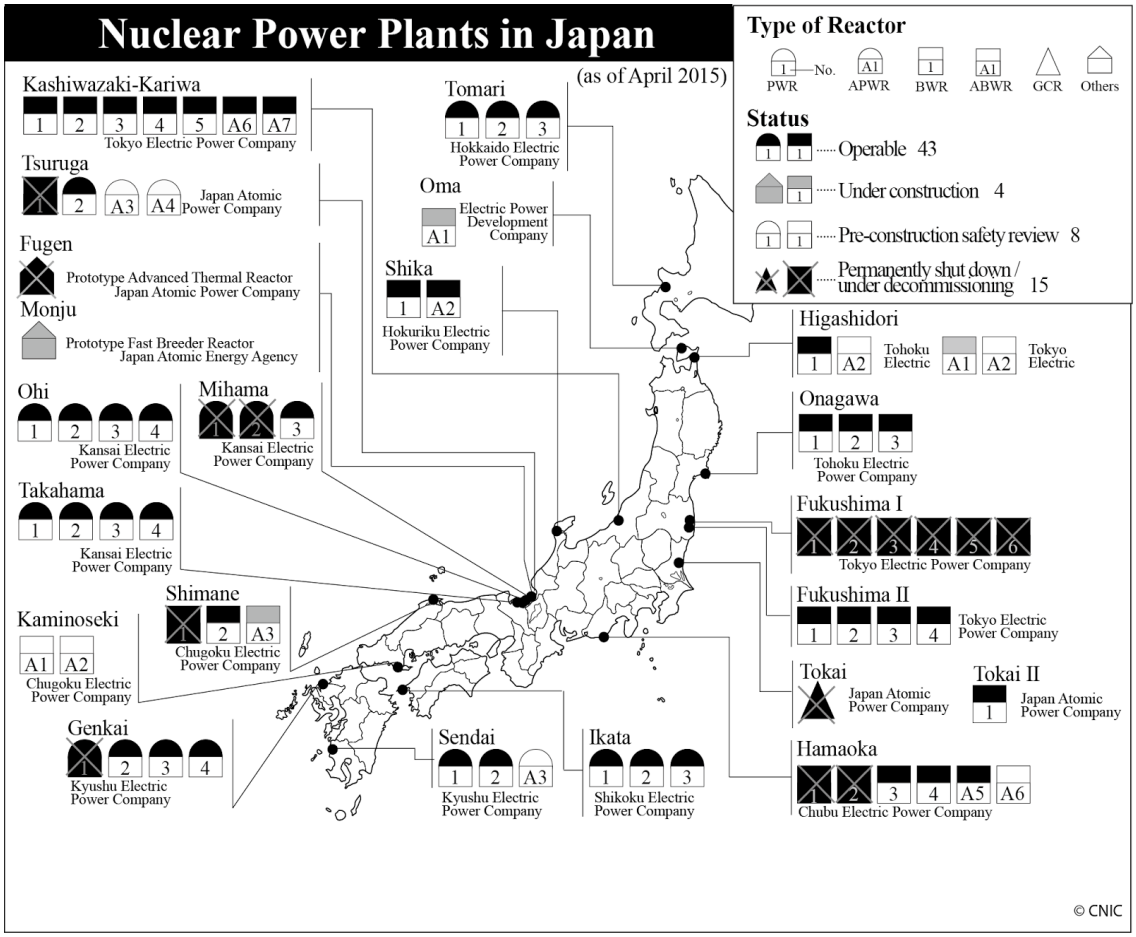


Figure 1. Nuclear Power Plants in Japan as of April 2015

Source: *Nuke Info Tokyo* No. 165 (March/April 2015) published by CNIC

The discourse to justify this ever-expanding nuclear industry was mainly economical. In the wake of the Organization of the Petroleum Exporting Countries' (OPEC) oil shock[61] in October 1973, the Japanese government was forced to take the next major shift in energy policy. Having

[61] The 1973 oil crisis was an oil embargo initiated in October 1973 by members of the Organization of Arab Petroleum Exporting Countries in response to the American support for Israel during the Yom Kippur War. The embargo led to increase in the price of oil from US$3 per barrel to nearly $12 at the global level with the price of oil significantly higher in the United States. The embargo led to oil crisis with many political and economic implications around the Globe. For more, see OPEC Oil Embargo 1973–1974". U.S. Department of State, Office of the Historian. Retrieved June 30, 2017.

been dependent heavily on cheap oil from the Middle East, Japanese manufacturing sector and power utilities suddenly had to pay extremely high prices for oil products.[62] To deal with the crisis, the Japanese government started promoting non-oil energy sources, establishing, for example, the tax-exempt Japan Dam Federation in 1974 to promote the construction of hydroelectric dam throughout the country. Nuclear power generation, also, became far more significant during that period of time. Japanese politicians decided that investment in nuclear energy must be increased in order to sustain high economic growth.

Even after the Fukushima accident, the 98-year-old Nakasone still advocates nuclear energy stating that Japan must 'maintain and advance its nuclear policy'. He recalled that, back in the mid-1950s, 'energy was the most critical issue in postwar Japan. We had no oil, no gas, and our coal reserves were dwindling. To recover from the defeat in the war and be back on our feet again, securing energy was our country's most urgent task. That's why I concluded nuclear energy had to be the answer.'[63] The Japanese government thus supported the construction of nuclear power plants to decrease the dependence on foreign oil and natural gas. Today, many conservatives share the same mindset as Nakasone in regard to nuclear power. Those politicians rely on the same economic argument through emphasizing the importance of securing energy, while underplaying the risks and threats surrounding nuclear power plants.

Although nuclear weapons created a negative image of nuclear power in the 1950s, a more positive image of nuclear power in the 1960s and 1970s emerged due to industrialization and pursuit of economic growth. In contrast to the opposition of the 1950s, anti-nuclear protests at the national level were rare and economic pressures from the late 1960s led to higher level of acceptance of nuclear power among the public. On the other hand, any resistance to nuclear energy was local, organized primarily by groups of farmers and fishermen. To allow the construction of NPPs, the central

[62] The market price of a barrel of oil nearly quadrupled between early 1973 and 1974 (Aldrich 2008, 132).
[63] Yoshida Takafumi. "Yasuhiro Nakasone: Learn Lessons from Fukushima Crisis and Continue to Promote Nuclear Energy," *Asahi Shimbun*, 23 May 2011.

government used strategies to facilitate the siting processes, as we shall see in the following sections.

1-2. 1979-2011: A History of Nuclear Power Accidents

A series of nuclear accidents since 1979 have caused anti-nuclear sentiments to re-emerge among the public. On 28 March 1979, the nuclear reactor at Three Mile Island in Pennsylvania failed to cool down and this led to a core meltdown. Despite its distance from Japan, the accident sparked opposition to nuclear power but without any impact on the government's pro-nuclear policy. To reduce anti-nuclear sentiments, the Japanese government reassured the public that nuclear power was safe and that a similar accident was unimaginable in Japan. One correspondent from the *Los Angeles Times* wrote, '[F]ollowing the Pennsylvania accident, both the government and the nuclear industry here maintained that such a mishap was impossible in Japan, since its reactors differed from those at Three Miles Island.'[64] At the time, the government, in tones that echo the current discourse since the Fukushima nuclear accident, emphasized the importance of nuclear power to the economic development at the national level.[65]

Although the government continued during the 1980s to promote nuclear power as a reliable and indispensable source of energy and downplay its dangers, opposition to nuclear power was increasing at both local and national levels. The opposition was not unique to Japan as there was an international suspicion towards nuclear energy after the Chernobyl accident. From the 1990s, the Japanese media has placed almost every aspect of the nuclear power generation under scrutiny due to accidents and cover-up scandals in Tsuruga (1981), Fukushima (1989), Mihama (1991), Monju (1995), Tokaimura (1999), and Kashiwazaki (2007). Both anti-nuclear activists and

[64] Yasushi Haka, "Three Mile Island Accident Leaves Japan Extra Jittery," *Lost Angeles Times*, June 28, 1979, F7.
[65] Henry Scott-Stokes, "Japanese Renewing A-Plant Resistance," *New York Times*, May 9, 1979, A9; NYT, "Japan Finds Need for Nuclear Growth," *New York Times*, Dec, 28, 1979, D4.

the media questioned the safety of this technology and the government's capacity to regulate the utilities companies.

Public opinion about nuclear power can therefore be organized into three periods. The first period starts from the end of World War II until late 1960s, during which anti-nuclear sentiments were associated with atomic weapons. In the second period, which extends from 1960s to 1979, the Japanese public was showing favorable attitudes towards nuclear energy, being framed as a highly-advanced technology that provides a stable and clean source of energy. The last period, stretching from 1979 until 2011, witnessed serious nuclear accidents, first in the United States (Three Miles Accident, 1979), in the Soviet Union (Chernobyl, 1986), and in Japan (Monju 1995, Tokaimura 1999 and Fukushima 2011).

Moreover, it is important to notice that the nuclear power program in Japan was in close interaction with the political climate of each of three periods. The perception of nuclear power as a dreadful technology from 1945 till early 1960s was shaped by the atomic bombings of Hiroshima and Nagasaki and the nuclear test bombing in the Bikini Atoll. Oil shocks and industrialization shaped perception of nuclear power as an advanced and stable source of energy in the 1960s until late 1970s. The perceptions of nuclear power as uncontrollable technology were caused by domestic and international nuclear accidents since 1979.

1-4. Siting Strategies

In the 1960s, the nuclear power program was increasingly challenged by anti-nuclear public sentiments and protests. As it will be shown in this section, this made government officials realize the significance of siting nuclear power plants in areas where opposition would be the weakest (Aldrich 2008).

The most critical contribution to the spreading of nuclear power in Japan did not come from politicians and media supporters but from the private

sector that showed strong interest in energy technologies. Following the U.S. model of state-regulated privately owned utilities, Japan was divided into nine different regions in which one power utility company had monopoly over every region. The regions of Hokkaido, Tōhoku, Tokyo, Chūbu, Hokuriku, Kansai, Chūgoku, Shikoku, Kyūshū and Okinawa each received electricity and came under jurisdiction from one electric utility company (Okinawa was only added to the list in 1972 after its return to Japan).[66] This, however, did not mean that the central government had no strength over power utilities. On the contrary, the government regulation of the electric power utilities was realized in the model of 'government policy, private management'.[67] Shouldering little burden of investment spending, the government provided power utilities with administrative guidance while power companies conducted the business.

Several studies have shown how the Japanese state delegated to utility power companies the negotiations for siting plants, while maintaining jurisdiction over nuclear power (Samuels 1987). Another study demonstrated how the state had delegated negotiations to the power companies and investigated bargaining power between local communities and private utilities (Lesbirel 1998). Similarly, Aldrich (2008) highlighted the role of the state in delegating the task of siting NPPs to power companies while simultaneously seeking to influence civil society through policy tools.

While power utilities companies such as TEPCO and Chubu Electric implemented the siting and the management of the NPPs, the central government played a significant role in the process. The central government showed full support to the regional power utilities through 'research funding, risk amortization, and financial and logistic support'.[68] Facing increasing opposition to the construction of NPPs over time, the state identified certain

[66] Before the end of the war, 152 electric power companies came under government control to monopolize and secure a steady supply of electricity to the military industry. The government achieved this goal through the establishment of Japan Electric Generation and Transmission Company in 1939. In 1942, all electric companies were merged into nine companies that held monopoly over its own region. After the war, the government-controlled Japan Electric Generation and Transmission Company was dismantled and the ownership was divided among the nine electric companies allowing the regional monopoly to remain until this day. See Oguma Eiji. "Japan's Nuclear Power and Anti-Nuclear Movement from a Socio-Historical Perspective," working paper, Keio University, 2012.

[67] Ibid.

[68] Aldrich, Daniel P., "With a Mighty Hand," *New Republic*. https://newrepublic.com/article/85463/japan-nuclear-power-regulation, 18 March 2011 (accessed 25 June 2016).

groups that would pose as potential obstacles to implementing nuclear-related projects. These include local governments leaders, youth and women, and fishing cooperatives, as will be shown below (Aldrich 2008). Moreover, capturing the depopulation problem outside metropolitan areas since the beginning of 1960s, MITI officials helped electric power companies locate potential host communities where graying population is prevalent.[69]

To avoid backlash from anti-nuclear movements, the government relied on policy tools designed especially for communities willing to host NPPs. Learning from past experiences over controversial facilities such as airports and large-scale dams, the government 'adopted softer policy instruments and employed side payments' to promote nuclear power.[70] For example, although land expropriation law has been widely used by the central government during the construction of public industries and facilities projects such as dams, airports, and electric power facilities, it has not been used in nuclear power plant sitings. Despite falling into the same category of public enterprise, MITI officials avoided using it, fearing it would bring unwanted negative reactions from targeted host communities that would disturb siting plans elsewhere in the future.[71]

Gaining the consent from the host community, especially from fishing cooperatives, became the biggest challenge for both the government and the nuclear industry. For cooling purposes, the operation of a NPP requires drawing water from the ocean and releasing the same water, albeit several degrees warmer, back into the ocean. Power utilities thus were required by the Japanese law to purchase the rights from fishing cooperatives in order to place the pipes in the ocean. Purchasing the rights, which needs fishing cooperative' two-thirds majority vote, has over the years become a major obstacle for the nuclear industry as fishing communities could use their veto power during the negotiation process and consequently disrupt the project.

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[69] For the depopulation issue, see Chapter 5.

[70] Aldrich, Daniel P. "Rethinking Civil Society-State Relations in Japan after the Fukushima Accident," *Polity* (2013).

[71] Aldrich notes that the Japanese authorities were inclined to use expropriation during negotiations to construct a NPP in Maki, where local residents successfully held a citizen's referendum that prevented the sale of the land after many years of on-going siting process for a NPP in Niigata Prefecture. See Aldrich, Daniel P. "The Limits of Flexible and Adaptive Institutions: The Japanese Government's Role in Nuclear Power Plant Siting over the Post War Period." *Managing Conflict in Facility Siting. Cheltenham* (2005): 109-133.

Concerns about the loss of livelihood along with fears about potential radioactive contamination were some of the main reasons for cooperative to resist (JAIF 1966, 10). As a matter of fact, fishing cooperatives across Japan have blocked, delayed or ended many attempts to site nuclear power plants (Lesbirel 1999). For example, fishermen in Ashihama (Mie Prefecture) and Maki (Niigata Prefecture) actively protested against siting plans, which led to delays and eventually cancellation. In Kaminoseki (Yamaguchi Prefecture), the project has been infinitely delayed because of the fishing cooperative's refusal to communicate with the government and the power company. As a result, the government has sought to focus on areas where fishing cooperatives were considered weak.[72] Moreover, in spite of the fact that technical criteria, such as distance to cooling water and population density, is usually the sole determinant for siting nuclear reactor, the Japanese government and nuclear industry added another determinant: target areas with weaker social ties and low potential for mobilization.[73]

Funding scientific research was another tactic the pro-nuclear coalition used to gain support for power plants. Based on orders from the Prime Minister's Office, several studies were conducted to reassure fishermen that temperature increases had no effects. Moreover, the government and electric companies sponsored and invested respectively in research to prove that NPPs caused no harm to the environment. Since the mid 1960s, power companies such as TEPCO and Chubu Electric have funded and conducted studies at fish farms that are heated by the discharge water from the nuclear reactors. Among the examples are aquaculture plant near the Tokai plants in Ibaraki Prefecture and Fubata's fish farm near the Fukushima Daiichi and Daini NPPs (Aldrich 2008, 147). The aim of such studies is to demonstrate how nuclear power has little adverse impact on the local ecosystem. Utility companies would further publish research results in various journals such as *Suisankai* (Fishing World), sponsored by the Japan Fisheries Association, to assure readers that the nuclear power plants have not harmful effects on fishing catch size.

[72] Nihon Genshiryoku Sangyo Kaigi (Japan Atomic Industrial Forum) 14, no. 10: 26.
[73] Aldrich, Daniel P.. "Location, Location, Location: Selecting Sites for Controversial Facilities," *Singapore Economic Review*, 53 (2008): 145–72.

Young women and mothers were another demographic group that planners began to focus on in the 1980s as a response to various opinion polls that depicted them as a major anti-nuclear segment in the local population. Indeed, *Asahi Shimbun* (July 5, 1988) started showing that young women and mothers make a significant portion of anti-nuclear citizens. Consequently, advertisements on nuclear power and other related PR outlets included images of young mothers with their children smiling, and messages that reassure them of the safety of nuclear energy (Aldrich 2013, 84).

Another approach was the reliance on scientists in order to assure host communities of the safety of NPPs. The central government through its Agency for Natural Resources and Energy sent state-paid scientists (some came from quasi-government agencies such as the Center for the Development of power Supply Regions and the Japan Atomic Energy Relations Organization (JAERO)) to lecture local residents on the importance of nuclear power. During their lectures, scientists would insist that Japanese NPPs are considered to be the safest in the world, surpassing those built in the Unites States and France. In 1988, scientists claimed that the average number of unplanned shutdowns per reactor was 0.4 in Japan compared to 4.0 in the United States and 5.3 in France. Skeptics have been questioning these statistics in the light of many scandals that happened during the 1990s and 2000s, which showed how power operators covered up minor accidents or failed to report them immediately.[74]

Furthermore, MITI officials and electric power companies implemented campaigns during siting process as an attempt to familiarize potential host communities with nuclear power. Local government leaders and representatives were taken on free 'study trips' to other areas where existing nuclear facilities were in operation. Such trips involved dinner banquets during which potential host communities' leaders and representatives of power companies got acquainted, with the latter allegedly giving gifts to the former.

One informant, MR. Yoshimura, a farmer (70) who lives in Hamaoka-cho, confirmed to me hearing such stories during the siting of Hamaoka NPP. He recounted how the government invited few representatives from Hamaoka

[74] David E. Sanger, "A Crack in Japan's Nuclear Sangfroid," *New York Times*, Feb 17, 1991, E4.

several times on trips to Tokaimura in Ibaraki Prefecture and Futaba in Fukushima Prefecture to see the facilities there. Another informant, Mr. Tamura, (46) who is employed at the Hamaoka NPP confirmed that the government offered such trips to different nuclear localities including the Hamaoka area. It is unclear how effective such strategies are regarding the acceptance level of a nuclear reactor, although Dusinberre and Aldrich argue that within these small communities 'the structure of civil society meant that an ordinary citizen's pro-nuclear decision was as likely to be based on social, political, and even historical obligation as it was on a clear grasp of atomic energy issues' (2011, 700).

Finally, one of the most effective siting strategies adopted by MITI is the redistributive system for rewarding communities willing to host electric power plants (hydroelectric, thermal, or nuclear). The most important system is called the Three Power Source Development Laws system (*Dengen Sanpo*), which was introduced in 1974, to institutionalize an already existing ad hoc compensation measures. Such measures were initially incentives for communities, which provided public funds for the construction of roads and bridges. Tokaimura in Ibaraki Prefecture, where the first nuclear reactor (1963) in Japan is located, was the first and only area to receive such funds from the Atomic Energy Commission until 1971, but this has changed when other localities began demanding similar treatment.[75]

Through the Three Power Source Development Laws, the largest amounts of subsidies went to local municipalities willing to host nuclear facilities or expand the existing facilities with new reactors (Lesbirel 1998, 36). The new system provided a powerful incentive as it produced a flow of cash by requiring all Japanese power consumers to pay a tax that was funneled into hosting communities.[76] This played a major role in promoting and developing nuclear power.

[75] MITI later made a proposal at the Diet to fund public infrastructure (roads, bridges,radiation monitoring, new schools, and similar infrastructure projects) in local areas where power plants are located. See Aldrich, Daniel P. "The Limits of Flexible and Adaptive Institutions: The Japanese Government's Role in Nuclear Power Plant Siting over the Post War Period." *Managing Conflict in Facility Siting.* Cheltenham (2005): 109-133.

[76] For more, see Kato Takaaki et al. "A case study of economic incentives and local citizens' attitudes toward hosting a nuclear power plant in Japan: Impacts of the Fukushima accident," *Energy policy* 59 (2013): 808-818. Also, Fackler, Martin, and Norimitsu Onishi. "In Japan, a Culture That Promotes Nuclear Dependency," *The New York Times* (2011).

As has been shown above, the combination of strategies was, from the perspective of the so called 'nuclear village', the right formula for overcoming any emerging local opposition to the siting of nuclear power plants. The next section will focus on how financial incentive tools act as tools of control over local government of areas where nuclear power plants are located.

1-5. Creating a "Cycle of Addiction"

Studies have shown that the local government and its constituents such as mayors, local officials, and assemblymen are the final decision-makers during the process of constructing a nuclear power plant (Lesbirel 1998).[77] As will be shown in the case of the Hamaoka NPP siting later in this chapter, local residents have mostly been excluded from the decision-making process.[78]

Before delving into the problem of financial incentives, it is important to note that Japanese local governments tend to manage sizeable municipal budgets when compared to those run by local governments in other developed countries. Moreover, it is not only the size of the budget, but also the portion of budget transfer from the central government that is fairly large as well.[79] Indeed, high percentage of local government budget comes directly from the central government. This leads to a compromise in the local autonomy as central government can, and do as will be shown below, control local budget transfer. In the case of the siting of nuclear facilities or expanding existing ones, MITI officials and electric power companies have capitalized on this relationship, creating the so called 'cycle of addiction' as local governments become economically dependent on the budget transfer from central government.

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[77] See also Hiroshi ONITSUKA*, 'Hooked on Nuclear Power: Japanese State-Local Relations and the Vicious Cycle of Nuclear Dependence,'* The Asia-Pacific Journal Vol 10, Issue 2, No 2, January 13, 2011.

[78] The first local referendum on the construction of a nuclear power plant took place in 1997.

[79] Miyamoto Kenichi. 2005. *Nihon no chihō jichi: sono rekishi to mirai*. Tokyo: Jichitai kenkyūsha.

As previously mentioned, the central government passed the Three Power Source Development Laws in 1974 to promote the construction of nuclear power plants and ensure national subsidies for local governments willing to accept such facilities. On the local level, the considerable sum of subsidies was very attractive. Additionally, a guaranteed receipt of local property taxes for the plant that would help improve the local infrastructure and fix deteriorating finance clearly appealed to the local officials in these impoverished areas (Aldrich 2014, 194-196). For instance, in Okuma (Fukushima Prefecture), the town's total revenues in 1978 amounted to 1.92 billion yen, of which nuclear-related income was at 1.7 billion yen (88.5%). Kamata Satoshi notes how the size of Okuma's budget had increased 26.6 times over a decade between 1965 and 1979, making the local government dependent on the plant (Kamata 2011, 113).

Being always dependent on funding from the central government, it makes sense to assume that local officials saw in hosting a nuclear facility a valuable opportunity to become financially more independent. This was not always the case, however. Although nuclear power plants boosted local finance, it failed to expand labor market outside the nuclear industry or to make the host locality financially independent from nuclear-related incentives. The unique feature of the Three Laws is that subsidies are provided for the first five years after the start of construction, but drops to a quarter of the initial amount once the plant begins operation (see graph below).

Another feature of the Three Laws' subsidies is that they were initially designated to be exclusively spent on infrastructural projects such as roads, bridges, and ports. As such hard infrastructures had become in sound condition in host localities by the 1980s, METI allowed localities to spend some funds on commercial development, parking lots, and industrial parks. It was only after 2000 when METI allowed money to be spent on more strategic projects (or soft infrastructure project) such as job training and invitations for other businesses to move to the area, as residents and local officials have become increasingly aware and worried about the deepening depopulation crisis in their areas. (Ohkawara and Baba 1998, 8).

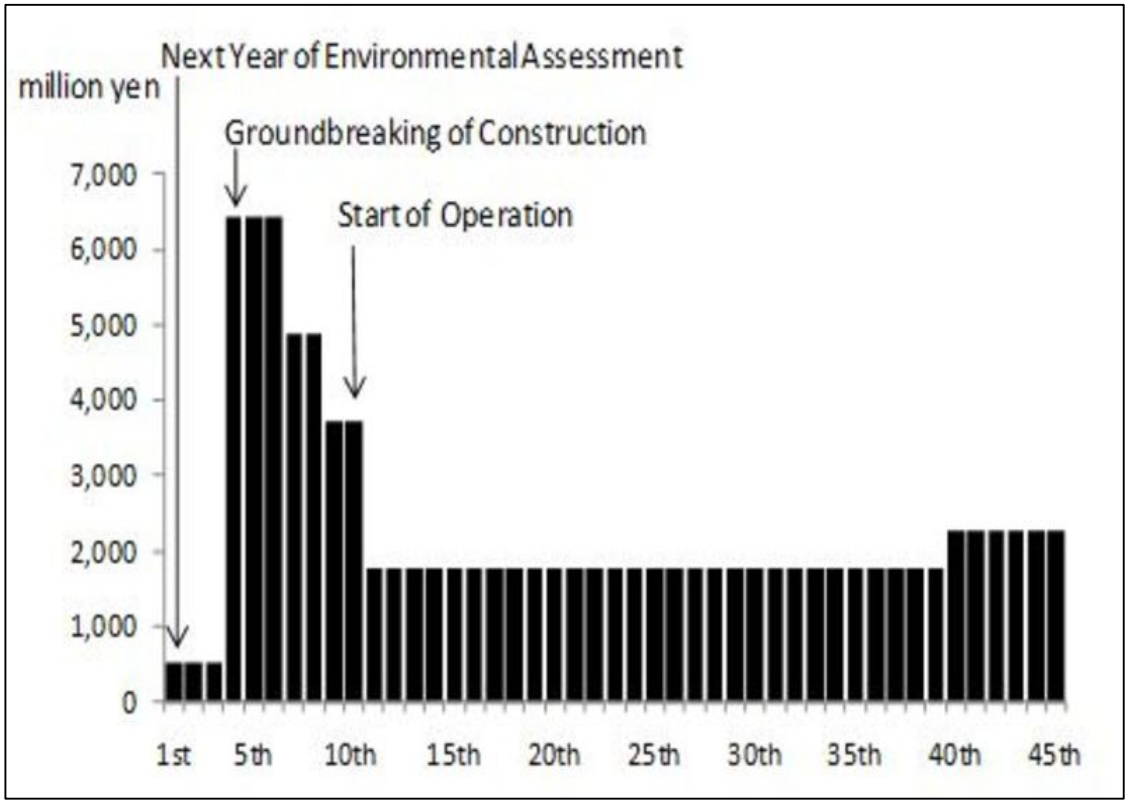

Figure 2. Amount of annual subsidies for a local government that hosts a nuclear power plant
(Model case of a plant with 1,350,000kW output)
Source: Agency for Natural Resources and Energy

In the case of Futaba where the crippled Fukushima Daiichi NPP is located, the town was facing deteriorating public finances, as the operation of large public facilities was becoming a burden on the town's budget. Lacking options for an alternative income, the local government agreed to TEPCO's

proposal for the construction of two new reactors in 1991. Local officials in Naraha, Tomioka (both Fukushima Prefecture) and Hamaoka (Shizuoka Prefecture) faced similar situations as finances deteriorated after the initial flow of subsidies.

In the case of Hamaoka, the town constructed a welfare center, a public library, and a swimming pool with high operating costs that made officials accept a proposal to expand the facility by adding a fifth reactor in late 1999s (see table below). One cannot but observe a flaw in the way local administrations in such localities lavishly spend the subsidies by constructing too many facilities that would not generate sustainable income and require a vast amount of spending for their operation. This, again, is linked to the way the central government provided limited outlets to nuclear localities on how the money should be used.

Unit	Gross Capacity	Construction Start	Commercial Operation	Status
Hamaoka 1	540 MW	June 10, 1971	March 17, 1976	Shutdown January 30, 2009
Hamaoka 2	840 MW	June 14, 1974	November 29, 1978	Shutdown January 30, 2009
Hamaoka 3	1100 MW	April 18, 1983	August 28, 1987	Shutdown May, 2011
Hamaoka 4	1137 MW	October 13, 1989	September 3, 1993	Shutdown May, 2011
Hamaoka 5	1267 MW	July 12, 2000	January 18, 2005	Shutdown May, 2011

Table 2: Reactor Data
(created by the author based on online data from Chubu Electric:
the operator of the Hamaoka NPP)

Another factor for this lavish spending can be traced back to the 1990s, when the central government allocated 430 trillion yen to domestic public investment over the ten-year period starting from 1991, and another 200 trillion yen from 1994 to be spent by 2008. The spending of 630 trillion yen did not take place on the behalf of the central government but was imposed on prefectural and local governments to expand their public investment.[80] Having

[80] This situation is also a result of US-Japan relations, when the US demanded that Japan should spend 10 percent of its GNP on public investments, which usually do not generate industrial productivity. The aim was to prevent the devaluation of the US dollar by limiting the influence of the Japanese yen to the Japanese market only. See Uzawa Hirofumi and Uchihashi Katsuto. 2009. *Hajimatteiru mirai: atarashii keizaigaku ha kanō ka*. Tokyo: Iwanami shoten. PP. 49-50.

large income, local governments of areas hosting NPPs were encouraged and often pressured by the prefectural governments to increase budgets.

The host communities thus enter a “cycle of addiction” as they become incented to host additional reactors so that the municipality remains financially sound, becoming more dependent on the nuclear industry, and wanting to expand its operation by adding more reactors 289 (Hasegawa 2004, 26). This also explains the concentration of nuclear reactors in few poor rural regions around Japan. The unique features of the Three Laws played a significant role in expanding nuclear power plants, while the demand from the central government to increase public spending further reduced the options held by the local governments. In the case of Omaezaki, for example, the city hosts five nuclear reactors and the construction of a sixth one began in 2008 but came to a halt following the suspension of the plant’s operation in 2011.

Local governments hosting nuclear reactors receive different types of economic incentives. The first three incentives are subsidies, fixed property taxes and donations that generously contribute to the local government financially, while the fourth incentive, in the form of employment, entails greater economic impacts. In Omaezaki-shi, the local government received 45.6 billion yen in subsidies since the Three Power Source Development Laws system was passed. The donations, however, may be higher as local governments and electric utilities refuse to confirm the total sum of donations (*Asahi Shinbun*, 15 September 2011). Subsidies not only improved living standards, but also created employment opportunities and attracted secondary industries that depend on the nuclear industry. Chapter 4 will further discuss these facts in more details.

Nuclear facilities were placed in localities where organized opposition was likely to be the lowest. In Hamaoka, the community was rural, depopulating and had weak local organizations and no history of opposition or environmental movements. In such a context, once a local community accepts the first nuclear reactor, it becomes susceptible to be selected to host future ones (Hoyman 2001). In the following section, I will present the similar circumstances that led to the siting of the Hamaoka NPP and the local politics that came into play at the time.

2. Development of Nuclear Power Plant in Hamaoka

The old town of Hamaoka, where I have been conducting fieldwork, has been through major transformations since the construction of the nuclear facilities. This has played an important role in shaping people's lives in the years following the introduction and subsequent siting of the nuclear facility. In the following sections, by relying on interviews with local residents and literature accounts, I will describe the changes that affected the old Hamaoka area and how these changes led to major transformations in the livelihoods of the local residents.

2-1. Omaezaki-shi: A General Background

The city of Omaezaki (Omaezaki-shi) is situated between the Pacific Ocean and a range of green-tea mountains. It is part of a region located in the central west of Shizuoka prefecture, at the tip of Omaezaki peninsula on the Pacific coast. Omaezaki residents have always been proud of the beauty of their land. According to the historical study of the journalist Mori Shigeki, *Genpatsu no machi kara* (From the Nuclear City): 'The region [Ogasa district] which lies between the city of Shizuoka and Hamamatsu is blessed with lands in abundance.'[81] He later adds that, 'when it comes to the Taiheiyo belt [also known as the Tokaido corridor], industrialization and development have been widespread in the region except for the southern part.' Indeed, this was the case in the old Hamaoka town and Omaezaki town, located in this southern part, which were left behind by developers following the end of the war. To this day, the inconvenient location of these towns (merged as Omaezaki city since 2004) excluded them from any railroads network that would reach the

[81] Before its dissolution, Ogasa district was a rural area located in western Shizuoka prefecture. In 1986, it was divided between one town (Kakegawa) and 45 villages. Up until the 50s, several mergers and consolidations happened creating new towns, including Hamaoka (March 31, 1951).

area. Even today, buses running from neighboring towns and cities are the only public transportation that can be used for accessing the place. As will be shown later, Hamaoka's remote location, away from other industrial regions in Shizuoka prefecture, made this area a target for the development of the Hamaoka nuclear power plant.

As of June 2016, the city had a population of 33,476. This city is relatively new. It was established in April 1, 2004 from the merger of Omaezaki town (Omaezaki-chō), known for its long-standing commercial fishing industry, and Hamaoka town (Hamaoka-chō), known for the culitivation of green tea and later as the location of the Hamaoka nuclear power plant. From an administrative perspective, the town of Hamaoka is not a unique case. It was established as a result of different waves of mergers and consolidations implemented at different periods all over Japan since the Meiji Restoration (1868). Hamaoka used to be part of the Kito district (Kito-gun), a part of Shizuoka prefecture (Shizuoka-ken), which was established when the act for the alignment of local government system was carried out in 1878. All the villages of this district were merged into five main villages (Ikenshinden, Sakura, Kitaki, Asahina and Niino villages) after the implementation of the act of the city, town and village system in 1898. Hamaoka was founded as a town in 1955 through the merger of these five villages. At the time, the town had an estimated population of 9816 (3401 households). The total area was 53.57 km².

The population of Hamaoka town was about 17,000 before the planning of the nuclear facility began.[82] The local agriculture sector has always made use of the unique natural features of the town nestled between the mountain and the sea. Hamaoka has a long history of green tea cultivation, which occupies the side of the mountains. Near the seaside, farmers have used techniques suitable for the unique nature of the sandy soil; they rely on plastic greenhouses for the production of strawberry and melon. The main source of income prior to the siting of the nuclear power plant was thus

[82] State of economy of Hamaoka in 1967 when the planning of the nuclear power plant became public: population 17361, area 53.91 Km2, 3415 households (from the Statistics Webpage of Omaezaki City Website).

farming (70% of the population produced rice, tea, melon and tobacco) with a large proportion of part-time farmers.[83]

To promote the unique coastal sand agriculture, the town constructed the first sand experiment station in Shizuoka prefecture in 1956. This coincided with the completion of the town hall building in Ikeshinden. In 1958, the town had its first junior high school, which bears the same name as the town. In 1960, the town's Chamber of Commerce was established. In 1962, the town suffered damages totaled to 210 million yen worth due to a powerful typhoon. During the same year, the Hamaoka Agriculture Cooperative was established. In 1964, the town had its first sewage treatment factory installed in addition to a wire broadcasting telephone. Road conditions were improved by the construction of the national highway No.150 Ogasa bypass that passes through the town.

2-2. Hamaoka Nuclear Power Plant: Siting History

It was in the summer of 1967 that Chubu Electric officially chose Hamaoka as the location for a nuclear power plant[84]; they anticipated receiving the approval of the Electric Power Development Coordination Council (EPDCC) by the end of the same year.[85] Besides Shizuoka, Chubu Electric supplied electricity to Mie, Aichi, Gifu, and Nagano Prefecture. However, Shizuoka Prefecture seemed to provide this utility company with the best siting options, especially in terms of feasibility due to the absence of mountainous terrains and the abundance of adequate cooling water in

[83] Interviews 2014.
[84] Construction of reactor no.1 began in 1971, two years before the first Oil Crisis, and the same year the town received a new proposal for expansion. The construction of reactor no. 2 consequently started in 1974. The Hamaoka nuclear power plant did not begin its operation (the first reactor) until 1976. Since then, the town became known outside as the "nuclear town" (in Japanese: *genpatsu no machi*). The scale of the nuclear facility began to expand with the construction of reactor no. 3 in 1983.
[85] See *Sankei* newspaper, 5 July 1967.

contrast to the geographical characteristics of Nagano and Gifu Prefectures. As for Aichi, pollution problems in that prefecture impeded the siting of energy infrastructure and similar industrial projects. As will be explained below, Chubu Electric avoided siting another project in Mie Prefecture after an unsuccessful attempt to site a NPP in Ashihama (Mie Prefecture) that resulted in a long dispute and eventually the abandonment of the project.

Chubu Electric was expecting an electricity supply shortage as its five-year forecast had showed a steady increase in demand from 4,950 megawatts (mw) to 7,849 mw. The utility company was heavily depending on its fossil-fueled plants located Nishi-Nagoya and Atsumi, and was hoping to fill approximately half of the expected shortage in the proposed Ashihama NPP which was delayed and eventually abandoned. Chubu Electric was thus keen to site the nuclear facility in Hamaoka as quickly as possible to fill this shortage gap.

As for the Japanese government, the Ministry of International Trade and Industry (MITI) positively assessed the project because it was supposed to balance the market in the central regions of Chubu and Kansai.[86] On the prefectural level, the government valued the nuclear project highly in terms of achieving three policy priorities listed in the 7th economic development plan (1966).[87] The first priority focused on maintaining high levels of economic growth as Shizuoka, which, unlike the nearby regions of Kanto and Kansai, had low levels of economic growth in the 1950s, and the first half of the 1960s.

In Hamaoka, which did not have an industrial base, the town was indeed facing a depopulation crisis, as it was losing around 300 young people every year to other urban regions that offered higher employment opportunities. As Mr. Yoshimura (70s), the farmer who lives in Hamaoka-cho said

> Locals know that up until the 1950s and beginning of 1960s, the name 'Hamaoka' did not ring a bell when brought up in Shizuoka city or

[86] Power shortage in the central electricity sphere, compromising Chubu, Kansai, and Hokuriku power companies, increased at 26% per annum.

[87] Several articles from Shizuoka newspaper published in the summer of 1967.

Hamamatsu city. This town was certainly some kind of marginalized unknown place to many people.

Indeed, Hamaoka was just another typical depopulated town, with a very weak and negligible tax base that accounted only for 37% of the town finance (Mori 1982, 32-36). 'This town was financially weak,' says Mr. Shimizu (60s), who recently retired from his job at the Omaezaki municipality and who was born in Hamaoka-cho in 1950. 'Before the nuclear power plant, the town did not have street lights and the roads were always in bad condition,' he adds.

The prefecture entered a high growth period only in the mid-1960s, as a result of development and industrialization of the eastern and western regions. In this regard, the nuclear power plant was essential to enhance the economic development. Following MITI's concerns about electricity generaton, the second priority was to increase electricity self-sufficiency in Shizuoka to reduce its reliance on energy plants in Tokyo and Kanagawa.[88] The third priority was to stimulate economic growth in the isolated southern part of Shizuoka to catch up with the eastern and western part of the prefecture. This part comprising Hamaoka, Omaezaki and other towns was labeled by MITI as underdeveloped.[89] Chubu Electric therefore did not face any opposition from the prefectural government, which was eager to accept the nuclear plant that would generate economic development without being concerned about the environmental implications.

Gaining approval for siting the Hamaoka nuclear power plant took less than two years, making the bargaining settlement one of the fastest in the history of nuclear power sitings in Japan (Lesbirel 1998, 18).[90] Political Scientist S. Hayden Lesbirel did an extensive work on the bargaining process for siting nuclear power plants in Japan and showed through multiple case studies why some bargaining processes could take short time for gaining approval while others could be prolonged, forcing the promoters, in some

[88] According to Enerugii keizai kenkyu-jo (1980), self-efficiency was about 85% in Shizuoka prefecture.
[89] Interviews 2014.
[90] In contrast, disputes between developers and fishing cooperatives delayed the construction of the Tomari NPP over thirteen-year before the process was resolved.

situations, to postpone or even abandon the whole project (Lesbirel 1998, 19-20). In bargaining, according to Lesbirel, 'it is important to keep the doors open to negotiation or to open them where they are closed. Bargaining processes and outcomes will be influenced by the extent to which promoters manage effectively distributional issues in the ways that minimize unwanted interference' (ibid, 80).

Lesbirel describes in his account on the siting of Hamaoka how Chubu Electric learnt from lessons of a failed experience at Ashihama in Mie Prefecture. The Ashihama nuclear power plant was announced in 1963 and would have been located on a desolate area overlapping the boundaries of Nanto and Kisei towns in Mie Prefecture. Nanto's town assembly voted against the plan in 1964, while Kisei voted for it. The conflict continued for decades even though Chubu Electric shelved the project temporarily in 1967 and started approaching the Hamaoka community.[91] Chubu Electric realized later that discussing the proposal with local and regional officials has been a mistake as this brought unanticipated opposition from the locals. While Chubu Electric estimated that there would be no ideological opposition to the Ashihama NPP, fierce opposition emerged from fishing groups, local public, and conservative politicians. In particular, well-established fishing cooperatives, which had a long history of protecting fishing grounds from incursions by fishermen from other regions, brought the alliance together and formed the Fishermen's Struggle Committee for Opposing the Construction of Nuclear Power Plant (Lesbirel 1998, 65). Yellowtail was the mainstay of the fishing industry since before the Pacific war but in the late 1950s the catch had been substantially reduced due to high frequency of typhoons that hit the area. Chubu Electric attempted to capitalize on the losses borne by fishermen by offering fishing cooperatives large sums of compensations. However, Chubu Electric underestimated the pearl boom that the region was experiencing since the early 1960s, generating employment and more than 3

[91] In the late 1990s, Ashihama mayor gathered over 800,000 signatures on a petition against the proposal and submitted it to the prefectural governor (*Mainichi Shimbun*, June 1 1996). In February 2000, in response to the Tokaimura nuclear accident, the governor announced the termination of the plan, and Chubu Electric confirmed that it is no longer seeking the construction of the plant in this location (*Ise Shimbun*, 2 February 2000).

billion yen per year. Despite offering compensations, the deal had not been reached as active fishermen eventually derailed the plan for the construction.

In the case of Hamaoka, Chubu Electric, which was recovering from the bitter experience at Ashihama, decided to avoid discussing the proposal with regional officials before approaching behind-the-scenes power brokers. In January 1967, Kato Osaburo, president of Chubu Electric Company indeed discussed the project secretly with Mizuno Shigeru, the president of Fuji TV and an influential businessman in Shizuoka Prefecture. Mizuno was very enthusiastic about the project and discussed the matter with Maruo Kenji, an LDP assemblyman. Mizuno and Maruo were born in Hamaoka and were both interested in the project at the prefectural level. They both were part of an influential network of politicians and businessmen, whose interests and regional loyalties led them to bringing development to southern part of Shizuoka prefecture (Interviews 2014 and Mori 1982, 51-52).

Mizuno and Maruo established connections with Kamogawa Tadaichi, a local and influential figure, to informally explain the importance of the project as an attempt to gain his support. Born in the Sakura hamlet, where the Hamaoka NPP is located, Kamogawa was an influential landowner before the Pacific war and later became the mayor of Hamaoka in 1955 and was the head of the Sakura agricultural cooperative. Being familiar with situation of the agricultural sector, which was facing financial shortages during the 1960s, Kamogawa was very interested in selling the land for the development of the project to fix the financial problems the cooperative was facing at the time. Kamogawa also considered the project a rare opportunity to stimulate the town's local economy, which heavily relied on prefectural and national subsidies, and lacked any viable developmental alternatives (Lesbirel 1998, 82-83).

Mayor Kamogawa advised the utilities officials not to discuss the project with local officials until after local elections scheduled for March 1967 despite the strong market incentive for the nuclear project. His explanation for this unexpected advice was based on the fear that the incumbent mayor at the time, Shinozaki Tadaichi, whose economic policies were not so popular within the LDP circle, would use the siting issue to cause a dispute and gain support from other factions for mayoral re-election. Accordingly, the

discussion of the proposal prior to the election would cause a dispute over the project and simultaneously risk Kamogawa's strategy to have a mayor elected from his own faction. Not wanting to be involved in an intra-party conflict similar to that in Ashihama, the utility officials accepted Kamogawa's advice and decided to postpone the discussion until after the election (ibid).

Indeed, the election strategy went according to Kamogawa's plan, as Kawarazaki Mitsugi, who was born in the Sakura district, and was a friend of Kamogawa and Maruo, was elected as the mayor of Hamaoka (Ibid). Kamogawa believed that the new mayor would support the nuclear project as shown in this statement made by Kawarazaki in 1984:

> Kamogawa called to congratulate me on my election win. He told me of his and Maruo's plan to develop a nuclear project in Hamaoka. I was stunned. They really kept the plan under wraps. I immediately spoke to Maruo, who convinced me that the project would be in the best interests of the town and prefectural economies. Maruo pledged his total support and backing. I was nervous about raising the issue with the electorate at that stage and I knew very little about nuclear power technology. But I had to proceed given the backing be had given in the election (Interview 1984 quoted from Lesbirel 1998, 83).

Lesbirel notes that the way developers approached 'behind-the-scenes power brokers' rather than elected officials had 'important implications for bargaining' for siting NPPs in such local communities (Lesbirel 1998, 84). Such approach avoided the entanglement in intra-political dispute, which could have unanticipated consequences on the future of the project. Soon after the mayoral election, Kawarazaki, along with local officials and politicians, established the Hamaoka Development Investigation Committee, which provided political support and administrative support for the project (*Sankei Shimbun* 19 April 1967).

2-2-1. Facing Regional Opposition

The nuclear project went public for the first time after the project proposal was leaked to the *Sankei Shimbun*, which featured the plan in its front page (July 5, 1967) with an article entitled: 'Chubu Nuclear Power Plant: Hamaoka Town (Shizuoka prefecture) will be in the lead with Generation Capacity of 500.000 KW, three times the amount of Tokaimura Nuclear power plant'. Following the leak of the proposal in the media, town authorities had to open a local briefing to discuss the primary construction plan of the nuclear reactor with local residents. In addition, the mayor presented a progress report to the surrounding municipalities such as Omaezaki and Sagara at the end of the same month. On 23 September of the same year, the town council of Hamaoka decided to enter negotiations with Chubu Electric. The council agreed to accept the construction of the nuclear power plant "if the terms and conditions of compensations are fulfilled" (Mori 1982, 54).

However, two major obstacles emerged throughout the planning: the purchase of land and the emerging opposition from fishing cooperatives, Lefties political parties, and citizen' groups in Hamaoka. They immediately formed an alliance even though it was ideologically diverse and financially weak. The Japan Socialist Party (JSP) and the Japan Communist Party (JCP) were the most vocal against the proposal in Hamaoka and its neighboring towns. Both parties were mainly concerned about safety issues from two perspectives: the first is that Hamaoka area sits on a major fault line where there is a high possibility of a large earthquake, and the second was based on the fact that the area around the proposed site is relatively more densely populated that other areas where nuclear power plants were being proposed at the time (Fukushima and Mihama towns). Indeed, such concerns still echo today among activist involved in the anti-nuclear movement around Japan. During one anti-nuclear demonstration held in the summer of 2012 outside the parliament building in Tokyo, one anti-nuclear activist (70s) who joined rally

from his hometown, Kakegawa in Shizuoka Prefecture, analyses retrospectively,

> [T]he main problem was that people were not familiar with nuclear technology and were uncertain about the risks of living close to a nuclear power plant. In the case of Hamaoka, the plant was always very worrying because any accident would harm large number of people in Shizuoka Prefecture and maybe the people living in Tokyo and Kanagawa because the plant is really close to the capital. This is why we still think that Hamaoka is the most dangerous nuclear power plant in Japan, and a Fukushima-like accident would have far reaching consequences on the country.

Indeed, this uncertainty about the siting of the nuclear facility in Hamaoka was common among local residents, including teachers, local shopkeepers, housewives, and some local farmers. Local residents were caught between the official local narrative, which at the time involved warnings against social and economic risks facing the town, against the narrative of safety presented by the Leftist factions and fishing cooperative.

The fishing industry, too, emerged as a threatening obstacle during the process of negotiation. In particular, the Hainan fishing cooperative, which comprised Omaezaki, Sakai Hirata, Sagara, Jittogata, and Yoshida fishing cooperatives, and operated to the eastern side of Hamaoka, formed the largest association of fishing cooperatives in Shizuoka prefecture. [92] However, not all fishermen uniformly shared the same concerns. Coastal fishermen were concerned about the environmental impact of the project and possible loss in value of their catch that mainly consisted of whitebait and shrimps. In particular, the coastline from Hamaoka to Yoshida had an ideal environment for whitebait. They argued that water released from the nuclear power plant would increase the temperature of the water around the shore. However, the fishing cooperatives had high proportion of deep-sea fishermen and those in

[92] Interviews 2014.

contrast did not worry about the negative impact the plant could have on their catch, mainly tuna.

Feeling that they would lose the most, coastal fishermen protested under the leadership of Hata Toju (born in Sagara Town) of the Sagara fishing cooperative, which mainly relied on whitebait trawling off the Hamaoka. Hata, a communist (member of JCP since 1955) and a fisherman, was ideologically opposed to nuclear power, regarding it as a technology that would help flourish monopoly capitalism. He used his capacity to mobilize fishermen against selling water rights. He believed that the formation of an alliance is the best way to increase strength in the local assembly. Hata aimed at gaining a political position in Sagara town after he had established the Fishing Alliance for Opposing the Development of the Hamaoka NPP. While not all fishermen concurred ideologically with Hata's views, they agreed with him based on safety concerns, sensing that the local assembly in Hamaoka and the utility company were moving forward with the development of the project at the expense of their livelihoods.

However, the alliance was relatively small and did not have a strong support base from Hamaoka town. Moreover, its financial foundation was weak and its membership was geographically dispersed.[93] The economic size of the Hainan cooperative was relatively small, totaling 300 million yen, especially when compared to that of Nanto cooperation in Ashihama, which was experiencing a pearl boom with an annual value at 3,000 million yen. Additionally, the waste released from the project was perceived to affect only coastal fishermen who comprised only 30% of the fishermen' population in the area. The deep-sea fishermen, who used the port as a base for their distant operations, did not see the project as having a negative impact on their industry. Also, they were more interested in obtaining compensations to reduce their debts without having to give up on their property rights.[94]

This rift between coastal and deep-sea fishermen acted to weaken the opposition and failed to change the structure of the bargaining process. Another factor that contributed to this failure was that the fishing industry was

[93] The cooperative employed 30 percent of the regional population compared to the Nanto cooperative in Ashihama, which employed more than 70% of the regional population.
[94] Interviews 2014.

less important to the economy than in Ashihama on the prefectural level. On the other hand, the Hamaoka assembly was dominated by the LDP, with only one seat held by a JCP assemblyman. Leftist activists were mainly from outside the Hamaoka, which did not have a history of labor movements or rural resistance. The opposition movement thus had little impact given its limited access to the decision-making at the local level.

As for the local opposition that emerged from local residents despite the fact that were not yet fully aware of the danger of commercial nuclear power plants,[95] utility and town assembly responded by holding public lectures to assure the safety and benefits of the nuclear energy, while utility officials visited local residents to listen to their concerns.[96] The fact that the environmental concerns throughout Japan in the late 1960s were not as strong as in the following decade played in the advantage of Chubu Electric at the time. Moreover, the utility company arranged free trips for community members — starting from local officials and politicians, and then teachers, housewives, and students — to visit other areas where NPPs are built. In particular, Chubu Electric financed trips to Tokaimura and Mihama as two locations with good safety records and booming local economies. This successfully changed community perceptions about the risk and benefits of nuclear power (Lisberel 1998; interviews 2014). This approach effectively acted to alleviate safety concerns and highlight generous benefits brought by nuclear power. It was also a successful attempt in reducing the influence of the anti-nuclear movement in the area. In an interview (1984, quoted in Lisberel 1998, 90), one local resident who participated in such visits remarked,

> The visits really changed our attitudes about nuclear safety. We talked with many other residents at Tokaimura. They said that if they were not afraid of nuclear power, why should we be. One picture (or in this case, one trip) was really worth more than a thousand words. We also had a great time. We did not pay anything, and whoever was footing the bill

[95] Antinuclear power movement was not significant until 1970s. For more, see Yamazaki Masakatsu. "Nuclear Energy in Postwar Japan and Anti-Nuclear Movements in the 1950s," *Historia scientiarum. Second series: international journal of the History of Science Society of Japan* 19, no. 2 (2009), 132-145.
[96] Interviews 2014.

provided a lot of entertainment. They gave us a lot to drink (sometimes we drank too much), not to mention the feasts they put on and even *omiyage* [souvenirs] they bought for our children.

As the opposition seemed weakened, Chubu Electric began in October 1967 the negotiations with 302 landowners in Hamaoka for land acquisition (1.6 million m^2) and decided to make them an offer in the beginning of 1968. However, this led to a backlash from non-owners of property rights in Sakura hamlet (interviews 2013). Those locals argued that while they would share the same risks of the facility, the project did not offer them any direct benefits, such as compensation payment, or indirect benefits such as guarantees of gaining employment opportunities. Such distributional conflicts were one of the factors that made MITI establish the Three Laws in 1974.

To contain the local sentiment, the town decided to create the Sakura Hamlet Policy Committee on the 11 February 1968. As the chairman of the Committee, Kamogawa proposed that Chubu Electric pays community compensation for infrastructure development and guaranteed employment opportunities for residents in the Sakura hamlet. Chubu Electric accepted the proposal and the two parties signed a formal agreement. Following this arrangement, the officials from the utility company and landowners resumed negotiation over land purchase, with an agreement reached the following year.[97] To reach the agreement, Chubu Electric relied again on influential local representatives such as Kamogawa who exploited the network of local politics at the Hamlet and convinced landowners to sell their lands.[98] In the

[97] Outline of the agreement: 1) Chubu Electric paid 750,000 yen for 10 ares of farmland and added maximum of 1,200,000 yen for farming compensation and cooperation fees (there were three rankings for land purchase). 2) Chubu paid 360,000 yen for 10 ares woodland and added maximum of 3,730,000 yen for forest compensation cooperation fees (there were six rankings for woodland purchase). See Mori, S. *Genpatsu no machi kara: Tokai daijishintaia jo no hamaoka genpatsu* (From a nuclear town: The Hamaoka nuclear power plant located in the Tokai fault). Tokyo: Hatatashoten (1982), 65-67.

[98] Part-time farmers made the largest portion of landowners. They were willing to sell at relatively low prices as their lands were not productive. Full-time farmers, who made a small portion, did not want to release their property rights, while others attempted to delay the negotiation to bargain for higher payments. These differences among landowners weakened their collective bargaining position, and allowed powerbrokers to stress the social decision-making rules of the hamlet after isolating the majority of landowners.

end, Chubu Electric paid a total of 1.6 billion yen for land compensation.[99] 302 landowners received large sum of money ranging from 10 to 70 million yen.[100] Chubu Electric exploited this new hierarchical network of local politics in the community to obtain acceptance of the nuclear facility and, over the years, of its expansion.

After the land purchase, Chubu Electric turned its eyes to the fishing cooperatives, which formed an alliance with the regional leftist factions. Concerned about possible reactions about nuclear risks from the local communities, the utility company wanted to reach an agreement with local fishermen while avoiding any unrest from Leftist factions. Through 'backdoor political channels,' Chubu Electric decided to rely on the LDP branch of the Shizuoka Prefecture, which established Special Nuclear Energy Committee in December 1968 (Lisberel 1998, 93). While the public agenda of the committee was concerned with nuclear safety issues, its secret aim was to break the 'nexus between the Fishing Alliance and the Leftist anti-nuclear movement' (Ibid.). To gain local support, the committee promised to conduct independent studies on nuclear safety issues. In particular, Chubu Electric worried that fishermen in Omaezaki town would oppose the project, and eventually not allowing the utility to use Omaezaki port, which was essential for the plant construction and fuel loading.

Moreover, Yanagihara Seiji, an LDP prefectural politician who was also a member of the nuclear committee, approached Kawasguchi Yuzo, head of the Omaezaki fishing cooperative, and Haraguchi Inaichi, head of Jittogata fishing cooperative to remove Hata from the leadership of the Hainan fishing cooperative. This attempt to change the attitude within the fishing alliance was successful due to the membership of these two fishing cooperatives, which mainly comprised of deep-sea fishermen. The turn of events played out in the fishing cooperative elections of April 1969, when the increasingly isolated Hata was defeated and replaced by Onada Shozakum a cousin of Kawaguchi. Eventually, an assessment conducted in collaboration with Tokai University was sufficient to convince the head of the Omaezaki

[99] The average purchase price per one tsubo (3.3 m2) was remarkably high: about 3000 yen (1000 yen was the average price for land compensation paid by TEPCO and Kansai Electric Power at that time). Ibid.
[100] Ibid.

fishing cooperative and more than half of fishermen to accept the compensation offered by Chubu Electric.[101] The electric power company along with influential local representatives capitalized on the weak position of fishermen and managed to change their stance by mitigating the risks and paying compensations (600 million yen) for fishing rights.[102]

This is how the construction of nuclear power plant was approved. Chubu Electric relied on a network of influential politicians and businessmen from the region to facilitate the negotiation with the Hamaoka community. By managing opposition effectively, Chubu Electric could reach a settlement and gain the permission for construction. Operators successfully downplayed the nuclear risk and capitalized on the economic vulnerability of the local community. Fishing cooperatives formed a coalition with Leftist political interests. Regional power brokers interfered and managed to split the alliance by isolating the ideological interference. In the end, they could negotiate a settlement with little compensation. While resistance was weaker than other cases (Ashihama, Tomari), there would have been a possibility of another abandonment if Chubu Electric had not learnt the lessons from its past experience at Ashihama.

In retrospect, the siting of the Hamaoka NPP was indeed a major local event in the history of the Hamaoka area. While the majority of the residents were excluded from the decision-making process of the siting, one should remember that the emergence of the Sakura district in Hamaoka-cho in 1967 as the targeted site for the construction of the Hamaoka NPP was framed for local residents in terms of a set of risks such as continuing depopulation and loss of local identify, against the abstract and invisible nuclear risk. In other words, from the local perspective, the nuclear facility was then seen as a new and unfamiliar technology that deserved justification or explanation: it had to be weighed up in a framework for its acceptance or rejection. One can argue, however, that this significance of the nuclear facility has been downplayed in the context of the everyday life of the ordinary citizen due to the long-

[101] See MINOTANI Kazunari, The Formation and Change of Consciousness and Reception of Information Pertaining to the Atomic Plant: With Special Reference to the Sample Survey Conducted in Hamaoka-cho, Shizuoka Prefecture [in Japanese].
[102] Mori 1982, 75-79.

established presence of the Hamaoka NPP and the industrialization of the area. How did this (in)significance of the Hamaoka NPP was constructed and understood among local residents before and after the Fukushima nuclear disaster. I will discuss this question in the following chapter.

CHAPTER 3

The (in)significance of the NPP in Everyday Life

The aim of this chapter is to demonstrate the various ways by which Omaezaki residents make sense of their being in close proximity to the Hamaoka NPP, over which they have very little control. This suggests a deceptively simple fact about the residents' life: all calculation of risks would have to be done on the premise that they stay in the community. To many residents, changing their residence could be as nearly disruptive as the breakdown of NPP in their current residence. Using informants' accounts, I will show how the Hamaoka NPP was perceived among local residents in their everyday life before and after the Fukushima nuclear disaster. While analyzing the factors that affect residents' view of the NPP as significant/insignificant, this chapter will point out the strategies employed by some informants to normalize the presence of NPP when it intersects with their own biographies and subsequently influences the conduct of their everyday life.

1. Theoretical Line

Scholars of geography and environmental sociology have taken an interest in notions of proximity, space, and place to analyze people's understandings of socio-technical risk. Burgess et al. (1988), for example, see 'place and space' as being shaped by particular social, geographical, and political factors, which also involve local context and values, while Irwin et al note that risk technologies (such as NPPs) are 'differentially constructed and consumed' within economic, political, social, historical and geographical

contexts (2001, 3). It is therefore important to take such factors into consideration for understanding how people construct and perceive their experiences of living in a close proximity to socio-technical hazards (Irwin et al. 1996; Bickerstaff 2004; Boholm and Löfstedt 2004). One should pay especially close attention to the way the 'risk object', such as a NPP, is framed, constructed, and interpreted within the context of everyday lives and social context (Pidgeon et al. 2006; Henwood et al. 2008). Indeed, the notion that risk is socially constructed is pertinent to this thesis.[103] In this chapter, while showing whether and when local residents view the Hamaoka NPP as significant in their everyday life, I will describe how informants interpret not only the nuclear power plant but the social world that shape such interpretations.

There has been a vast amount of literature that expensively explores the complexities of understating local communities' attitudes towards local industrial facilities (including nuclear and non-nuclear techno-hazards). Some studies, for example, have shown that people may think that their area is being stigmatized by the presence of such facilities (Bush et al. 2001; Flynn et al. 2001). Other studies have referred to the so-called 'halo effect', when local residents deny the uniqueness of living close to such facilities (Bickerstaff and Walker, 2001). In particular, local residents reject any negative associations with their lives being close to such an industrial development. In this regard, Baxter and Lee (2004) show how local residents, living close to a hazardous waste facility at Swan Hills (Alberta, Canada), may 'opt to view outsiders' negative views of the facility and the town as a threat [rather] than […] view the facility itself as a threat' (Baxter and Lee 2004, 725). The emergence of the 'halo effect' can therefore be a result of suppressing the threat to avoid stigmatization. Regardless of outsiders' views, however, one should point out that from the perspective of local people, living close to such a facility can be just ordinary and part of the everyday life experience. In other words,

[103] Our understandings of environmental threats (radiation, air pollution, and climate change) can only be seen as socially constructed even though such threats have real effects on both people and ecosystems. This includes experts' understandings of risk, which involve degrees of 'personal judgment'. See Pidgeon, N., Hood, C., Jones, D., Turner, B. and Gibson, R., 1992. *Risk: analysis, perception and management*: report of a *Royal Society Study Group*. The Royal Society, London, pp.89-134.

depending on what degree the threat is perceived, such perception rarely affects the conduct of daily life at the local level.

When it comes to the nuclear power development in Japan, the surrounding regions of host communities, which comprise the majority of the Japanese population, have rarely voiced their concerns or expressed objections towards such facilities prior to the Fukushima nuclear disaster. Although there are differences in costs and risks between the host communities and those living further away, the greatest majority of Japanese citizens hardly question the nuclear technology as it rarely comes down as a remarkable issue in the context of daily life. This is, to some extent, equally true in the case of host communities living in close proximity to a nuclear facility, where citizens have been residing normally in the shadow of such facilities for a long period of time. In Hamaoka, although the local community has gained benefits from accepting to host the nuclear facility, for example in increased employment opportunities and in the provision of services and subsidies (as will be analyzed in the following chapter), much of the local residents have seen little direct benefits. As one informant, Ms. Yamamoto (50s), who runs a business hotel with her son in Hamaoka-cho, says, 'We never really thought about it [Hamaoka NPP] in the past.' Another informant, Mr. Igarashi (50s), who runs a surfing hostel in Omaezaki-cho notes that,

> there is no point worrying about it [Hamaoka NPP] as I have lived most of my life in the area. It just came as a surprise to know after the suspension [of the Hamaoka NPP] that our municipality is quite dependent on nuclear subsidies.

The above-mentioned accounts contradict the commonly held hypothesis that community support solely stems from the perceived economic benefits (Blowers and Leroy 1994; Williams et al. 1999; Aldrich 2008). Indeed, as will be shown later, such effects are not always strongly felt, with local residents having lived normally in the shadow of the nuclear facility regardless of any existing economic benefits at the individual level. While it is important to examine the impact of economic benefits on the attitudes of residents towards the nuclear industry, such factors do not necessarily constitute a

convincing explanation on why the majority of residents seem to have been unconcerned about the existing nuclear infrastructure, especially up until the Fukushima nuclear disaster.

Nevertheless, Beck's 'Risk Society' theory (1992) suggests that both institutions and individuals are increasingly preoccupied with risks as part of everyday life, due to the process of reflexive modernization associated with the transition from industrial society to a 'risk society'. Risks are no more limited to socio-economic and national boundaries, with Beck stating that 'poverty is hierarchic, smog is democratic' (Beck 1992, 36). Due to globalization trends, risks are both local and global, and have become increasingly difficult to locate and calculate. Beck further claims that individuals are no longer ignorant of risks, as they are constantly pursuing information as a strategic attempt to avoid risk.

While Beck explicitly focuses on the process of individualization, there are two points missing in such an argument: the first is directly related to risk objects such as the nuclear technology, while the second encompasses all sorts of risks including the nuclear one. The latter is that Beck's argument generally lacks solid evidence grounded in an empirical everyday lived experience (Tulloch and Lupton 2003). The way individuals perceive risks and construct their understanding of a techno-hazard (such as an NPP) cannot therefore be separated from their own values and local conditions. The former point is the assumption that individuals are necessarily preoccupied with the nuclear risk. Such arguments leave us with the impression that individuals (in this case Omaezaki residents) are constantly paying attention to the nuclear risk and that such risk is actually being weighed up and integrated in a sort of cost-benefit framework. But can the nuclear risk be positioned as a central concept in an everyday context? In this thesis, I argue that the nuclear risk, at least until the Fukushima nuclear disaster, has not been really significant and thus did not play a major role in the context of daily life.

While Lupton and Tulloch (2003) discussed the everyday construction of the idea of risk, conceptualized through 'risk taking', the literature that is based on the everyday experience of being designated as 'at risk' due to place or location in the context of NPPs around Japan is scarce, especially in English. While place's definition is often based on the drawing of

particular geographical boundaries (Massey, 1994), a place can have different meanings for different people. Further, Pred refers to 'sense of place' as the 'felt sense of the quality of life at a particular place and time' (1983, 58). It is furthermore shaped by the 'the resonance of a specific location that is known and familiar, replete with human histories and memories' (Lippard 1997, 7). While Pred theorizes the place in terms of community experience, he acknowledges that the sense of the place is not always the same among people living in a specific location (Pred 1983). Therefore, 'differences in daily practices and experience, biography and place-specific social relationships will all affect an individual's sense of place' (Simmons and Walker 2004, 95).

Following the Fukushima nuclear disaster, both the central government and the media associated the risk of a major earthquake and a subsequent nuclear disaster with the place, in this case Omaezaki area, where the Hamaoka NPP is located. While this perspective emphasizes the relationship between the risk of the disaster and the place, it fails to integrate the rather more important local perspective, which is shaped by the mundane conduct of the everyday lives. Indeed, for the Hamaoka residents, nuclear risk is not the defining element of their surroundings. It is rather contextualized within their area's history, choices (or lack thereof) and experiences of an area.

This research takes the position of a sociological approach that pays more attention to the importance of local context and meaning in understanding how people view a techno-hazard facility such as a nuclear facility. In this way, risk is understood as a constructed 'quality or potentiality of an object or situation and as one frame among many through which that object or situation might be perceived and understood' (Henwood et al., 2008, p. 424). In other words, risk perceptions are dependent upon social factors and processes, and those who experience them. Risk is therefore not the quantitative data typically and professionally provided by the experts, but the perception shaped by the everyday local reality. Using sociological approaches to better understand risk perception can be a useful nuclear risk communication strategy at the local level, rather than relying on quantitative methods that usually generate polarized pro-/anti- nuclear frameworks.

However, one cannot assume that the nuclear risk is always part of the everyday life. During the research, I realized that an attitude of reflexivity towards certain key concepts, such as how risk is used to shape my understating of people's experience, is necessary to avoid drawing premature conclusions and false assumptions based on informants' accounts. Omaezaki residents who participated in this study provided insights into the experience of living in the Hamaoka area, which is deemed by the government and the media as being 'at risk'. Yet, some accounts did not necessarily incorporate nuclear risk at all into their everyday decision-making (especially prior to the Fukushima nuclear disaster), and where they did so, it was often marginal to other concerns.

2. Long History of Low Concern

As has been shown in the previous chapter, METI officials and electric utility companies have, for over half a century, emphasized the importance of nuclear power for its role in alleviating security challenges of energy supply and fossil fuel price volatility. More recently, despite concerns over waste disposal and accidents, the threats posed by climate change have encouraged the government to actively pursue the utilization of this source of energy. This political-economic support has drawn an image of the nuclear technology as 'insignificant'; it led to the acceptance of the nuclear power among the general public and host communities.

One could argue that the public mood has increasingly become hostile towards nuclear technology due to a series of serious nuclear accidents that called into question the knowledge and experience of government nuclear experts and regulators. Since the early 1990s, various polls have shown that the Japanese public started expressing strong doubts about nuclear energy in response to multiple accidents, each worse than the previous. Yet, until the Fukushima nuclear disaster, nuclear-related issues have rarely constituted serious concerns in the daily life of the general public. Indeed, this 'insignificance' of nuclear power in the context of everyday life is evident in the lack of action on the public side to provoke a reverse course on a nuclear

energy policy that is viewed by the so-called nuclear village as vital to Japan's national security.

This is not to say that the government and electric utility companies had no say in shaping the public's views towards nuclear energy. On the contrary, the political construction of pro-nuclear discourse has strengthened the perception of nuclear power as insignificant in the everyday life of the greatest majority of citizens. Through the employment of various tools presented in the previous chapter, the so-called 'nuclear village' persistently argued to convince the citizens that it is in the public interest that nuclear facilities should have a role to play in the country's energy mix alongside other resources; that it would be in the public interest to allow electric power companies to add and operate new reactors to existing facilities; and that the government should take a proactive approach to the construction of new NPPs.

Despite the occurrence of minor and major accidents at the domestic and international levels respectively, nuclear power has therefore always been on the policy agenda in Japan and the government has downplayed any *significant* aspect of constructing, expanding, and operating NPPs around the country. When asked about his views on nuclear power following the Chernobyl nuclear disaster, Mr. Iwata (70s), a retired teacher who has been living in Hamaoka for the most of his life, says,

> I remember being told that the Russians were not up to the task and that our Japanese scientists and engineers are by far better in dealing with this technology.

Another informant, Mr. Tanaka (60s), who runs a hostel in Hamaoka, remembers how his concern about one accident was countered by assurance from the government.

> We started getting worried about [the Hamaoka NPP] after what happened in Tokaimura and wondered if we would experience a similar accident. But the government said at the time that it was very

unlikely and that the Hamaoka NPP is safe and no such accident would ever happen here.

The way the so-called 'nuclear village' downplayed any rising concern toward the nuclear program has played an important role in shaping both public and local views on any existing and/or future nuclear reactor as *insignificant*. It is important to point out that it is *only* in the context of *daily life* that the greatest majority of Japanese citizens characterized the construction and operation of NPPs around Japan as insignificant. In other words, regardless of the occurrence of multiple nuclear accidents in the past, an ordinary citizen does not merely brace him/herself for such disruption. People' time is consumed by various daily concerns and life conditions.

Opinion polls, the only readily available tool to allow an understanding of the public's view on nuclear power, and which does not take into consideration the *context of everyday life*, show public support towards nuclear power despite serious accidents and mishaps at the domestic and international levels. One would imagine that accidents such as the Three Mile Island in March 1979, the more severe one in Chernobyl in April 1986, and the one in Tokaimura in 1999 would leave a significant impact on Japanese attitudes to nuclear power. However, public support remained steady. In 2000, when Japan was having the second largest fleet of active NPPs in the world, more that 61% of the respondents did not mind keeping existing plants in operation.[104]

How do local residents who live in a close proximity to the Hamaoka NPP have come to view the facility in the context of their daily life? Were they concerned about the plant prior to the Fukushima accident? If so, what past events have triggered them to be concerned? As will be shown below, the Hamaoka case is an example of a nuclear host community with seemingly pervasive low concern towards the nuclear facility. Similar to the greatest majority of Japanese citizens, the majority of informants viewed the nuclear facility as *insignificant* at least until the Fukushima nuclear disaster and the

[104] See Kotler, M. L., and Ian T. Hillman. "Japanese Energy Security and Changing Global Energy Markets: An Analysis of Northeast Asian Energy Cooperation and Japan's Evolving Leadership Role in the Region." *The Baker Institute Energy Forum.* Rice University, Houston, TX, US. 2000.

subsequent suspension of the Hamaoka NPP. Moreover, past nuclear accidents around and outside Japan failed to generate a sufficiently great concern to consume their daily life, or to leave any significant impact on it.

Indeed, when I started the fieldwork in Omaezaki, I was expecting my informants to be or act as highly concerned about the facility. In fact, I saw people pursuing a normal lifestyle: going to work, enjoying their meals, surfing, playing with children in the park. For the researcher and the outsider I am, this normal life seemed surprising when juxtaposed to the presence of the Hamaoka NPP. The truth is, in context of the daily life, residents are not worried about how to deal with the nuclear facility or how threatening nuclear reactors can be. Young people wonder, 'where am I in my career?' while farmers think 'am I going to have a good harvest this year?' and parents worry 'is my daughter going to pass the university's entrance exams?' or 'is my son going to get married this year?'.

2.1 Factors Influencing Perception of the Hamaoka NPP

The following section describes the factors respondents discussed as influencing their views on the nuclear facility in Omaezaki. In contrast to the assumption that nuclear power is always seen as a dreadful technology (Slovic 1987), findings show that the majority of residents did not think of the NPP as significant in their daily life. There are several factors that can be identified from the accounts that articulate the nuclear facility as normal.

Familiarity and Local Knowledge

Familiarity is one important factor allowing residents to conduct a normal life in the shadow of the nuclear facility. Getting used to the facility over a long period of time as well as claiming to know more than outsiders are some of the characteristics that emerged during the research. For example, Ms. Ozawa (40s), a housewife, was born in 1977, one year after the Hamaoka

NPP began its operation. She was raised in Hamaoka-cho and still lives there with her husband and two children. She says,

> The thing is I grew up here and the plant has always been around. I really don't remember ever questioning what goes on there until Fukushima.

Ms. Ozawa's familiarity is generated by 'growing up' with the plant. It was something that had always been there and has been physically part of her everyday life. With the lack of mediatized local accidents and an increased familiarity over a long period of time, she did not see the facility as having any impact, positive or negative, on her everyday experience of living in the area. Takuya (20s), a surfer who was born and has been living in Omaezaki-cho all his life, never felt uneasy about the nuclear facility either:

> I don't remember having any worrying thoughts about it [the plant], maybe because I have been seeing it from the sea while surfing since I was 15.

Indeed, the view of the NPP as an ordinary feature is apparent in the informants' familiarity with the Hamaoka NPP over the course of their lives in the area as well as the long-established presence of the Hamaoka NPP. For example, middle aged and elderly informants have lived with the nuclear facility for more than four decades. They have not necessarily made the choice to live in the Hamaoka area, but they naturally have strong attachment to the place they call home. The presence of the nuclear facility is therefore not a noteworthy aspect of the quotidian life as they have seen or passed by the plant frequently and noticed its expansion over the years without feeling personally threatened by its operation. Mr. Nagasawa (70s), a farmer who lives and works on his land in Hamaoka-cho, says,

> It's been around for decades now so you just get used to it over time and never care about it.

Another informant, Ms. Sugiyama (40s), a district nurse and single mother who works and lives in Omaezaki-cho, adds that she 'never really paid attention to or felt worried about the plant until seeing what happened in Fukushima.' Such accounts show that, unless there is a mediated accident, the nuclear risk is often not necessarily integrated into the context of everyday life. To the greatest majority of Omaezaki residents, this seems to have been the case prior to the Fukushima nuclear disaster. While most informants acknowledge the presence of the NPP, they did not see it as an aspect worth worrying about. Until the Fukushima nuclear disaster and the subsequent suspension of the Hamaoka NPP, the possibility of nuclear failure was, in their mind, negligible. Mr. Tanaka (60s), who runs a hostel in Hamaoka-cho, says:

> You get used to the plant being there and never notice anything until something happens and you start focusing and worrying a little bit about it. We would hear about a minor accident in Niigata or Tokai and wonder if Hamaoka will experience a similar accident… But they were simply fleeting thoughts.

While most informants do not have direct contact with the facility, many seem to have some knowledge about the plant. In other words, knowing somebody who is more directly knowledgeable is all that is needed to be reassured. The account of Mr. Horikawa (60s), who runs a small restaurant in Hamaoka-cho and whose cousin once worked at the Hamaoka NPP, shows that knowledge is socially constructed and can be obtained through networks of family members, friends, and neighbors.

> I somewhat understand what happen inside the plant even though I never stepped a foot inside the facility. I know that Chuden spent a lot of money to make sure that the operation is done properly, and I know from people that have worked there, including my cousin, that safety is the top priority there.

Indeed, having a family member, a friend, a neighbor or just an acquaintance who works at the station is sufficient to feel that the facility is

safe and not worth worrying about it. This also provides a sense of knowledge on the general operation of the nuclear facility, the belief that it is safe, and generates trust:

> I have never been inside the plant but I know a couple of people who work as technicians there. One is my friend's friend whom I hang out with a couple of times in a bar where surfers go. (Miki, 30s, surfer)

Fleeting Concerns

Moreover, older informants indicate that because of their advanced age they have no worry about the Hamaoka NPP. Mr. Yoshimura (70s), a farmer who lives in Hamaoka-cho, says that he is not worried about his life in case of an accident, but he indicates that he would still be concerned about the nuclear facility because any serious accident with radiation fallout would impair the ability of his children or grandchildren to use his land.

> It is really important to take care of the land if you want to pass it over to the next generation. Everyone including myself assumed [the plant] was safe in the past. It is not that we have witnessed any accident [in Hamaoka] but the events of Fukushima made me concerned about a similar accident and that it would entail my livelihood.

Indeed, farmers, such as Mr. Yoshimura who understandably cares about his land, tend to be relatively more cautious of such infrastructures. Omaezaki farmers who inherited land from their parents or are planning to pass on their land to their children thus show special care for the land and worry about infrastructures (such as NPP) that would have grave environmental consequences.

Mr. Iwata is another resident who expresses his concern about the impact of the plant on the future generation. He is a former high school teacher (76) who lives 2.5 km from the plant. When asked about how he

received the news of Fukushima in 2011, he says that ‘people around me were totally shocked when the Fukushima disaster took place. We’ve always been told that nuclear power is safe.’ He admits that he himself, despite his awareness of the danger a NPP poses, was taken aback with the triple disaster of 3.11. ‘The whole thing in Fukushima came as a shock even for someone like me who felt skeptical about nuclear power to begin with. It is almost unbelievable when you realize that it could have happened in Hamaoka.’ Mr. Iwata refers to the proximity of the plant, describing its dangerous presence on the local community:

> Now that I am old I don’t really care about myself. My greatest worry is related to my family and especially my grandchildren who live with me in the same house and go to the primary school around here. Their school is located less than 1.5 km from the plant so you can imagine how dangerous it would be in the event of an accident.

Mr. Iwata mentioned that he started getting worried about the NPP way before the tragic events of Fukushima. He readily tells me that he has always been opposed to the plant and signed anti-nuclear petitions since the Kobe earthquake:

> I did not pay attention to the plant until the Kobe earthquake in 1995. Chuden was proposing adding a fifth reactor [completed in 2000] and I did not like how the plant was just expanding in the area without any limit in the horizon. You have seen the huge seawall, right? It used to be pleasant to look into the ocean while passing the area or looking inwardly towards the town from the beach area, but all you see now is concrete and nuclear reactors.

While this comment on how the Hamaoka NPP has expanded from a facility with one reactor to five ones indicates the significance of the immediate physical proximity on risk perception, and a feeling of encroachment to the local environment, the majority of informants did not share this kind of view on the plant’s impact on the place. In contrast to the

previous view, one informant said that the size of the land that Chubu Electric acquired in the past has not changed in size, and that only the scale of the plant within the area has changed. Another informant expressed his appreciation that Chubu Electric has built a large sea embankment as a preventive measure that would minimize the risk of a potential tsunami:

> I think the seawall is very convenient for the community whether the plant is restarted or not. (Mr. Tanaka, 63, hostel owner)

Another form of reasoning came from one construction worker (20s) I briefly talked to during one round of fieldwork, who did not seem to see a difference between the nuclear risk and other risks involved in his daily job:

> I take risks everyday so why shall I be worried about it [the Hamaoka NPP]? I think we should worry only when there is an accident.

When asked if he distinguishes between what he knows about the NPP and what he worries about, he tells me

There are certainly a lot of things I worry about more than a nuclear accident.

Similar to this account, the majority of participants in this research recognize the presence of the NPP but argue that up until the Fukushima nuclear disaster the nuclear facility did not pose a major source of concern, with some saying that life is full of risks. Takuya (20s), the surfer who lives in Omaezaki-cho, argues that 'one cannot worry about something that is beyond one's control.'

Tradeoff

Even those who seemed to be worried about the NPP talked about what could be called a tradeoff, arguing that they decided to stay in the area because it offered convenient amenities. In other words, any concern about

the NPP was counterbalanced by other aspects of their lives such as the need to find a job, enter the housing market, or the convenience of the location, or simply that life is full of concerns and in this context, the NPP does not represent a risk accompanied by high levels of worry. This view is illustrated by Miki (30s), a surfer and café operator, who moved to the area 10 years ago from Atami and has been living and working with her boyfriend in Omaezaki-cho:

> I don't remember thinking about it [Hamaoka NPP]. I knew about it but it did not really influence my decision to move to the area. I just felt like I have made the decision to move here and that there is no point worrying about it.

Such accounts show that living in a certain locality, such as Hamaoka, always produces meaning, which is shaped by the place. This is not only related to the physical characteristics of a specific locality for economic and social activities, but also to the socially constructed meaning it has for an individual, and to shared values (Rose 1995). It is important to note that meanings are not merely a product of a specific locality, but are rather constructed by the individuals and shaped by the social context surrounding individuals (Eyles 1985). At the local level, attachment to one's place is rooted within multidimensional relations that shape the everyday experience. Participants talked about many aspects as important in the choice they made to continue living in the area. From their perspective, the meanings attached to the place coexist with and, up until the Fukushima nuclear disaster, overwhelmingly counterbalance any rising concern about the nuclear facility. Indeed, rather than the physical characterization of the area as 'at risk' by the experts, informants perceive and value their connection to the area beyond the physical aspect or in terms of the presence of the nuclear facility.

Economic Sustainability

Economic development is another factor that influences perceptions of their locality among Omaezaki residents. Perceived economic and social benefits of a nuclear facility are significant in shaping the attitudes of local residents of a host community, as will be analyzed in the following chapters. When there is high awareness of the contribution made by a nuclear facility to the local economy, host communities tend to ignore the nuclear risk. During conversations with informants, many of them indicate the positive impact of the NPP on the area in general. For example:

> I cannot deny that the [nuclear power] plant has been beneficial to the area. It provides jobs and generates taxes for the municipality. I heard that Chuden is the biggest provider in this area. (Mrs. Watanabe, 50s, a cafe owner in Hamaoka-cho)

> The facility is good for our community because Chubu Electric provides employment and income. Shops like mine rely on their industry too. They are the biggest employer in the area. I think many people, including myself, will be negatively affected if the facility was permanently shut down. (Mr. Horikawa, 50s, a restaurant operator in Hamaoka-cho)

Mrs. Watanabe and Mr. Horikawa emphasize the significance of the Hamaoka NPP in economic terms. The plant for them is mainly a source of livelihood. Not all informants, however, explain their positive view of the plant in the same way. For example, one informant view the plant positively as a source of local identity:

> While I do not get any profit from the plant, I have not considered it as dangerous or harmful to the local area before the Fukushima disaster. On the contrary, this area is in good conditions thanks to the local [nuclear] plant. You only notice the difference when you visit another

rural area where such industry doesn't exist. (Mr. Igarashi, 50s, surfer and hostel operator in Omaezaki-cho)

A real estate agent discussed the benefits of living in Omaezaki and how the amenity of the area counteracted any concerns about the Hamaoka NPP.

> Until last year [2011] the majority of our clients did not think much of the plant or anything like that when they rent or buy a house in the area. Of course, they know that there is a nuclear facility but it does not really come into consideration. Actually, people used to think of the area as having potential and thus were incented to invest due to the presence of the plant and the economic activities it creates.

For others, the NPP is one of the many features that accompanied the growing industrialization of the surrounding landscape. In this sense, the NPP can be perceived as contributing to lowering the quality of the everyday life, and thus having a negative impact on the sense of place, but it appears more as a symbol of change rather than a problem in itself.

> Hamaoka is where I grew up and lived all my life. I have always loved this place and have fond memories of it. It makes me sad to see how rural life has changed over the years. I understand it is convenient if you are not a farmer but I never wanted our town to host a NPP in the first place. The area has fundamentally changed and everything is done in accommodation to this industry… Actually, a lot of things changed. People changed too and we [farmers] have become a minority in this area. (Mr. Yoshimura, 70s, farmer)

Mr. Yoshimura's account reflects the hardships experienced by farmers over the last decades in the Hamaoka area, where farming has been dwindling as everywhere else in the post-industrial world. The nuclear facility represents a modern and convenient technology that led to the transformation of the area beyond recognition, as we have seen in the previous chapter.

Corresponding to this account is Mr. and Mrs. Kato's, who are both in their late 70s. They work together in their ramen shop, which they opened in 1985 in Omaezaki-cho. The place is obviously well-loved with more than 10 pictures hanging on one wall. There is one black and white picture of Mr. Kato and his parents wearing kimono. 'This was taken during the summer festival in the beginning of the 60s,' Mr. Kato says. He still remembers how hard life was as a child in the small fishing village Omaezaki used to be. He adds:

> My father used a small boat to catch *shirasu* [whitebait], which he carried on his back to the market. There were no roads at the time. Villagers had to walk through narrow unpaved paths in straw sandals. This of course, all changed after the nuclear power plant was introduced in the town.

There is a picture of the old couple taken in front of the famous Sensoji shrine in Asakusa, Tokyo. 'That was during our honeymoon,' says the wife and she adds while smiling that 'visiting Tokyo was like a dream for many here.' There is another picture taken during a baseball game of the couple and their daughter, who recently moved with her family to the Kansai area. In an interview in early 2012, Mrs. Kato comments:

> It was a very sad moment when my daughter and her husband decided to move out from Omaezaki, after the good job offer my son-in-law received from a construction company in Osaka. It was particularly sad to be separated from my two grandsons. Today, however, watching on TV what happened to the families affected by the Fukushima disaster, we both feel relieved to have our two grandsons away in Osaka rather than here where the Hamaoka nuclear power station is very close.

The 3.11 disaster significantly increased their perception of the nuclear facility and the possibility of a major disaster in the area. Mrs. Kato adds,

> We realized we live in a dangerous place after the Tohoku disaster. Will we ever experience a similar disaster here? Probably it is too late

to say this but maybe this plant should not have been built around this area.

Mr. Kato agrees with his wife and says that ‘it is impossible to imagine what would happen to this place if a similar disaster hits the area.’ Less than a year after the Fukushima disaster, the old couple did not want to take the risk of having their grandsons around Omaezaki and prefer to go visit them in Kansai. Interestingly, this has changed the following year when the daughter with her two sons visited during the summer of 2013. When asked if she is worried, the daughter says,

> My parents have been here almost all their life and I have been born here so it is normal to be back. My parents built this house and all the family was born in this place.

Indeed, one cannot just break up with his/her social and historical ties because of a probable nuclear risk. Like the Kato couple, many elderly have strong ties to their houses as well as the area. The Kato couple does not try so much to articulate the situation in economic or political terms, but mainly shares their emotions towards the beloved members of their family. They are especially willing to talk about their memories of the past, presenting their life before the power plant as very hard and inconvenient, doing so with some nostalgia.

Regardless of the nuclear facilities, residents make their choices within the context of more mundane but still important everyday considerations: social and historical attachments to the place they call home, the cost of living, social reality, and the convenience for pursuing a normal life. Those who moved recently into the area may have limited choices – economic and social conditions wise – and they made their decision irrespective of how they see the presence of the nuclear facility.

Findings show that informants, especially those who had grown up and lived much of their lives in Omaezaki, view the NPP as normal in their everyday life. To them, the nuclear infrastructure is ‘familiar’ and as ‘part of

the area' and not going to have a huge impact on the everyday life. One informant says,

> I've grown up with the plant being around the corner, and my uncle used to work there for a while. It is not something that is unusual here. It is just something that has been there and I never noticed this plant differently until last year [2011].

This is one of the explanations behind the indifference to the NPP in the past, and to some extend the support for a nuclear restart despite the Fukushima nuclear disaster. Indeed, the acceptance of the nuclear restart can be partially due to the local view of the NPP as normal and familiar aspect. The findings are congruent with existing studies (Venables et al., 2012) that showed that attitudes to proposed new nuclear power facilities in the United Kingdom were dependent on the extent to which the existing plant in the area was perceived to contribute symbolically towards the place of local communities. In other words, locals tend to be more accepting of a new proposed reactor when they see existing plant as a familiar aspect of the place.

3. The Focus on Stigma After 3.11

In the wake of the Fukushima nuclear disaster, the suspension of the Hamaoka NPP and the sustained media coverage of the area as 'at risk', Omaezaki residents suddenly found themselves faced with the nuclear facility as an overwhelming presence. Almost all informants claimed that the area has been 'marked' by the NPP since 3.11, which was seen as having a negative impact on the quality of life in a number of different ways. Interestingly, most important to the residents along with the worry induced by the possibility of a major accident were what they saw as harmful rumors being propagated about their area. For local residents, one major way in which the NPP made its presence felt after Fukushima was thus not so much through the direct risk is represented but through the negative associations with nuclear power the outsiders brought upon the community.

In addition to the risk of radiation release in the wake of a major accident, nuclear facilities may indeed have other negative impacts on the residents' relationships to the local space. Risk research has shown that the existence and operation of NPPs often causes the stigmatization of the place (Gregory et al. 1995). A place can therefore be 'marked' by the presence of a certain technological infrastructure or a technological-related event. Indeed, when a NPP is proposed in a certain community, it might lead to imposing stigmatizing effects on the locality and the host community (Slovic et al. 2001). Localities hosting a nuclear facility can be regarded as 'contaminated' even in the absence of major accidents or reported incidents of radiation release. For local residents living there, stigmatization does not only have economic, but also social and psychological consequences.

When people identify themselves strongly with a certain place where a technological risk exists, they may distance themselves from such risks associated with a NPP in order to avoid the social stigma. Risk research on technological stigma is based on how Erving Goffman defines stigma in terms of 'spoiled identity' (1963). While Goffman's definition of stigma clearly highlights the association between technological hazard (NPP) and the potential for stigmatization on individuals and community, the identification of nuclear risk is not always sufficient to cause negative public reaction towards the host community.

This research assumes that the presence of a nuclear facility does not always lead to the stigmatization of the place. In the context of stigma and technological hazard, it is important to note that this research focuses on the impact of a long-existing nuclear facility which had a relatively 'normal' presence, from 1976 (date of operation's commencement) until 2011, in the everyday life of local residents who have been living with the nuclear industry. None of the informants have acknowledged that the facility had any significant stigmatizing effects on their area before the nuclear disaster. Regardless of affiliation with the Hamaoka NPP, informants generally complain first and foremost about the bad local image that has emerged after 3.11 amidst national media attention. Thus, one could argue that even a major nuclear disaster such as Fukushima still fails to give *significance* to the NPP itself, the

focus being rather on criticizing the attention given to the NPP by outsiders, deemed illegitimate and/or harmful.

In general, informants complained about harmful rumors and how it affects property values and their local products. In an article published in *Chunichi Shimbun* (07/04/2012), Nakayama Akira, the head of the Green Tea Commerce and Industry Association, wrote that harmful rumors were hurting many people in the area. The same article indicated a decline in land value (for residential and business purposes), with the rate falling three times compared to the one before 2011. During fieldwork, one short conversation with a real estate agent in the area confirmed the report, my informant noting that 'businesses cannot continue with such a bad image.' The same agent added that there were plans for the expansion of an automobile parts manufacturing operation that came to a halt just few months after the Fukushima disaster.

In contrast to Ibaraki, Gunma and Tochigi prefectures, as well as the northern parts of Kanagawa, Chiba and Shizuoka prefectures, where farmers struggled to sell their products after detecting levels of radiation exceeding the provisional limits (500 becquerels/kg), the southern part of Shizuoka prefecture where Omaezaki City is located did not seem to have been similarly affected, due to their distance from the Fukushima Daiichi NPP.[105] Yet, the accident caused problems to those residents whose livelihoods mainly depend on farming and tourism (marine activities) with the area being 'marked' as dangerous due to presence of the Hamaoka NPP.

While the government's request to suspend the Hamaoka NPP came as a relief for those who opposed the operation of the nuclear facility, the news was particularly aggravating to local farmers as the suspension request have reinforced the spreading of the negative image attached to the NPP. Their situations became increasingly difficult with the media drawing attention to nuclear-related food safety issues. Farmers not only depend on lands for making a livelihood from the harvest, but they have to deal with consumers who are increasingly aware of food-safety issues. In Omaezaki City, even

[105] See Bachev, Hrabrin. "March 2011 earthquake, tsunami and Fukushima nuclear accident impacts on Japanese agri-food sector." *Tsunami and Fukushima Nuclear Accident Impacts on Japanese Agri-Food Sector (January 21, 2015)* (2015).

though local farmers were not affected by any radioactivity released from Fukushima Daiichi NPP, they were thus troubled by the rumors due to the proximate location of their lands to the Hamaoka NPP.

Although the new official inspection measures did not restrict local products in a place like Omaezaki City, many clients avoided buying from the area. The *Shizuoka Shimbun* estimated that the annual sales of agricultural products in Omaezaki City was to decline by 30% (*Shizuoka Shimbun*, 15/05/2011). The disadvantage to farmers meant that this problem was not to be solved by monetary compensation, as winning back clients is more important, especially on the long term. Indeed, from the perspective of the local farmers, the damage caused by unwanted attention does not simply imply a momentary decrease in income but rather a long-term disruption in their livelihoods.

Mr. Nagasawa (70s) heads a small-scale farming family who used to produce green tea but shifted recently to growing mandarins and grapefruits. While pointing at the big trees surrounding his land, he proudly says that his farm still has a traditional layout characteristic to the Hamoka area, compared to the extensive use of plastic houses in other farms. Despite the warm weather and the fact that the region is surrounded by mountains and sea, farming in Hamaoka has always been at a disadvantage due to the strong sandy wind that can damage crops. Farmers therefore encircle their farms with big trees as a precaution against the wind. Mr. Nagasawa, who has rarely questioned the presence of the facility in the area prior to the Fukushima nuclear disaster, says,

> It was only after 3.11 that I realized how dangerous it [NPP] is. I mean without experiencing any accident, the image of this area is not nice anymore. This negative portrayal of Hamaoka brought a lot of uncertainty to my life.

Mr. Nagasawa is one of many farmers who have been worried about the rumors concerning their area since 3.11. The first year following the disaster with the subsequent shutdown of the Hamaoka NPP was particularly

difficult for his business. He says that while sales have recovered afterwards he feels it is not at the same level as before 3.11. He adds,

> Honestly, I'm concerned about such rumors more than the [nuclear power] plant. Many people live off the plant so it is very complicated, you know… As a farmer, I just want to get on with my work so I can keep my head above water.

While the farming sector nationwide is already facing many challenges that include a dwindling farming population and cheap imported products, harmful rumors are another challenge to farmers in areas hosting NPPs. Moreover, while large-scale farmers are still capable of producing and selling products from their areas, small-scale farmers like Mr. Nagasawa are under increasing financial pressure. For them, the mere dependence on farming has become extremely difficult for making a decent living. Family members therefore end up being farmers with side jobs. This means producing seasonal products while taking a side job at night or work full-time on the land while relying on the vital second income brought by other family members' part-time jobs. While Mr. Nagasawa devotes his whole time to his farm, his son has a full-time job in a local factory and does farming on weekends.

Mr. Yoshimura (70) is another farmer whose products are shipped to big cities through contracts with Japan Agricultural Cooperatives (JA)[106] or sold directly in the local market. In contrast to Mr. Nagasawa's, his farm uses plastic houses to produce melons and flowers. He claims that farmers in Hamaoka have difficulties selling their products, compared to other farmers in the neighboring communities. This is because how tightly 'the name Hamaoka is associated with nuclear power; it is a harmful label to be put on agricultural goods.' Mr. Yoshimura even adds,

[106] Japan Agricultural Cooperatives (JA) is an association that aims to offer consumers safe farm products. It is organized for agricultural management and supports farmers by sharing common farming tools and by organizing to sell farm products jointly. See National Federation of Agricultural Cooperative Associations (2011).

> The merger between Omaezaki-cho and Hamaoka-cho resulted in Omaezaki City, not Hamaoka City. This is because farming sectors might have had troubles every time there was an issue with nuclear power that gets the media attention.

Indeed, the newly created city adopted the name of Omaezaki rather than Hamaoka, despite the fact that Hamaoka was considered the dominant town with a population twice as much of that of Omaezaki's.[107] This may be an indication that local authorities were concerned about negative image linked to the nuclear power before the Fukushima accident even happened. Moreover, Hamaoka town has been financially stable and rich in public provisions due to the benefits that came from hosting a nuclear facility. As for Omaezaki, while the town operated an important port, its municipality had a weaker financial base and the rate of depopulation was steeper. The fact that the post-merger city nevertheless took the name of Omaezaki can thus be considered an anomaly.

In regard to the stigma resulting from harmful rumors, farmers complained that local governments or regional administration do little to effectively help the farming sector. Mr. Yoshimura says that 'the government is only focused on branding campaigns that appeal to consumers.' To his disadvantage, this does not guarantee a stable process of production and consumption. 'The government is basically communicating with consumers rather than producers,' he adds. Indeed, for many farmers, such campaigns are nothing but a failed prescription for their maladies. The government's response towards such risks is mainly cosmetic. It corresponds to Beck's statement that 'staring into the abyss of dangers becomes integrated into normality' (Beck 1995, 52).

[107] The merger itself was not exceptional as it was part of a national wave of municipal mergers started in 1999 and completed in 2010. On the national level, this resulted in halving the number of municipalities (cities, towns and villages) from 3232 to 1727. The mergers had two goals: first, the reduction of national-level budget expenditures through decentralization of government functions. Second, the mergers aimed at improving the cost-efficiency in service provision through local public administration. In every merger, the dominant municipality absorbed the subordinate one and kept its name. The dominance of a municipality depends to a large extent on the population number and the strength of the financial base.

In addition to the farming sector, harmful rumors are perceived as the main negative consequences of living close to a NPP after Fukushima by local residents whose livelihoods depend on tourism in the area. In particular, those who live near the beach area and depend on business generated from marine activities in Omaezaki town are affected.[108] Hamaoka town on the contrary can rely more on business hotels, hostels and guesthouses which accommodate to the nuclear industry.[109] To those locals who are not affiliated with the nuclear industry, the news of the plant's suspension led to an unsettling period as the number of tourists dropped sharply (*Japan Times*, 30/05/2012).

Stigma is not only limited to decline in property prices and business, however. As mentioned earlier, literature on risk has emphasized that stigmatization resulting from nuclear risk can spoil the identity of the community. After the Fukushima disaster and the way Hamaoka NPP has been portrayed as a dangerous area in the media, some local residents are more concern about the image of their community being to some extend damaged by the facility than the nuclear risk in itslef. Takuya (20s), a surfer who lives in Omaezaki-cho, expresses his frustration on how the area is viewed by outsiders:

[108] Located at the cape of the most southern side of Shizuoka prefecture, Omaezaki-cho is richer with touristic attractions than its neighbor Hamaoka-cho. The beach area is an important part of the local economy. Moreover, due to its geographic and climatic characteristics, water sports such as surfing and sailing have become an important feature of Omaezaki's identity long before the merger with Hamaoka-cho. The town is a famous surfing spot widely known in Japan. Other activities that attract tourists are turtle-watching tours in autumn, the iconic Omaezaki Lighthouse and Omaezaki Marine Park. Yet, tourism failed to become a major industry for this area. This could be explained by the fact that much of the touristic activities are seasonal (mainly in summer). Another explanation is the fact that the town mostly receives one-day visitors with low demand for accommodation, which is a vital and fundamental part of tourism industry.

[109] Tourism in Hamaoka dates back to 1964 after the release of the Japanese New Wave film *Woman in the Dunes* (directed by Hiroshi Teshigahara), in which the sand dunes of Hamaoka were chosen as a location for the production of the movie. This local spot became a popular attraction for many movie fans, who would pass by the area to take pictures. Another attraction this town is known for is the Ikemiya shrine in Sakuragaike district. This ancient shrine, built in 584, attracts many visitors from inside and outside Shizuoka prefecture during the religious festival that takes place in autumn. One last attraction is the Hamaoka Nuclear Power Museum, which was opened in 1972. It is important to note that the above-mentioned attractions have a trivial impact on the local economy.

> Last time I was attending a volunteering event in Shizuoka City and when I introduced myself and mentioned that I come from Hamaoka, some attendants showed surprise and went like: 'How is the situation now? Isn't it uncomfortable living there?'

Takuya claims that the plant has become problematic after the event of the Fukushima disaster but that this does not mean that the whole town is bad, especially since, he insists, the Hamaoka NPP has not experienced any accident nor released any radiation. While Takuya does not see such views as personally affecting him, he says that he heard about someone who experienced discrimination because of his work at the Hamaoka NPP:

> Such views don't really affect me on the personal level but I heard local stories about a cancelled wedding right after the Fukushima disaster because the guy was working at the plant and the girl was from Nagoya or somewhere.

Although marriage discrimination has become an issue for the evacuees from the areas of Fukushima Daiichi NPP, [110] this type of discrimination seems to be a problem even for people living in a locality like Hamaoka that has not experienced any radiation exposure. Moreover, it is these kinds of direct consequences unto everyday life that are the most strongly felt by the people experiencing them, rather than the probable threat of a future nuclear failure in the area.

Another account that highlights how locals worry about outsiders negatively viewing the Hamaoka area following the Fukushima disaster is based on an interview with Mr. Kawashima, who is affiliated with the nuclear industry. Mr. Kawashima graduated from Hamamatsu Technical School and joined Chubu Electric in 1988. He says that he became interested in nuclear energy during his studies and later decided to work at the Hamaoka NPP. 'At the time, I didn't have any knowledge about radiation, but gradually gained

[110] Ben-Ezra, Menachem, Jun Shigemura, Yuval Palgi, Yaira Hamama-Raz, Osnat Lavenda, Miki Suzuki, and Robin Goodwin. "From Hiroshima to Fukushima: PTSD symptoms and radiation stigma across regions in Japan." *Journal of psychiatric research* 60 (2015): 185-186.

knowledge about the operation of the nuclear facility.' 'A very rewarding job,' he adds. A young-looking man with a pleasant smile, Mr. Kawashima is very proud of what he has been doing at the Hamaoka NPP for more than 25 years. Originally from Hamamatsu City, he currently lives in Hamaoka-cho with his wife and two children, a daughter (16) and a son (13). He is happy to be with his family who are supportive of his work.

'The image of nuclear power did not change, but the awareness of the safety definitely increased,' he says. According to Mr. Kawashima, responding to phone calls from worried citizens was a very difficult task right after the Fukushima meltdowns. The information center received more than 900 calls within less than 2 months until the suspension of the plant. 'It was especially difficult for the corresponding staffs. Once we had to deal with a crying woman who requested the shutdown of the plant instantly. Another phone call came from an angry man making aggressive threats.' Mr. Kawashima admits that phone calls were still more manageable than face-to-face encounters, remembering how a female staff at the nuclear power museum was severely lectured about nuclear power by a stranger for long hours.

Many employees thus complain about negative attitudes from people around them. The government deciding to shut down the plant was not seen as a responsible response but rather as an aggravating measure. Mr. Kawashima recounts the changes after the events of 3.11 saying that his wife 'was complaining a lot about the government's request to suspend the plant.' He adds, 'it was surprising when my daughter [14 at the time] was told at her school located in Kakegawa City that her dad is in a poor situation.' He says that 'young kids repeat what they hear from adults around them.'

While this thesis discusses the issues of responsibility and blame in another chapter, it should be pointed out that except those who have a clear anti-nuclear stance, informants, including Takuya and Mr. Kawashima, blame the central government and the media for highlighting their area as 'dangerous,' and therefore for spoiling the identity of a place they have always thought of as 'normal'.[111] Even for Mr. Kawashima, who is linked to the

[111] On May 5, one day ahead of the Prime Minister's request to suspend the Hamaoka NPP, Minister of Economy, Trade and Industry, Banri Kaieda, had visited the plant and said that the decision would be made by mid-May as to whether more emergency countermeasures were

company and emphasizes its positive contributions to the locality, acknowledges the persisting negative effects.

4. The Normalization of Nuclear Risk

One way for the local residents of coping with the ongoing situation and protecting themselves against the criticism their area is facing is through normalization. The normalization of nuclear risk is based on the assumption that the Hamaoka NPP is not entirely a safe facility. In this sense, informants do not deny the nuclear risk but attempt to downplay it (Pidgeon et al. 2003). In contrast to the view that denies the uniqueness of the NPP, the normalizing view makes living with risk, whether nuclear or not, a part of the everyday life experience. As a result, most informants seem to think that living in the shadow of the Hamaoka NPP is no different than living further in neighboring cities.

4-1. Normalization Strategies

Similar to Bush et al.'s study on the presence of hazardous facility, this research indeed found that informants adopt strategies of normalization drawing on notions of either "differentness" or "sameness", as an attempt to play down the significance of living close to a nuclear facility (2001, 54). The strategy of sameness is expressed in accounts that deny the uniqueness of living in the proximity to the NPP.

Ms. Watanabe (50s)'s account provides a good illustration of this strategy of sameness. She has been running a coffee shop with her brother in Hamaoka-cho for more than two decades. The cafe is spacious and has a

necessary. The request made by Prime Minister Naoto Kan the following day was therefore met with strong criticism as being "too sudden without regard for necessary procedure," and "a political performance to try to keep his post." It has been shown that the Prime Minister did not have legal grounds to suspend operations of a power company's NPPs, and this is why the Prime Minister did it in the form of a "request." (See *Reuters* 05/05/2011; *Japan Times* 08/05/2011)

modern interior. Located less than 100 meters from the entrance of the Hamaoka NPP, regular customers are mainly affiliated with the nuclear industry. Ms. Watanabe has a welcoming smile and shows a vibe of hospitality to her customers. Supporting the nuclear restart, she admits that there has been a lot of uncertainty in regards to the NPP. However, she suggests that in the event of the shutdown her business will not be very much affected. Pragmatically, she says that 'there will be always people around anyway coming for decommissioning and other activities.' Ms. Watanabe, who does not seem to be worried about the plant, claims that in the event of a Fukushima-like explosion, radiation releases would not be limited to the Hamaoka area but would extend to neighboring communities and further cities as well.

Similarly, Mr. Yoshimura (70s), the farmer from Hamaoka-cho, expresses worries based on a negative view of the whole nuclear industry, rather than the local one.

> Even if Hamaoka [NPP] was permanently closed, would our life be safer now? How about other NPPs? You know that other reactors are not that far from us. Maybe nothing will happen in Hamaoka but what about other [nuclear power] plants around the region? We are lucky to be far from Fukushima but will we be as lucky the next time an accident happens in Niigata or in Fukui?

In this sense, his worry did not only come from the proximity of the Hamaoka NPP, but from other NPPs built around Japan and operated by other utility companies than Chubu Electric as well. The above two informants therefore express their strategy of sameness by accepting the NPP as a potential threat while denying that the risk is limited to their area. The Fukushima disaster was mentioned few times to refer to this issue. Such accounts remind us of Beck's notion of 'democratization' of risk (1992). As a matter of fact, the damage induced by the Fukushima nuclear disaster was not limited to the host community but affected communities from neighboring cities as well.

Some informants talk about imagined scenarios of living near or working at facilities where the risk is supposedly much higher than with a NPP. This strategy relies on ‘differentness’ in order to normalize the nuclear risk by opposing it to a supposedly greater risk. Mr. Kawashima who works as a technician at the Hamaoka NPP and lives in Hamaoka-cho said that living near or working at coal-mines or chemical factories poses far more harmful threat than working at or living close to a NPP, as the risk of nuclear accident is relatively marginal. We can see that in such accounts, informants make comparisons to empathize the ordinary aspect of living in the shadow of the NPP.

The most anxiety-provoking element of nuclear power is radiation. Yet, this element seems to have been subdued through normalization. For many informants, especially before the Fukushima nuclear accident, radiation was viewed as an element that exists in nature and thus not limited to the Hamaoka NPP. Moreover, the fact that many employees moved in the area with their families to work at the Hamaoka NPP was taken as a proof that life around the plant was safe. Mr. Horikawa, the restaurant operator in Hamaoka-cho, says,

> You know people wouldn't accept the facility if there was a proof of radiation release outside the plant. I also happen to know many people from outside who work at the plant. Those people fear for their children’s safety and wouldn't just live or work in here if they know that it is unsafe.

4-2. 3.11: ‘A Most Extraordinary Event’

These accounts show again and again that prior to the events of 3.11, the presence of Hamaoka NPP had not been constructed as significant in the everyday life of the informants who participated in this study. With the absence of major accidents in the local area, the operation of the long established nuclear development had been viewed as normal and the

physical presence of the facility was supposed to be familiar and ordinary. The research found that informants have been aware of the nuclear risk but used strategies of normalization. Yet, the Hamaoka NPP was not seen among the informants as the only source of threat on their everyday life.

Whether for or against restarting the Hamaoka NPP, all informants have expressed experiencing anxiety since 3.11. In this thesis, the term anxiety is not based on a clinical perspective but rather on how risk literature has discussed the notion in recent years. Slovic et al. for example have extensively discussed the notion of risk as feeling or affect (2004). This research similarly makes use of such discussions in relation to the use of the term 'anxiety.' In other words, anxiety is when local residents feel the nuclear risk in their everyday life. However, just as it is rare to use the noun 'anxiety' in casual conversation conducted in English, the term 'anxiety' did not necessarily come up in the conversations conducted in Japanese. The word 'anxiety' used here is an interpretation of words such as '*shinpai*' or '*fuan*', which express one being worried or concerned. Another term often used by the informants is '*bikkuri*', which literally means 'surprised' but could be interpreted, in this context, as 'horrified'. The significance of such detailed interpretation is based on the argument that 'language that people use reflects, conditions, and reveals the terms in which they think about things' (Macgill 1987, 53).

When did/do informants have feelings of anxiety? It is especially when a particular event intersects with their everyday lives. This corresponds to the argument Irwin makes that hazardous facilities are not separately constructed as risky facilities outside the domain of everyday life of the community:

> Environmental problems do not sit apart from everyday life (as if they were discrete from other issues and concerns) but instead are accommodated within (and help share) the social construction of local reality (2001, 175).

Nuclear risk is visible when informants regard it to be touching upon their lives. It is what Pidgeon el al. calls 'the intersection of risk and biography' (2008). During interviews, informants did indeed talk about special events that

triggered them to become anxious. Such events include the news of minor accidents, health threats, local issues and Fukushima-like events. These events that provoke awareness of the nuclear risk can be categorized as mediated risk issues and direct experience of threat/risk. All informants said that the events of 3.11 were the most anxiety-provoking, 'a most extraordinary event'.

Minor accidents and knowledge of health issues seem to be mediated risk issues as informants become aware of such issues via national and local media, or form their social networks. Despite the fact that a couple of minor incidents occurred in Hamaoka NPP in the 2000s,[112] informants rather refer to greater accidents such as Tokai (1999) and Kashiwazaki-Kariwa (2007). For many, such minor accidents have triggered a sense of anxiety (feeling of the nuclear risk), yet it was short-lived due to the relative insignificance of such events and the safety assurance by the government and nuclear industry at the time:

> I remember there was a lot of media coverage on the accident in Niigata [Kashiwazaki-Kariwa] and I started thinking about the safety of Hamaoka. People talked about it but only shortly, maybe because it was not too serious. (Mr. Tanaka, 63, hostel owner)

As for the knowledge about health issues, informants had been aware of such issues primarily from stories of people diagnosed with cancer or from watching or reading news about radiation and cancer in general,

> You think that this is not related but when you hear that someone has cancer, you do really wonder! (Mrs. Kato, 60s, ramen shop owner)

[112] Since the start of its operation in 1976, Hamaoka NPP did not experience any major accident. In 2000s, various minor incidents were reported, including 1 residual heat removal system rupture accident (07/11/2001) and Unit 2 water leak (24/05/2002). The most mediatized story was when an independent inspection discovered that 16 unique signs of cracks in steam pipes were known by the Chubu Electric but were not reported to the prefecture level authorities. See NISA − Japanese Nuclear Industrial Safety Agency, 1 October 2002, 'Interim Report on the Falsified Self-imposed Inspection Records at Nuclear Power Stations'.

Suggesting there might be some association between cancer and nuclear power, Takuya, the surfer who lives in Omaezaki-cho, recounts how his cousins became opposed to the nuclear industry after witnessing a loved family member developing cancer and ultimately passing away.

> My uncle got cancer just few years after retirement. Part of his intestines had to be removed. It was like a nightmare. My cousins blamed the plant at the time and were saying that the plant was making people sick.

Such biographical narratives about knowing someone diagnosed with cancer show that people might feel a sense of uneasiness towards the nuclear risk. This intersection of nuclear risk and personal biography happens through direct experience of the nuclear threat and involved health issue.

Besides cancer and other health issues that lead to uncertainty regarding the potential effects of living near the nuclear facility, one informant narrated a story that led him to be concerned about the nuclear facility. This is when the nuclear facility is framed as a source of disruption to the local environment and livelihood.

> I have never been worried about radiation as long as it is being dealt with inside the [nuclear power] plant, but I started getting worried when they transferred the spent fuel elsewhere. Chubu Electric uses a special route for transferring the spent fuel to Omaezaki port. I know it is not permitted for other vehicles to use this road but still I ask myself: what would happen in case of an accident? (Mr. Yoshimura, 70s, farmer)

In this account, the feeling of anxiety stems from uncertainty about the kinds of threats the transferred nuclear materials would pose outside the facility.[113] This event led the informant to question whether nuclear power was safe.

[113] Chubu Electric ships radioactive waste stored at the Hamaoka NPP Power to Japan Nuclear Fuel Ltd.'s Low-Level Radioactive Waste Disposal Center, located in the village of

Both mediated and direct nuclear risk experiences intersect with the informants' biographies at certain moments during the course of their lives in the community. Except for a couple of informants, such experiences appear to have been fleeting incidents that did not make them live in a constant state of anxiety. In *The Nuclear Peninsula,* Zonabend notes that anxiety is 'furtive,' 'muted,' and more or less 'repressed'; this 'is not difficult to detect when you are talking to the people of la Hague' (1993, 124). She concludes that this repression is 'a hidden suffering on a modest yet real scale, indicating the stubborn persistence of a sickness in our civilization' (ibid.).

The findings of this study are in harmony with those of Zonabend, in particular when local residents experienced anxiety about the nuclear risk before the Fukushima nuclear disaster. Anxiety was not constant but rather episodic and influenced by the conduct of everyday life. For someone who works at the plant, the best way of coping would be by not thinking about the nuclear risk. For others who are not linked to the facility, the threat of a nuclear failure was considered trivial when personal issues were taking precedence.

This chapter has examined the various ways the residents defend their living in the shadow of the Hamaoka NPP. Interviewees have revealed that the long-established presence of the facility downplayed the nuclear risk in the everyday life of the community. This was supported by the absence of any major accident and living in the area for a long period of time. Indeed, the way informants often touch upon the Hamaoka NPP indicates an attitude that confirms the familiarity of and the lack knowledge related to the facility that has been to some extent integrated into the locality over the last four decades.

Indeed, living in Hamaoka for a long period of time or recently choosing to live in the area do not mean that residents are ignorant of the NPP and the impact of a probable accident, but those concerns are not significant and meaningful in their everyday needs and in their understanding of the place in which they have lived for a long time. Moreover, the Hamaoka NPP rarely

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Rokkasho, Aomori Prefecture. Waste is transported over land from the plant to the company's private quay located at the Omaezaki Port. Then, the waste is transported via a vessel to Rokkasho village. Fore more, see Chubu Electric's corporate press newsletter, https://www.chuden.co.jp/english/corporate/press2005/0310_1.html (accessed Dec,11 2016)

appeared as an encroachment on the surrounding environment. This is evident among relatively young informants who have been born in Hamaoka around the time of this industrial development. Growing up in the area, they have viewed the NPP as a familiar aspect of local everyday life. For them, there was no point worrying about the facility, which existed during the course of their lives.

However, during the conversations with informants it was revealed that the facility was often conceptualized as extraordinary when there was a direct or indirect experience of the threat. Fukushima triggered just such awareness of the nuclear risk. This includes farmers who had to deal with stigmatization or those who associate the nuclear risk with health issues. After the Fukushima nuclear disaster, all informant expressed anxiety towards the nuclear facility. In sum, while there is a high level of awareness of nuclear risk, this does not seem to correspond with an opposition to the nuclear restart, suggesting that for most residents worry about a potential nuclear failure is marginal to their everyday concerns and their decisions to reside in the area.

The nuclear risk thus came to play a central role in the perspective of my informants who have realized that their choices are constrained. Lack of viable choices is not only about being limited in economic terms, but is also an indicator of the lack of capacity to draw on additional resources when needed, and the worry associated with this makes the nuclear failure a frightening prospect. The following two chapters will explore the reasons why local residents may downplay the nuclear risk in their everyday lives.

CHAPTER 4
Diffusion of Risk(s):
Economic and Social Pressures in a Nuclear Town

While Omaezaki residents came to realize the danger of living in a close proximity to the Hamaoka NPP in the wake of the 2011 Fukushima crisis, the nuclear risk has so far failed to provoke a change of attitude that would translate into protest and opposition. Indeed, the majority of residents continue to downplay the risk and express their support of the nuclear restart as evident in the two mayoral elections of 2012 and 2016. What could be blocking from their vision the risk of living in the shadow of the nuclear facility? The answer to this question lies within the social reality of the community and the intensity of other risks existing and affecting the course of everyday life. In particular, social and economic risks that have persisted long before the Fukushima disaster are playing out and competing against the risk of a nuclear failure in the area. The aim of this chapter is to explain what lies behind the social and economic difficulties in articulating the perceived nuclear risk among local residents in Omaezaki. In addition to the analysis of the economic concerns, this chapter will discuss the other sorts of risk(s) that could be hindering the residents from protesting against the nuclear industry.

As shown in chapter 2, Omaezaki community came to host nuclear power as an attempt for the production and reproduction of the residents' longing for a better and improved living standard. After the operation of the nuclear facility began, the majority of the local residents rarely questioned this industry or opposed its potential hazards in their daily lives. That being said, I do not argue that the majority of residents were ignorant of the risks posed. They were rather more concerned with pursuing the more urgent and significant demands of their everyday lives. However, the Fukushima nuclear disaster broke the "safety myth" that was widely believed throughout Japan. In

the past, the damage was thought to be more or less containable to the plant itself, should an accident occur. The Fukushima nuclear disaster resulted in a large-evacuation zone (30-km) around the plant site, and as of June 2017, the fallout from the nuclear meltdown has yet to be fully resolved. It is therefore important to ask how Omaezaki residents negotiate the nuclear risk in the context of the everyday life following the Fukushima nuclear disaster.

Explaining how host communities perceive living close to a nuclear facility is not a simple matter. The various components for understanding how local residents come to terms with the notion that they are exposed to risk are a result of specific social, economic, geographical, historical, and political characteristics. How residents construct, perceive and reflect on their experiences living in close proximity to such facilities therefore depends on such components (Bickerstadd 2004; Masuda and Garvin 2006). In this sense, it is not only the nuclear risk per se, but also social, economic and political factors that are vital to understand risk(s) perception. The necessity to combine this array of factors in order to reach an understanding of risk perception is neatly summed up in Elyes et al.'s statement:

> Risk is now widely recognized to be socially constructed; appraisal and management are determined by people's place in the world and how they see and act in the world. All ideas about the world are in fact rooted in experience and different forms of social organization and their underlying value systems will influence risk perceptions (1993, 282).

Nuclear power has generally been depicted as a dreadful and worrying technology, linked to anxiety-inducing feelings such as fear. A historic association with atomic weapons and concerns about radioactivity in the wake of catastrophic events mainly contribute to this dark image (Slovic et al. 1991; Joffe 2003). In particular, various national surveys have shown that the public fear of nuclear power results from concerns regarding contamination from potential release of radioactivity, harmful effects on health, and the Chernobyl, Three Mile Island, and Fukushima accidents (Slovic 1993; Gills et al. 2013). Moreover, research found that accepting or rejecting nuclear power and radioactive waste is closely related to levels of trust (Wynne 1992). This,

however, as has been shown in the chapter 3, does not always translate into actual or remarkable concern on the part of the residents of the host community, and arguably the general public, in the context of the everyday life. Indeed, prior to the Fukushima nuclear disaster, the majority of Omaezaki residents in particular, and the Japanese public in general, rarely expressed opposition against the operation or the expansion of the NPPs around Japan as nuclear issues rarely affected the conduct of everyday life.

In the case of the host community, a common hypothesis held among geographers and social scientists argues that proximity to nuclear facilities is associated with higher levels of support for the local nuclear industry. The usual explanation is that when a community is marginalized, its support towards the operation and expansion of a nuclear development infrastructure stems from the economic benefits generated by the nuclear industry at the local level (Blowers and Leroy 1994; Eiser et al. 1995; Williams et al. 1999; Aldrich 2008). Japan indeed seems to be no exception. One could argue that even after the Fukushima nuclear disaster, many host communities continue to support restarting nuclear facilities in their backyards due to the economic conditions of the such localities that have become dependent on the nuclear industry.

In line with the above-mentioned studies, my research has found that economic benefits indeed play a significant role in shaping the attitudes towards the local nuclear industry. However, as I will demonstrate below, supporting or opposing a NPP is not a decision made by the individual based merely on economic calculation. Although economic benefits are significant, social and political factors play a vital role in shaping the decision-making process local residents go through. Moreover, while the Omaezaki community has gained benefits from accepting to host the Hamaoka NPP, for example in increased employment opportunities and in the provision of services and subsidies, the majority of my informants, and arguably local residents (as will be shown in the statistical data below) have seen little direct benefits.

Meanwhile, my findings show that local residents expressing support for and acceptance of the facility are not devoid of latent feelings of anxiety and uneasiness (see chapter 3). While the absence of major incidents masked such feelings in the past, the Fukushima disaster highlighted the nuclear risk,

bringing back these feelings back to the surface, and in return intensifying risk(s) calculation in the everyday lives of the residents. Many residents therefore express their support for such facilities, but with varying degrees of reluctance.

It is indeed through constant interactions with his or her environment that an individual builds his or her own risk understanding. Essential components such as familiarity, local knowledge, and local context are intertwined with people' values and identities. This means that an important part of risk perception revolves around the role of the individual and the way the individual articulates his or her vision of this role. Examining people's risk biographies and risk perception in the context of everyday life is thus necessary in risk research (Tulloch and Lupton 2003).

1. Nuclear Power Plants: Costs and Benefits

How do host communities analyze the costs and benefits of nuclear power after the 2011 Fukushima crisis? Host communities did not suddenly discover with the Fukushima accident that nuclear power reactors are high-risk facilities. They always knew that hosting a nuclear reactor comes with a cost. This is why a range of financial incentives is offered to them, in the form of compensations, in return for accepting such a facility. One informant put it very bluntly:

> Why would they [Chubu Electric] give money and compensation if there was no risk? There was always risk [at the Hamaoka NPP]. The Fukushima accident is when this risk was actualized. There is no reason to complain.

For host communities, accepting the potential threat(s) to their safety therefore represents the cost, while the nuclear-related subsidies are the benefit. The host communities are aware of this cost-benefit balance since the

installment of the first reactor in their backyard. However, the absence of major accidents prior to 2011 has attenuated the visibility of the cost. In other words, local residents failed to see the nuclear risk posed by such a facility in their everyday life. The Fukushima nuclear disaster has highlighted the Hamaoka NPP that suddenly appeared risky, shifting the outlooks of local residents in regards to the nuclear facility.

1-1. Nuclear-Related Benefits

The fact that the cost of hosting a NPP can be attenuated in such ways shows how important the benefits can be at the municipal level. What are they precisely? Beyond the host community level, a NPP has two main benefits. The first and most obvious one is the ability to generate electricity. The electricity generated from a NPP is put into use to support daily life and various business and industry-related activities in a wide region. Secondly, a nuclear plant has a large-span social benefit as it creates large amount of power while releasing lower volumes of carbon dioxide emissions than fossil fuel-fired power plants during power generation. It should be pointed out that if a broader region receives the benefit of nuclear power generation, the area under risk from potential nuclear accident(s) is comparatively smaller and more localized, the cost of nuclear power thus not being equally shared by its beneficiary.[114]

On the host community level, benefits brought by a NPP are twofold. First, it creates employment. This is an important benefit for marginalized rural areas that face stagnant economy and unstable employment rate. The plant provides employment not only during its construction, but also during normal

[114] There is a significant gap between the widespread region and the hosting area despite the fact that the region affected by the potential release of radioactivity partially overlaps with the host area that receives the benefit of NPP. The benefit of a NPP (electricity) is widely distributed away from the plant site while risk is much more focused within the area. Before the Fukushima nuclear disaster, utility companies and METI were the exclusive beneficiaries of nuclear power in the wide region, whereas the general public living far away from a reactor site enjoyed a constant supply of electricity without bearing the nuclear risk. It has been demonstrated in the wake of the Fukushima nuclear disaster how a wider region can be affected by the radioactive contamination. In other words, nuclear risk is “democratic” (Beck 1992) and those who considered themselves far away from NPPs found out after Fukushima that they are not immune to all consequences.

operation and maintenance. While the beneficiaries of employment are primarily the local residents living near the nuclear reactor site, the benefit affects neighboring and distant communities as well. Secondly, an economic benefit comes from financial incentives that are provided to the prefectures, cities, and towns that host NPPs. The Three Power Source Development Laws (three legal acts that provide a mixture of financial incentives to facilitate the locating of power generation units) ensure that municipal budgets are significantly improved for communities accepting to host NPPs. In the case of Okuma, Fukushima Prefecture, the acceptance of the nuclear facility led to a significant increase in the town's total revenues over a 15-year period – nuclear-related revenues from the Three Power Laws amounted to 1.7 billion yen (88.5%) from the total budget to 1.92 billion yen in 1978 (Kamata 2011, 113). In the case of Hamaoka, the town's budget had increased more than 10 times over a decade between 1972 and 1982, making the local government depended on the plant (Mori 1982, 45).

As shown in Table 2, a local community hosting a NPP receives different types of economic incentives. The first three categories generously contribute to the local government financially, while the fourth category entails greater economic impacts. The local taxes received by local government are not all related to nuclear activities. Property tax and local corporation tax are generally applied to all kinds of business activities, while nuclear fuel tax and spend fuel tax are specific to the nuclear industry. The Three Laws for Power Source Development provide national subsidies to the local municipality. According to the Agency of Natural Resources and Energy (2010), the sum of national subsidies passed to local communities hosting nuclear facilities reached 44.9 billion yen during the construction period (which usually lasts 10 years). The same agency estimates an extra 76.6 billion yen that would be channeled to the local governments during the operation of the nuclear facilities over at least 35 years.

Category	Financial Source	Examples
Subsidy	National Government	Subsidies based on the Three Laws for Power Source Development
Local Tax	Utility	Property tax, local corporation tax, nuclear fuel tax, spent fuel tax
Donation	Utility	Construction of public facilities, money
Local Economy	Utility and Government Expenditure	Job opportunities

Table 2. Economic Incentives
(Source: created by the author based on data combined from multiple literature accounts)

Donations are another important benefit that host communities receive for hosting NPPs. Donations are given on an irregular basis and usually are not disclosed to the public. For the installment of reactor unit 3 (1982) and unit 4 (1986), Chubu Electric paid Hamaoka-cho large sums of money in the form of contributions. According to documents acquired by the *Tokyo Shimbun* (1/1/2014), the town received a total of 3.672 billion yen in what is known as cooperation contribution (*kyoryoku kifu*), and 5.39 billion yen in the form of memorandum. The *Asahi Shimbun* (21/07/2016) reported that Chubu donated a total of 3 billion yen to the Sakura District Council in Hamaoka-cho over two decades (1969-1989). The same newspaper (11/04/2011) reported that TEPCO paid 39.7 billion yen in donations since 1990 to the municipalities hosting its four NPPs.

Host communities are the most direct beneficiaries of such incentives and research shows that municipalities that host NPPs have relatively stable and sound finances. For example, the four towns in Fukui prefecture (Mihama, Takahama, Ohi and Tsuruga)[115] that host collectively more than a dozen nuclear reactors enjoy comparatively stable finances and are, in contrast, not affected by the financial troubles facing neighboring towns that do not host nuclear reactors. Another instance is the town of Saga, where the Genkai NPP is located. It receives about 10 billion yen each year, which provides about two-thirds of the municipality's annual budget.[116]

[115] The highest concentrations of nuclear power plants are in Niigata, Fukui, and Fukushima Prefectures, a phenomenon called the "Nuclear Ginza" (Genpatsu Ginza), as a reference to the famous shopping district in central Tokyo. See Feldhoff, Thomas. "Japan's energy future: challenges and opportunities in a changing geopolitical environment." *Geopolitics, History and International Relations* 3 (2) 2011: 34.

[116] Miyoshi Yosuke. "Finance structures of local constituencies that hosted nuclear power plants: examples from the Wakasa region of Fukui Prefecture" (Genshiryoku-hatsudensho shozaichi-jicchitai no zaisei-kozo), *Ritsumeikan School of Economics* (*Ritsumeikan Keizaigaku*) 60(3) 2011: 383–414.

1-2. Dependency Breeds Dependency

A unique feature of the Three Laws is that subsidies are provided for the first five years after the start of construction, but drops to a quarter of the initial amount once the plant begins operation. Moreover, subsidies were initially designated to be exclusively spent on infrastructural projects such as roads, bridges, and ports. As such hard infrastructures had become in sound conditions in host localities by the late 1980s, METI allowed localities to spend funds on commercial development as well. It was only after 2000 when METI allowed money to be spent on soft infrastructure project such as job training and invitations for other businesses to move to the area.

The host community enters a “cycle of addiction” (see chapter 2) as it becomes incented to accept additional reactors so that the municipality remains financially sound, becoming more and more dependent on the nuclear industry. The community would lose the subsidies if local politicians opposed the operation of the nuclear facility. This would cause local politicians to either decrease public spendings on local infrastructure and services, or increase local taxes. Moreover, in addition to the benefits from the public sector, host communities receive enormous financial and physical contributions from power utility companies.

When asked how could the municipality face financial troubles when it had received generous revenues over the years, Mr. Iwata (70s), the retired teacher who lives in Hamaoka-cho, critically replies:

> Local officials have gotten used to public spending in a wasteful manner. They always spend money on public projects like roads and other things that don't generate any profits. They [officials] rarely work on creating some sort of sustainable alternatives and people just discovered the problem.

While the lack of alternatives in the past has undoubtedly made the municipality heavily dependent on the nuclear industry, local residents have become aware of this unhealthy dependency and started looking for a solution in order to reverse the situation. Attracting other industrial companies to the area, however, is not an easy task and has proved unsuccessful in the past.[117]

As the main cost of hosting a nuclear power plant affects primarily the immediate local area, the benefits are particularly high for the hosting community. As a result, host communities rely considerably on the nuclear plant's local and regional socioeconomic benefits. When the government announces the suspension of a NPP, not much consideration is given to the impact this decision would entail on the local area. For example, the Hamaoka community realizes that the possible closure of the nuclear plant can cause much more than a decline in tax revenues. In particular, the local community has to confront the socio-economic impacts of the plant's suspension and possible closure. In the event of a plant closure, the host community is left on its own. It has to find alternative resources to replace the jobs that would leave the area and the municipal revenues that would significantly drop.

Moreover, the community would have to deal with many social challenges that would result from such a decision. Rapid depopulation and the weakening of the community's social fabric are some of the deep-running concerns that influence the decision-making process among residents. For many residents who have been coexisting with the physical presence of the plant for a period that spans over a generation, the threat of closure appears therefore more disruptive to the economic and social life of the whole community than a potential nuclear threat.

Indeed, Omaezaki residents seem to be unable to articulate perceived nuclear risk due to the nuclear industry being a major contributor to the City's economy. This does not mean that each resident has any tangible benefits from the nuclear facility. I found that while some informants benefit from the

[117] New industries tend to be small in size compared to the nuclear industry. For example, Idemitsu Kosan's liquid crystal plant started operation in 2006. This plant is a relatively small operation, hiring only 20 people, so its impact on the local economy is small. One drawback is that it is far from Shinkansen bullet train station and the Tomei Highway interchanges. (interviews 2012)

plant through direct employment or secondary industry, other informants do not have any benefit from the Hamaoka NPP. Supporting the nuclear restart stems from the fear of unanticipated consequences from not keeping the status quo. In this case, the 'dependency breeds dependency' aspect is relevant to Omaezaki at the municipal level and to those who benefit from the plant. However, such an aspect does not provide a complete explanation when one considers that a large segment of the local population does not receive benefits.

2. Local Impacts of the Hamaoka NPP

In this section, I examine the economic impact of the Hamaoka NPP on the town of Hamaoka and later on Omaezaki City, after the municipal merger in 2004. It can be said that the nuclear industry has direct and indirect impacts on the life of the local community. Direct impacts are limited to the operation and directly attributable to the NPP itself: production, wages, taxes and other municipal payments and charitable contributions. My research found that the Hamaoka NPP is indeed a vital part of the local economy that used to lag behind the region and the state in key indicators of economic performances. One of the most significant contributions is providing municipal revenues that contribute to better local conditions.

2-1. Municipal Revenues

One cannot deny that since the development of the nuclear facility, local infrastructure has improved beyond recognition. The town, despite its relatively small scale, maintains a complex network of roads that goes through the main highway towards the east and the west of the prefecture. Electric (light) poles are all painted with a treelike brownish color, in harmony with the beauty of the surrounding nature. The town is rich with public services. Education, sport, medical and welfare sectors are all equipped with good

facilities and advanced systems. The soundness of the town's finance is the background to this developed public infrastructure (Mori 2001). Strolling around the streets of Hamaoka, the visitor would have the impression of an urban environment as the area has convenience stores, supermarkets and even a pachinko parlor.

In the past, Hamaoka-cho was a very poor town, having a very low financial base of which more than 70% came from national and prefectural government. According to an index for judging financial power of a self-governing body, Hamaoka-cho had a low financial capability[118] with an index of 0.32. The nuclear industry brought generous subsidies and fixed property taxes, which increased the town's financial capability. Revenue started growing only one year after the operation of the rector unit 1 began in 1976 (financial capability index: 1.02). The index dropped below 1 in the following year but it rapidly recovered after the construction of reactor unit 2. The index kept indicating high financial capability throughout the following two decades with the construction of reactor unit 3 and 4. After the municipal merger with the relatively poorer Omaezaki-cho, the financial index dropped from 1.3 to 1.18 but soon bounced back to 1.27 following the installment of reactor unit 5. With the increase in tax revenue, local businesses received subsidies and public services were accordingly enhanced.

For accepting to host five reactors, the host community has received more than 45 billion yen in subsidies as of fiscal year 2010 (*Japan Times*, 16/2/2012). In the fiscal year 2011, the nuclear related subsidies and fixed-assets taxes totaled 7.21 billion yen (42%) of the municipal budget, totaled at 16.7 billion yen (*Japan Times*, 30/5/2012, Mainichi Shimbun, 11/4/2013). Following the suspension of the Hamaoka NPP, subsidies for Omaezaki related to nuclear power generation dropped by 35%, forcing the city to set up a smaller budget for 2012. One retired resident, Mr. Shimizu (60s), who used to work at the municipally, told me in the summer of 2012 that 'the municipal spending will get worse as long as the plant remains idle.'

[118] The financial capability index is an assessment tool that measures the level of knowledge, skills, and attitudes needed to make informed judgments and effective decisions regarding the use and management of money.

Interestingly, unlike Mr. Shimizu who is more familiar with the municipal situation than the majority of ordinary residents, some of my informants acknowledge that they have only started considering the nuclear facility's contribution to the city's budget after the 2011 Fukushima crisis and the subsequent suspension of the Hamaoka NPP. For example, Takuya (20s), the surfer who lives in Omaezaki-cho, admits that before 2011 he had only a vague idea of the plant's actual contribution to the local economy:

> I mean I knew before 2011 that the plant is good for our town but I didn't really know that the city will be affected in case of closure.

Elderly informants who have been more familiar with the local situation for a longer period of time do not deny that the nuclear industry brought improvement to the local infrastructure. One farmer, Mr. Nagasawa (70s) who lives in Hamaoka-cho, says that many local sectors, including tea cultivation, are 'sustainably maintained due to the subsidies received by the Hamaoka NPP.'

Indeed, nuclear-related grants have been instrumental in funding multiple public projects. For example, in 1986, the municipal Hamaoka Hospital was opened and the following year the town witnessed the construction of Konoki Employment Promotion Housing, and the first phase of the Ikeshinden Industrial Park. The town became more vibrant with a new boost in the 1990s following the construction of reactor unit 4. The municipal hospital and industrial park were both expanded and the town had its first sport stadium. Tea cultivation received its own boost too with the establishment of Tea Agriculture Cooperative and the Hamaoka Tea Processing Facility as an attempt to promote the industry. Some of the recent facilities created with nuclear-related subsidies include public library, touristic products hall, swimming pool, welfare center, conference hall, Omaezaki cable TV, and Sakura kindergarten.

Local politicians are therefore aware of the risk of a permanent shutdown of the nuclear facility. Their awareness is translated into a supportive attitude towards the nuclear industry. Financially, the municipality will be hit the hardest as 42% of its revenues come from the nuclear industry

(*Japan Times*, 30/5/2012). The shutdown of the facility would necessitate budget adjustments that might have negative consequences on the service sectors as well as on the employment rate in the public office. Meanwhile, donations and other forms of contributions would come to an end, leaving its dependents in need of alternate resources. Over the years, the education sector and fire department have indeed both greatly benefited from such contributions. Moreover, due to decreased demand, other industries in the local and regional areas would decline, in particular those that have been tied to the operation of the Hamaoka NPP.

2-2. Voicing Economic Concerns

Dependency on the nuclear facility is evident at the municipal level and in the accounts of those whose livelihoods are tied with the operation of the Hamaoka NPP. To the majority of Omaezaki resdients, however, it is not the dependency on but the coexistence with the nuclear facility for a long period of time that makes it difficult to articulate the perceived risk after the Fukushima nuclear disaster. Indeed, as will be shown in the accounts below, many of my informants seem to lack the choice to change the *status quo*.

Mr. Igarashi (50s), who runs a small and old-looking hostel in Omaezaki-cho, does not receive any direct benefit from the nuclear industry and has recently become opposed to the nuclear industry. Yet, he is particularly concerned about how the municipality would cope with the scenario of the shutdown and the implications it would have on his business.

> I don't know how the municipality is going to function if the plant is closed. I didn't know that the city depended so much on nuclear revenues until last year [2011]. People around here are saying that we would have to pay more taxes… I really hope we won't. My place [the hostel] has not been doing well recently and my family and I are barely getting by.

Mr. Igarashi's account indicates a state of uncertainty that came up amidst an already difficult period for his business. While he did not benefit from the plant nor paid attention to the nuclear risk in the past, he feels suddenly exposed to the reality of the current municipality that heavily depends on the nuclear industry. He says that he feels 'things will be worse in the future' and that he is only looking forward to the day his son completes his university studies and becomes financially independent.

Mrs. Sugiyama, 40s, is a single mother who works as a district nurse in the town. She explains that what happened in Fukushima changed her views about the NPP. 'If I have the choice, I would not opt for a restart. But when I think about the city budget, I fear unexpected outcome.' Depending on the city budget for her livelihood, Mrs. Sugiyama is worried that the shutdown of the nuclear station will negatively affect her income. 'My two children and I live off one salary. I cannot imagine what would happen if I lose it.' She says that her life has been going through a rough patch since the death of her husband:

> My husband and I had a salary that enabled us to lead a decent life. Now that he passed away, my salary is barely enough to meet the needs of my two children and myself. Since his death, I have been in a state of insecurity trying to keep my head above water. With the recent nuclear issue, we [medical staff] have been told that the budget might be reduced.

Mrs. Sugiyama explains that she suddenly found herself on her own, fully responsible for the welfare of her sons. 'I never thought seriously about it [NPP],' she adds, indicating coexistence with rather than dependency on the plant. A medical worker like Mrs. Sugiyama is personally threatened by any potential austerity measures resulting from any policy changes including the potential shutdown of the Hamaoka NPP. Similarly to Mr. Igarashi, who did not notice the nuclear risk in the past, she is overwhelmed by the socioeconomic risk looming on her personal security. Mrs. Sugiyama is probably not the only medical staff that is facing such dilemmas. Moreover, when it comes to the public sector, the municipality funds the salaries not only

of medical staff but also of fire department personnel and other public service employees, including kindergarten and elementary school teachers.

Mr. Iwata (76), the retired teacher who lives in Hamaoka-cho, explains that many workers in the public sector have traditionally been part of the middle class and have been enjoying relatively secure employment conditions that would be negatively affected by any potential structural reform measures. He adds,

> Things have been deteriorating for over a decade now…The merger with Omaezaki-cho resulted in a reduction of jobs in public service, so that some retired people like me were not replaced by new ones and this pushed young people outside of the area.

While issues of youth outmigration and population shrinkage will be broadly discussed in the following chapter, it is important to point out that informants, such as Mr. Iwata, are aware of the difficulties the area has been facing regardless of the nuclear facility. In other words, with or without the Hamaoka NPP, the area's financial and other plight could not have been unabated.

Mr. Ozawa (40s), the housewife who lives in Hamaoka-cho, is also apprehensive about the possibility of a negative impact on the local school following the closure of the plant:

> My two children are at school in Hamaoka. What happens if the [nuclear] shutdown had an impact on the school budget? My husband and I will probably have to think of another school elsewhere. I'm glad he does not work for the plant [Hamaoka NPP] so I'm not particularly worried about money, but if things get worse we would probably have to move out and rebuild our social life away from Hamaoka.

Mr. Ozawa is one of many residents who are not sure how the nuclear shutdown might affect local life in the area. In other words, her account does not show strong correlations between the perception of economic benefits and her attitude towards the nuclear facility. While not being affected on the

personal level, Mr. Ozawa seems to be listening to her peers, and her opinion of the nuclear facility might be shaped by the social environment around her.

> I don't know if it is true or not but many people are warning me that schools, doctors, shops ... all the public and private services of the municipality would pay the price of a closure.

These accounts do not stress the significance of the nuclear risk as much as the future impact on the personal and communal lives. In this sense, it shows how residents face risk that is multifaceted and changing constantly, and therefore have to consider the multiple short and long-term effects of their decisions. Despite not benefitting from the nuclear industry, many informants are aware of the uncertainty surrounding the future of their locality in the event of a permanent shutdown of the Hamaoka NPP. While becoming opposed to the restart of Hamaoka NPP in the wake of the Fukushima nuclear disaster, many residents seem to be constrained by time and resources and therefore do not see the nuclear risk separately from reality of everyday life. In other words, those people who have been conducting an ordinary life cannot be fully occupied by a nuclear facility that suddenly became *risky*.

3. Direct and Indirect Operational Impact

In addition to the municipal revenues, the Hamaoka NPP provides hundreds of jobs. This direct impact generates substantial secondary impacts throughout the region. The nuclear power plant creates jobs in the secondary industry, such as construction, that procures many of the plant's needs. Moreover, spending by plant employees makes a significant impact on industries and business outside the NPP supply chain. Based on informants' accounts, I will address some of these economic impacts indirectly attributable to the Hamaoka NPP and how such impacts affect the attitude of the residents towards the NPP. The economic impact includes temporary

workforce at the plant (such as construction and cleaning activities) and the local industries that accommodate to the needs of the nuclear industry (real estate agencies, hotels and restaurants), and others. Finally, I will evaluate the local impact that would accompany a permanent shutdown of the plant. Whether the closure of the Hamaoka NPP would have multiple negative impacts that go far beyond the plant's operation will be analyzed; and whether this would hit other industries including the local's healthcare, hotels, restaurants and real estate agencies will be explored.

3-1. Employment

The Hamaoka NPP provides a sizable number of temporal and permanent full-time jobs. Chubu Electric provided 3594 jobs in Hamaoka NPP, as of Oct 1, 2010. 41% of the employees are from Omaezaki city and the rest are employed from neighboring cities: Kakegawa, Makinohara and Kikugawa city, and other cities in Shizuoka (see figure 2). Most of the plant's workforce lived in the vicinity of the plant, and that have kept much of the earned income within Omaezaki City and its surrounding municipalities. Employees at the Hamaoka nuclear power plant enjoy well-compensated and stable employment, allowing them to perform the best among their peers in the area.[119]

[119] Interviews (2012).

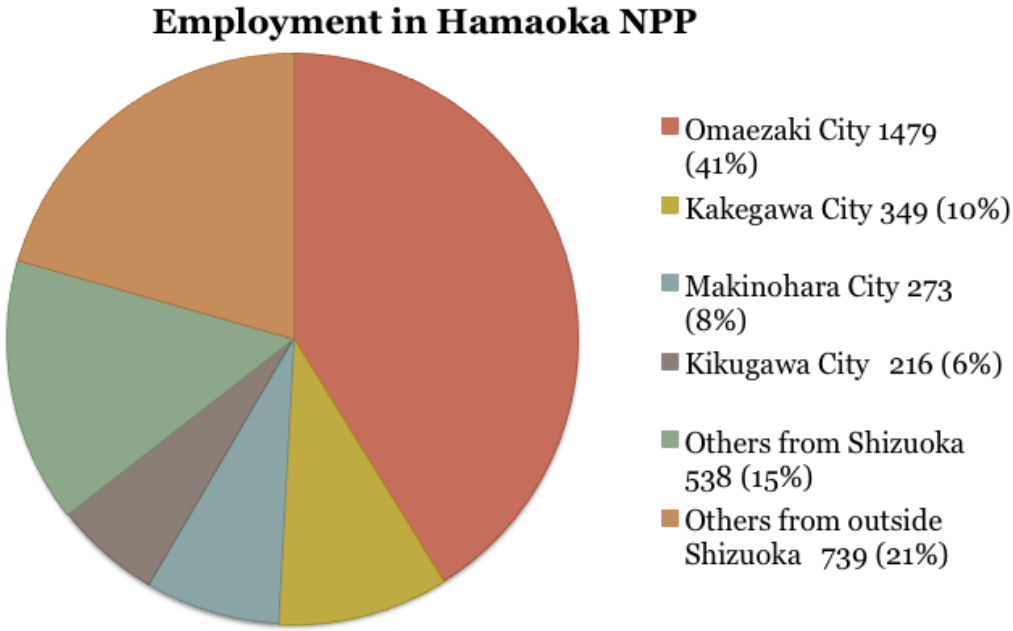

Figure 2. Employment in Hamaoka NPP
Source: Website of Chubu Electric Company

According to the data provided by Omaezaki City's website, among the 1479 people from Omaezaki employed by Chubu Electric at the Hamaoka NPP, 765 are directly employed full time. Most of those employed have skills specific to the nuclear industry while others have management and supervisory responsibilities. Additionally, there are 2502 people employed by subcontractors at the same facility. The workforce provided by subcontractors varies in size depending on factors such as the construction of a new reactor, the scale of operation and the frequency of inspection activities. According to the nuclear-industry-related data provided by the municipality of Omaezaki City, subcontractors employ few thousands of workers at the Hamaoka NPP. The data shows that the number varies in number, reaching a total 6650 workers in 1991.[120] Many of these workers are hired on an irregular basis and

[120] See Omaezakishitokeisho 2011 (Omaezaki City, Statistics Pamphlet 2011), https://www.city.omaezaki.shizuoka.jp/hisho/shise/toke/documents/m.pdf. Retrieved October 29, 2016.

perform the most unwanted tasks in the nuclear facility, hence are sometimes referred to as “nuclear gypsies”.[121] It should be noted that the majority of these workers are not from the local community, but hired from day-labor centers in big cities such as Tokyo, Osaka, and Nagoya.

Unlike other industries in the area, many jobs at the Hamaoka NPP require specialized skills. Therefore, wages tend to be above average. Residents who work at the plant have therefore relatively well-compensated jobs and many can achieve home ownership and above all a good social status among their peers in the community.[122] As mentioned above, not all employees come from the area. The highly-specialized nature of the nuclear industry requires skilled workforce that cannot be provided by a small area like Omaezaki City. Therefore, other regions help supply the needs of the plant. This small figure compared to the number of the local population (over 32.000) implies that Omaezaki residents are not benefiting as much as expected from the Hamaoka NPP, at least when it comes to direct employment.

This is an indication that many local residents do not receive any direct benefits from the nuclear facility and thus their support of the nuclear restart is not an attempt to gain any profit but to avoid the losses that would result from the closure. The findings show that informants do not consider nuclear risk as the most pressing issue in their everyday life. Instead, they place issues of nuclear risk in the context of a differentiated and locally relevant landscape. Among a multitude of risks and hardships, nuclear risk is considered as a condition they are used to and which they can cope with. As one informant jokingly puts it, ‘I have more life experience living in an area where there is a nuclear power plant than living in a nuclear free area.’

Now, how do those who work at the plant explain their situation? During the fieldwork, I managed to conduct interviews with two residents who are directly employed by Chubu Electric. Besides Mr. Kawashima (50s) who is from Hamamatsu and whom I introduced in the last chapter, I talked to

[121] Writer Kunio Horie coined the term “nuclear gypsy,” which refers to ‘contract workers who have traditionally performed the dirtiest, most dangerous jobs for Japan’s power utilities.’ See McCurry, Justin (July 13, 2011). "Fukushima cleanup recruits 'nuclear gypsies' from across Japan". *The Guardian*. Retrieved October 29, 2016.
[122] Interviews (2014)

Mr. Tamura (40s) who was born in Hamaoka-cho. In order to avoid the official narrative usually provided by the corporate's public relations division as much as possible and to have a more authentic conversation, I asked the informant to do the interview outside his office environment. Therefore, the interview took place in a casual setting at a coffee shop in Hamaoka-cho over the weekend.

Chubu Electric assigns one representative personnel for one of the five districts in Omaezaki City. Mr. Tamura (40s) is in charge of representing his company in one of the five districts in Omaezaki City. His job involves communication with residents and responding to their concerns regarding any problem that rises up during the operation of the facility. Living with his family in a house 2 km away from the plant, one might think that he and his family are constantly worried about their safety. 'We are not worried at all', he says in a calm manner, and adds that 'it is something we have gotten used to. I remember I stopped getting worried after few months of starting this job.' Mr. Tamura met his wife, who is from the neighboring Kakegawa City, at work after she was transferred to the Hamaoka NPP from the headquarters of Chubu Electric (located in Nagoya) in 2000. She later decided to quit in 2010 to focus on raising their two young children.

A civil engineering major, Mr. Tamura has been working at the Hamaoka NPP since 1995. 'I'm extremely lucky to have found such a good job and stable income in this area', he says. 'I wouldn't have met my wife if it wasn't for the plant so I owe it a lot,' he adds with a smile. Mr. Tamura looks indeed satisfied. Unlike many local people who still have to some extent the rustic and laborious lifestyle that comes from living in rural Japan, my informant has the look of an urban middle-age man that one could encounter in any big city. 'My work is stressful so I am glad to be living in the countryside. I can relax after work,' he says. Yet, he complains that there are not much recreational activities available in the area, and says that he usually takes his family to Kakegawa City or Shizuoka City for leisure on weekends. 'Our town is far from everything and not everyone can have a stable job like me. My friends moved out after high school in search of jobs and never moved back. Now they visit once a year to see their families during the New Year holiday. They always tell me how jealous they are of my position.' It is not very common to

meet highly educated, relatively young people in the area. The nuclear industry is one of few places that still attract people like Mr. Tamura to stay.

Being familiar with the operation of the nuclear plant, he and his wife have always spoken positively of the benefits of nuclear energy. When asked about his opinion of the Fukushima meltdown, Mr. Tamura notes that 'the accident should not have happened. Nuclear energy is not supposed to inflict such pain on people's lives.' Living and working in a similar environment, he understands well how it feels to experience such a catastrophe not only from the position of the nuclear industry but also as a local resident living with his family in the immediate vicinity. Yet Mr. Tamura thinks that the Hamaoka plant should be restarted once the new security measures come into effect.

> I think I will be fired if the plant closes down or at the least I will have to move to another department far from the area, which I don't want to do. Even if I receive a small payout, it won't be very much. My wife and I are worried because we bought our house 10 years ago. I need my salary to pay my mortgage installments.

Moreover, to fulfill his familial responsibility, Mr. Tamura mentions the latest events put him under new pressures and gave rise to concerns about his children's future and the care of his elderly relatives:

> I am thinking, just in case something bad happens to my job, so that I will be able to find an alternative. I have a family to support. I have to make sure that my kids do well at school so they can make it as adults.

Asking Mr. Tamura if local life has undergone changes since the suspension of the nuclear facility, he says that nothing much has changed and life is the same for almost everyone. The suspension of the plant created different kinds of jobs related to inspection activities and the construction of the embankment. In other words, the Fukushima disaster and the subsequent suspension of the Hamaoka facility did not cause major disruption in the local employment sector according to him. He admits though that the suspension increased the sense of uncertainty about the future and created a climate of

tension among local residents. It was disruptive in the sense that more people started worrying about the future. He explains how suddenly the local community became anxious about the nuclear facility yet he hopes that people will support the restart of the plant eventually.

> I guess things will not be the same anymore. Many people including my relatives and neighbors in the area are anxious about the plant…Of course I'm not the only one in this situation. Many residents understand the difficulties of finding a good job in the area. I know people who still cannot find regular work here.

This account shed a particular light on some of the concerns and positions of those directly employed by the nuclear industry. Despite his positive attitude, Mr. Tamura's awareness of being caught in the cycle of dependency created by the nuclear industry is apparent. His account reflects that he is clearly anxious about the possibility of sustaining the middle-class aspirations for his children's future. Unlike the experts who solely focus on the nuclear issues, Mr. Tamura realizes that, even under exceptional conditions, he and his family are not only exposed to the nuclear risk, but other related risks that he deliberately accept, take, and let shape, whether actively or passively, his everyday live.

3-2. Secondary Operational Impacts

In what follows, I will show how some of the local residents I interviewed rely on the operation of the Hamaoka NPP and how the threat of the shutdown looms negatively on what they have been led to consider as a normal conduct of everyday life. It should be noted that the choice of these residents was based purely on their willingness to talk with a stranger about their everyday life: no specific criteria were applied beyond this one that appeared fundamental to me in order to obtain as spontaneous, as personal

an account as possible. I had no prior knowledge of their opinions on the Hamaoka NPP, nor information about whether their livelihood was in anyway dependent on or coexisted with it.

Mrs. Yamamoto

Mrs. Yamamoto is a talkative and welcoming lady in her 50s. She owns an inn with a capacity of around 20 clients located in the vicinity of the Hamaoka nuclear power plant. It is not the only inn of its kind but hers is one of the closest, being only around 2 km from the nuclear plant. Relying mainly on clients affiliated with the nuclear facilities, she managed to turn her small family property into a good business 20 years ago. During the operation of the plant, her hotel relied on technicians, engineers and businessmen coming from big cities like Tokyo and Osaka. Today, following the Fukushima nuclear disaster and the subsequent suspension of the Hamaoka nuclear power plant, Mrs. Yamamoto is uncertain about the future. She has no alternative business plan for her hotel in case the power plant is pushed toward a shutdown. For the time being, however, the suspension of the power plant has not yet badly affected Mrs. Yamamoto's business. The hotel has been quite busy with clients of different purposes: journalists, professionals and workers involved in the building of the tide embankment in front of the Hamaoka nuclear power plant. 'I live in confusion and so does everyone in this town,' she tells me.

I start with Mrs. Yamamoto's narrative because it captures the uncertainties residents whose livelihoods depend on the nuclear industry face on a daily basis. Mrs. Yamamoto has one son (22-year-old) and one daughter (19-year-old). Her son did not continue his studies after finishing high school and decided instead to work with his mother running the inn business. Before 2011, they both were planning to expand the inn by building a small annex that would accommodate to the growing nuclear industry at the time. The plan was shelved amid the climate of uncertainty that emerged after the Fukushima nuclear disaster and subsequent suspension of the Hamaoka NPP. As for the daughter, she had to move out from Omaezaki city when she was accepted in undergraduate program at Shizuoka University. When I ask Mrs. Yamamoto for which candidate she voted in the mayoral election

conducted in the summer of 2012, she says: 'I voted for Ishihara because he promised to restart the plant [Hamaoka NPP]. The other candidate was too reactionary and did not know what he was saying. You could argue that restarting the Hamaoka is a wrong decision and I would agree with you. But let's not fool ourselves here. There are no other alternatives for now or in the near future.' Mrs. Yamamoto thus justifies her political choice out of a lack of other viable alternatives. She believes that her business would not survive without the restart of the power plant. While lighting a cigarette, she tells me that she wishes there was a better alternative where clients would come to her hotel for other purposes than the nuclear facility. Then she adds:

> My business depends on this plant. I have been doing this job for 20 years and nothing bad had happened. Why would we suddenly stop now? Who is going to pay all the hefty monthly bills and my daughter's tuition fees? You know, it brings me headache.

Talking to Ms. Yamamoto, she explains how the actualization of her plans has been undermined by the events of 3.11. 'We never expected anything like that to happen,' she adds, in reference to the nuclear disaster. With a pessimistic attitude about the future of her business, she is determined to protect her interests to secure a better future for her daughter.

Mr. Tanaka

Mr. Tanaka (63) is the head of a family-run guesthouse in Hamaoka-cho. The place is smaller than Ms. Yamamoto's inn and looks rather old. After the construction of the nuclear plant, a large number of people would come and stay in the town for the regular facility inspection but the town did not offer convenient accommodation facilities. Mr. Tanaka took this opportunity by opening the guesthouse in 1981. He proudly says that he established long-lasting friendships with his clients affiliated with the nuclear industry. He tells me that in the past, nothing came through this town except the diesel

locomotive running between Fujieda town and Fukuroi town in the same prefecture. Tanaka remembers the time when the town received the proposal from Chubu Electric. ‘The mayor started telling the local people that the chicken that lays golden eggs is finally home,’ he says. The local residents including Mr. Tanaka had hopes for a prosperous town so they accepted hosing the Hamaoka NPP.

According to Tanaka, seven poor families were living on the purchased land but their livelihood improved thanks to the plant. Jobs suddenly became abundant and the community was growing. While Chubu electric owns a housing complex in the area that accommodates to workers who are required to stay long in the area, Tanaka’s business relies mostly on the regular inspection activities at the Hamaoka NPP. Since the beginning of its operation, there have been regular inspections at the facility once every six months. Every inspection would last for 90 days and a number of inspectors would move in the town. Mr. Takeda’s guesthouse was bustling with people. The best time, according to him, was during the construction of unit 3 and the construction of unit 6, which came to a halt in 2011. Many workers were staying at his guesthouse during these two periods although he complained that the number of guests have decreased over the last 10 years. It is because of the reduction in the number of regular inspections and personnel following the shutdown of reactor 1 and 2. He also blames it on the establishment of several new business hotels. At the moment, things are slightly better for his business with workers flowing the town again for the construction of the tide embankment.

During our conversation, Mr. Tanaka says that there are many residents like him whose livelihoods depend on the NPP. ‘After the construction of the plant, not only business hotels and guesthouses, but also gasoline stations, restaurants and bars establishments started appearing in the small town.’ He admits, though that the town economy is declining. He fears a sudden change that would bring unforeseeable consequences in his life.

Mr. Horikawa

Mr. Horikawa (56) is an operator of a restaurant located in the vicinity of the Hamaoka NPP. After having a conversation with him, I understood that his business relies on clients employed by the nuclear facility. He believes that he will be facing troubles if the plant is shut down permanently.

> Shutting down the plant would not be an issue for people whose livelihoods are not dependent on this industry. Many people, including myself, support the power plant today because we are dependent on it. With the suspension of the operation, the economic situation of this town is uncertain. I know for sure that my business would not survive unless the nuclear reactors are restarted.

The restaurant is Mr. Horikawa's only source of income. He tells me that it is not always profitable and he barely makes ends meet, particularly with increasing bills and expenses for his two sons who are high school students. To boost their business, Mr. Horikawa and his wife started preparing bento [lunchboxes] and offer catering services to the workers at the NPP.

> In the event of a [plant] shutdown, my business will be negatively affected and I might have to find an alternative. I am turning 60 soon and I have no plan for retirement. I don't think I can start any new business at this point. You know, I have to keep a hold of what I've got.

These narratives highlight the perverse effects of the benefits brought by the plant: they are seen by the residents as the sole and only resources they can count on to sustain a decent living. Therefore, to many residents whose livelihoods coexist with, and to a great extent, depend on this one single industry, the 2011 sudden course of events came with an acute feeling of powerlessness, of being unable to reinvent their life without the nuclear facility. In other words, they see no other choice but to keep with the *status quo*. In such a context, it appears that what is masking the probable nuclear risk from

the residents' field of vision is the real and more pressing risk(s) threatening their everyday lives. Albeit the risk of a Fukushima-like catastrophe in Hamaoka has become more salient in the eyes of the local residents, its intensity fails to downplay the immediate and more personal risk(s).

The main risk those residents fear seems to be unemployment, or the prospect of a less decent job. This fear looms all the darker over their everyday life that the local area suffers from chronic economic issues that make the NPP a providential source of benefits within a profoundly distressed, economically and demographically affected landscape. In order to understand what is at stake in the community's everyday life with hosting the nuclear facility, it is now necessary to analyze the broader context of a shrinking, aging society.

3-3. Persisting Economic Uncertainties

Despite the municipal revenues and the jobs (direct and indirect) generated by the Hamaoka NPP, the area has failed to attract businesses and industries that would provide an alternative source of income and employment, and decrease the dependence on the local nuclear industry. Indeed, despite the operation of the Hamaoka NPP, local economic conditions are still difficult and Omaezaki City has a relatively low rate of labor participation.[123] Moreover, jobs that offer low income and require physical labor do not attract younger population. Young people retreat to migration when they do not find stable full-time jobs with fixed contracts and decent income. This problem, as it will be shown in the following chapter, in part leads to sustaining another chronic problem, i.e., population shrinkage.

[123] The participation rate is a measure of the active portion of an economy's labor force. The rate refers to the number of people who are either employed or are actively looking for work. During economic recession, many workers often stop looking for employment, resulting in a decrease in the participation rate. As of December 2012, labor participation rate was at 55.5 percent. This is lower than the prefectural and national rates of 57.5 percent and 58.50 percent respectively.

In order to understand the economic struggle that working age population of Omaezaki City is faced with, the overall picture of the employment structure in the city deserves our attention. Figure 3 shows that the primary sector provides the lowest rate of employment at 10.2%. Manufacturing (5.428 employed persons) and construction (1.835) mainly shape the secondary sector, which provides 38.6% of the general employment. Tertiary sector employment is the highest at 49.1% of the workforce. The employment is mainly in wholesale and retail trade (2.213), medical, health care and welfare services (1.286), hotels, eating and drinking establishments (1.200), transport activities (794), government employees (510) and education (435).

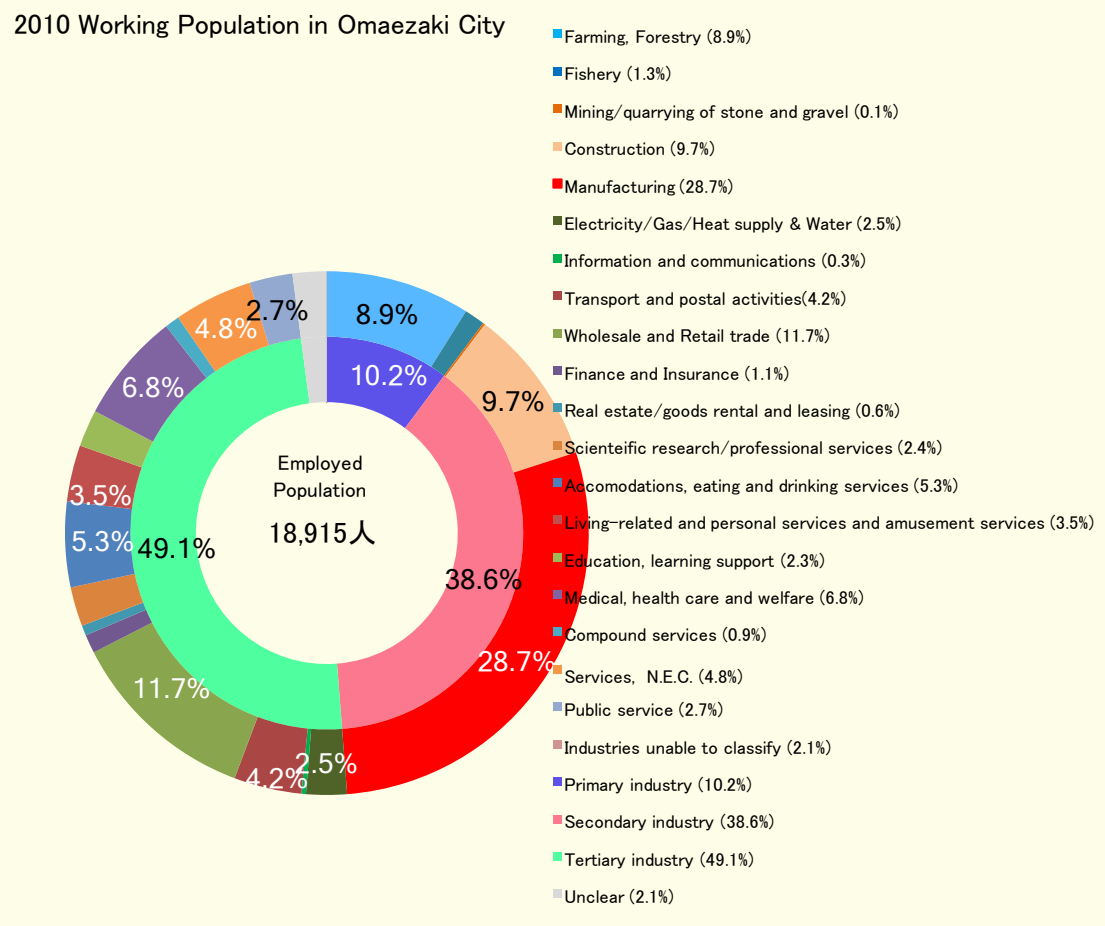

Figure.3: 2010 Working Population in Omaezaki City
(Based on data retrieved from employment statistics section of the Omaezaki City Municipal Website)

In small factories, many workers such as farm wives are on a part-time base. Lacking legal status, these workers, regardless of their skills, earn very little wages that do not exceed the legal minimum per hour. For small-scale farming families, the working pattern is usually characterized by elderly members working at the farm, while the housewife works at a local factory and other young members of the family work in bigger cities or for a local

construction company. Some family members might have jobs in the public sector (town office or agricultural cooperative).

Moreover, real wages at such factories in the area continue to fall because of the cost competition with developing countries. Mr. Iwata, a retired high school teacher who lives in Hamaoka-cho, explains how a small clothing and textile subcontractor in the area announced plans to shift its supply route to a South Asian country. Families who were involved in the business appealed to the management to keep at least part of the production in the area. The management eventually agreed on the condition of lowering subcontract costs.

> I know some families who had difficulties keeping their contracts with a textile factory in the area that was supposed to be relocated to Thailand. Luckily, the manager agreed to keep one line of the production and now these families continue to supply materials… But hourly wages fell from 1000 yen to 850. There had no other choice.[124]

Another informant, Mr. Yoshimura, the farmer in Hamaoka-cho recounts how many farmers' livelihoods, including his, do not depend solely on agriculture anymore. He says that young males usually work in construction while women workers at factories. He further explains that many workers cannot simply negotiate wages as an attempt to maintain factories and jobs. This as we will see in the next chapter lead to further depopulation and aging community.

[124] Oguma (2011) recounts similar situations in Fukushima prefecture where many hourly wages dropped as low as 300 yen. While such wages are illegal, employees generally do not appeal to labor protection agency in fear of losing jobs in an already precarious employment context. See Oguma, Eiji. "The Hidden Face of Disaster: 3.11, the Historical Structure and Future of Japan's Northeast." *The Asia-Pacific Journal* 9, no. 31.

4. Social Pressures

As has been shown above, the economic risk is significant in shaping residents' attitudes towards the nuclear risk. However, it is difficult to imagine that only economic benefits dictate the residents' view towards the NPP in the host community of Hamaoka. It is clear that some residents fear unexpected outcome on their economic life and such fear therefore translates into a supportive attitude towards the NPP. However, explaining residents' attitude only in economic terms would be simplistic.

Besides economic concerns, what are the risk(s) that could be blocking the residents view from protesting against the nuclear risk in the host community? One issue that fails to draw the attention of those who emphasize the economic benefits is the social pressure felt by many residents who became anxious about the facility after the events of 3.11. Indeed, a resident who does not receive any tangible benefits from the Hamaoka NPP and is worried about his/her safety may sense uneasiness with expressing negative opinions towards the nuclear facility. This research found that residents are tied up to the social reality that makes them have a paradoxical attitude towards the nuclear facility.

Miki (30s), a surfer and café manager who recently became opposed to the plant, says that she does not dare to discuss or express her opinion with anyone around her:

> It is a very touchy subject. If you are at the local bar or attending some gathering and then decide to talk about it you will have to feel the mood and make sure no one you know will be upset with what you are going to say.

Mr. Iwata (76), the retired teacher who has been opposing the operation of the nuclear facility since the Kobe earthquake, shares a similar opinion.

> Two of my neighbors work at the plant and my wife has a relative who is affiliated with the nuclear industry. Even when they are not around, you

sense that they might know what you say and you just don't want to hurt anyone so you end up being silent. I myself don't care and speak up my mind but I understand it is not easy for everyone.

Similarly, Mr. Ozawa (40), the housewife who lives in Hamaoka-cho who has been worried about the safety of the area explains how the topic of the nuclear issue can create tension among the residents.

> The shutdown of the [Hamaoka] plant would destroy families. Some people do not understand this situation. They get provocative and just snap at anyone affiliated with the plant. My husband told me about a fight that happened in a local bar recently when an angry anti-nuclear man told a worker at the plant, 'If you want to work in the nuclear industry, just go to Fukushima.'

Many residents cannot speak up their opinions against the NPP fearing their actions would cause unanticipated outcome on their social relations. While speaking up their opinion would not necessarily bring collateral damage to their livelihood on the economic level, many residents are thus still reluctant to express such a different opinion. As the young surfer, Takuya, puts it, 'you just don't want to "lose face" in front of your friends or neighbors.'

Residents who oppose the restart of the NPP are indeed aware that the closure of the facility would have a negative impact on some of their peers. This does not allow the emergence of a strong, locally rooted anti-nuclear coalition. This includes the attitude of some residents of the neighboring communities in Makinohara and Kakegawa, which have been portrayed in the media as opposed to the restart of the Hamaoka NPP. A shopkeeper (40s) from the neighboring Makinohara City shows a complex attitude.

> I am honestly against restarting the plant and would rather see it close down but I cannot just say that to anyone. I have a friend who has been working there for more than 15 years. I know him and know his parents

very well. His livelihood is attendant on the plant. It is a very sensitive matter.[125]

While the municipal boundaries that define such communities may deceive the observer about the situation, such boundaries are not always meaningful for the ordinary resident. People have relatives, friends and acquaintances, who may benefit from the plant in one way or another. These very real social ties with relatives, friends and neighbors often weigh more, within the residents' decision-making process, than the 'imagined community' that is created by political boundaries (Anderson 1983). This emphasis on the social ties therefore creates a different reality than the one often portrayed by the media.

According to Kainuma Hiroshi, local residents of villages and towns that host nuclear facilities often remain silent about the potential risks of the technology. The reason for this silence is thus manifold: not only the fear of losing jobs and economic benefits, but also the anxiety over the potential loss of social connections play a role. Kainuma points out that this feature is common in peripheral communities that tend to be marginalized and unequally treated in comparison to urban centers (Kainuma 2011, 101-118).

This analysis was to some extent confirmed by my interviews. Mr. Ito, 76, a retired factory manager and a long anti-nuclear activist, could not have expressed it more clearly:

[125] Neighboring local municipalities have been opposed to restarting the Hamaoka nuclear facility (See Chapter 1). This has been demonstrated when the Makinohara City Assembly on September 26, 2011 voted for a resolution that calls for a permanent shutdown at the plant (*Wall Street Journal*, 18/10/2011). The restart of the nuclear station does not rely merely on the local decision of Omaezaki City. Chubu Electric agreed upon a "safety contract" with the Shizuoka Prefectural Government, in which only the governor will have the power to veto any restarting of the plant. However, his decision will depend heavily on local decisions of Omaezaki and other neighboring cities. Additionally, the role of nuclear-related revenues and jobs in the decision-making process in such cities is almost trivial. For example, while Makinohara City receives taxes and jobs from the nuclear station, the economy depends on various resources mainly including the production of green tea and the manufacturing of automobile components. In particular, the local Suzuki car factory, which provides seven times more subsidies and jobs from the nuclear station, has given hint of moving its factory elsewhere unless the plant is shutdown (*Japan Times*, 16/07/2011). For local residents in Makinohara City, it can be argued that different sorts of risk(s) are influencing the decision-making process, with locals fearing an unexpected outcome on their livelihood.

> Residents don't always speak honestly in gatherings. They feel each other out. Due to regional ties and blood relationships, people often seem to be tied down with money. The word “genpatsu” become a taboo no one dares to spell out.

The utility companies take advantage of the residents’ reluctance to create tension among the community. Chubu Electric hires scientists to attend town meetings and explain about the safety of the plant. Such meetings are often framed as an open dialogue between local residents and representatives from the nuclear industry. Scholars and journalists argue that the utility companies, which aim at targeting certain categories of the local population to attend, usually stage such meetings.

TEPCO, for example, organized in 1980 a public hearing regarding its proposal for building a NPP in Kashiwazaki town. Over 6,000 members from national anti-nuclear groups arrived, hoping to attend. Despite the great turnout, only eleven of the twenty confirmed questioners and 77 of 250 confirmed observers were allowed to attend the meeting. The proposed power plant was approved and completed five year later (Aldrich 2008, 131).

On April 6, 2011, Chubu Electric held an explanatory meeting at the Sakura District Hall in Omaezaki City. The meeting aimed at discussing the Fukushima nuclear disaster in light of the gigantic tsunami and explaining the tsunami-counter plan to be implemented by Chubu Electric. The company, however, did not talk about the measure taken against the anticipated Tokai earthquake. Mr. Ito says,

> During the meeting, I expected there would be a fierce exchange of criticisms but to my disappointment nothing happened. Young people who should take the initiative and raise their voices rarely show up at such meetings. You will be stunned by the silence of the residents who mostly come from the Sakura district where the Hamaoka NPP is located. I was very surprised as if there has been an arranged meeting between them and the operator.

Other pro-nuclear groups sponsor discussion of nuclear power as well. The American journalist Eric Johnston recounts his experience when he participated in one symposium about nuclear power in Fukui Prefecture. He notes that nearly all attendees were pro-nuclear advocates and that he was the only 'opposing foreign voice who would add a small degree of public legitimacy to what was obviously a rigged game.'[126]

Whether one agrees or not with Johnson's statement of these meetings being a 'rigged game', it seems clear during my fieldwork that many residents did not seem to have an effective outlet to speak up their concerns. Conversations show that some informants consciously make the choice to retreat into silence despite feeling anxious about the nuclear facility. However, it could also be argued that expressing the fear to speak up is an indirect way to indeed voice an objection. As Mr. Kato (70s) who runs a ramen shop in Omaezaki-cho, jokingly says, 'silence is gold.'

Social relations therefore play an important role in shaping residents' attitudes wards the nuclear facility. Unlike outsiders who focus on the abstract nuclear risk in the wake of the Fukushima nuclear disaster, local residents cannot isolate or restrict the nuclear risk to one place and one moment in time. Risk understandings depend on a combination of social aspects that can be located in the community, and the ways in which residents make sense of them in and through everyday practices.

As has been in shown in this chapter, informants are aware of the nuclear risk but are also confronted with difficult decisions to make, which have visible consequences on the social and economic conditions of everyday life. Despite the benefits generated by the nuclear facility, local residents feel vulnerable and undermined by any potential changes and threatened by the impact of possible economic and social collapse.

Apart from informants' concerns about socioeconomic conditions and their children's future, there has been a sense of anxiety about the ability to care for the elderly. Based on how informants talked about their fear of socio-economic precariousness, population shrinkage, caused both by ageing and

[126] Eric Johnston, "Covering Nuclear Power in Japan - Notes from the Front Lines," The Foreign Correspondents' Club of Japan (2007).

youth's outmigration, emerged as a major concern. The next chapter will focus its analysis on this risk that looms large on the nuclear host community.

CHAPTER 5
Diffusion of Risk(s):
Population Shrinkage in a Nuclear Town

When discussing the aging and population shrinkage-related challenges currently affecting the Hamaoka community, it should be pointed out that these are chronic problems the community has been facing for over half a century. These demographic challenges are having a significant impact on the everyday life of the residents and the local community as a whole. To juxtapose this risk against the probability of a nuclear failure, the former is more difficult to neglect than the latter, which has only recently amplified in the wake of the Fukushima nuclear disaster. Based on population data and informants' accounts, this chapter aims at analyzing issues of depopulation and ageing along with their attendant impact on the Omaezaki community. It will further show how this demographic problem casts its shadow over the area with seemingly more urgency than the nuclear issue.

The depopulation crisis is not simply a recent response to the 2011 Fukushima disaster and its aftermath. The language of this crisis dates back to 1967, when Hamaoka politicians framed the dream of local development or *machi-zukur*' (town-making) in terms of risks such as continuing de-population and loss of identity, which were looming over the community larger than the risk of a nuclear failure. These social factors have then shaped local residents' reluctant acceptance of the nuclear facility when the Sakura district in Hamaoka-cho emerged as the targeted site for the construction of the Hamaoka NPP (Lesbirel 1998). For the Hamaoka community, the acceptance of the nuclear project was not about playing a role in the national energy policy, but about the survival of the town itself (Mori 1982).

Population shrinkage is not a unique phenomenon to Omaezaki City. With a sustained fall in fertility rate, the Japanese population has been shrinking for decades and recent projections indicate further population decrease of around 25% by 2050 (The National Institute of Population and Social Security Research 2012). While population shrinkage may have positive consequences in terms of decreased human pressures on the environment and the quality of life (Butler 2015), ageing and population shrinkage may have negative outcomes on the affected regions. In particular, the spatial inequality between metropolitan and provincial regions at the national level, and between local and urban areas at the regional level. As mentioned before, the rural and urban inequalities (such as Hamaoka against other urban areas in Shizuoka and Kanto region) is not recent but extend back and been recognized by government officials since at least the immediate postwar period. Issues of ageing and population shrinkage have become especially acute since 1990s, when 'the onset of economic stagnation coincided with the unwinding of the demographic tempo effects of the postwar baby boom and the long period of below replacement fertility.'[127] This has been a pressing issue for rural communities, where segments of old residents are larger and yet these localities have been lagging behind urban areas in terms of economic development.

While the acceptance of the nuclear industry helped the community to maintain the population intact at the time and even achieved growth in population number during the 1970s and 1980s, due to the local area becoming more industrialized — as will be shown below —, it has never brought the desired outcome on the long term; the community is still facing today population shrinkage and aging. Despite the expansion of the nuclear facility (reactor no. 5 started operation in the late 1990s), the local population has indeed been experiencing renewed shrinkage since 2000 and Omaezaki City's population lost around 4,000 persons, from a peak of 36,059 in 2000 to 32,433 in 2015 (see Figure 4).

[127] Matanle, Peter. "Towards an Asia-Pacific 'Depopulation Dividend'in the 21st Century: Regional Growth and Shrinkage in Japan and New Zealand." *The Asia-Pacific Journal: Japan Focus* 15, no. 6 (2017).

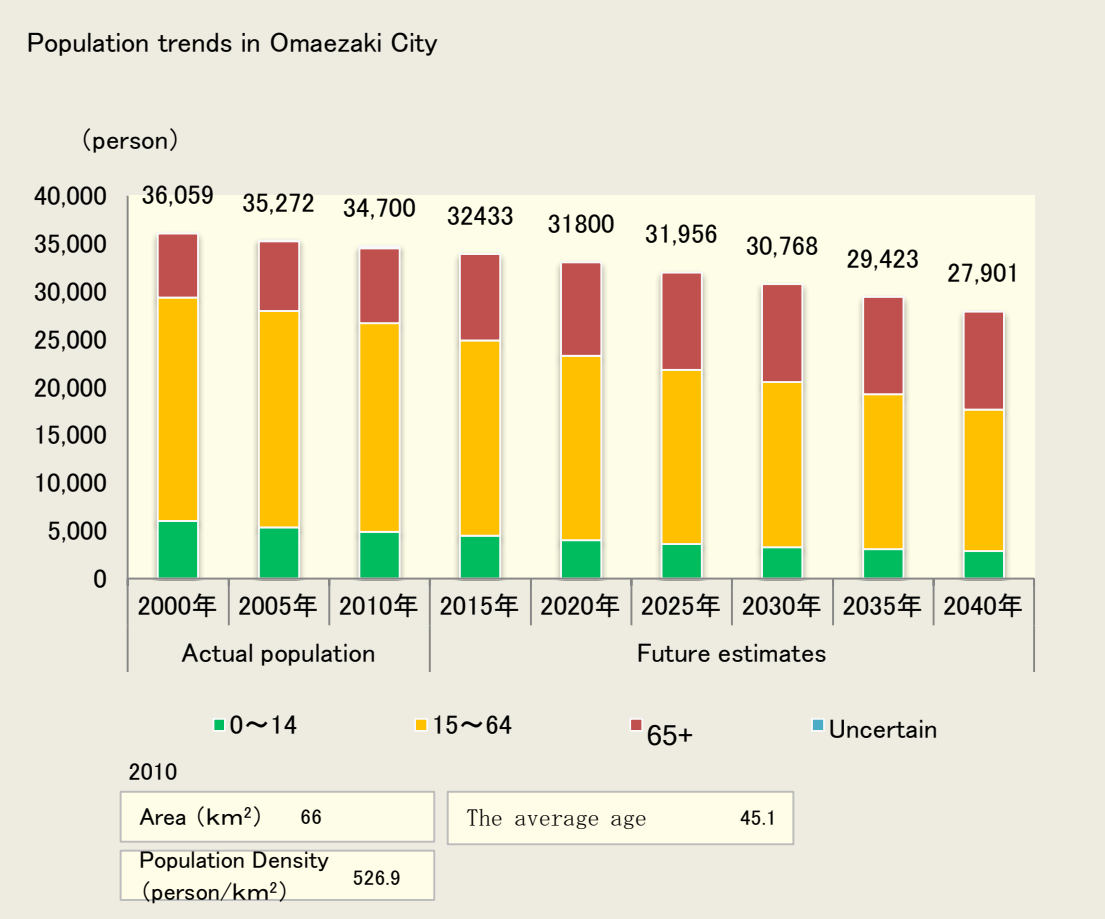

Figure 4. Population Trends from 2000 to 2040 in Omaezaki City
Chart made by the author based on the data
from the official statistics webpage of Omaezaki City (2015).

Compared to other rural and urban areas facing depopulation in Japan, it could be argued that the population decline in Omaezaki City is not as substantial. However, it is not the actual numbers of the population *per se*, but the breakdown of the demographic pyramid that deserves our attention here (see Figure 5). As of 2015, residents aged over 65 constituted around 27% of

the population, compared to less than 16% in the 1960s. This has many implications on the community: decreased working population; increased pressures on government to provide pensions; strain on the local government to provide adequate health care to support the elderly (i.e. care and medication); larger tax bills borne by the working population; and decreased rate of economic growth.

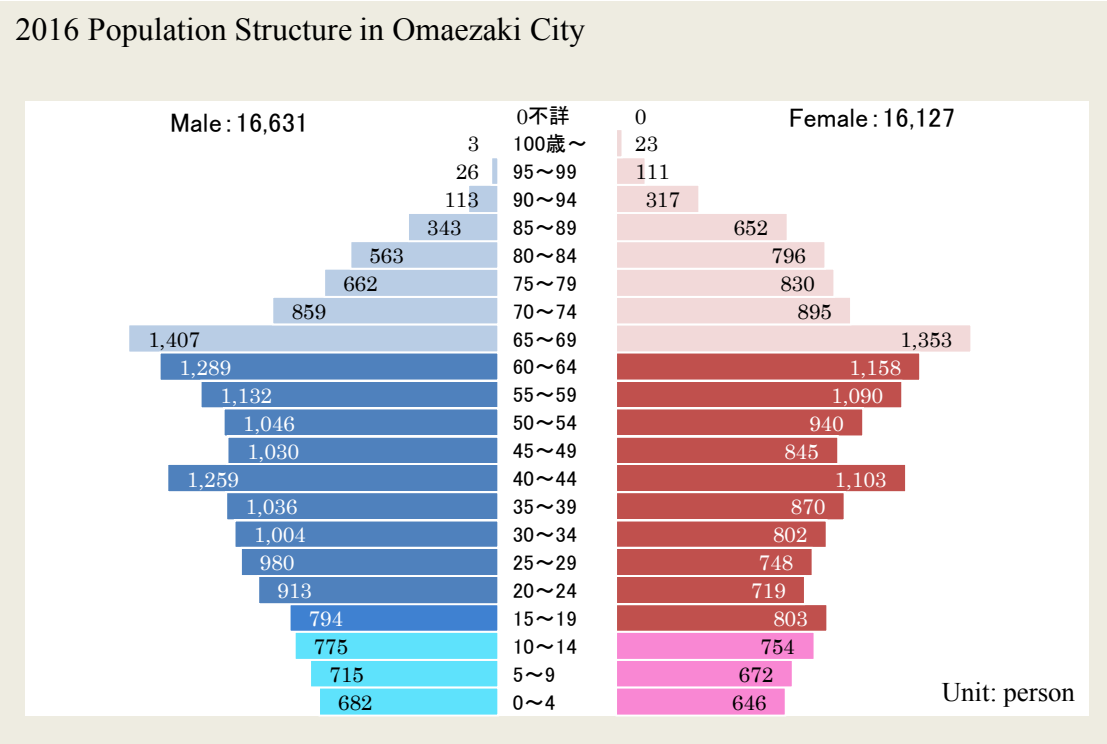

Figure 5. Population Structure in Omaezaki City (2016)
Chart made by the author based on the data
from the official statistics webpage of Omaezaki City (2016).

To give a general overview of the depopulation and ageing issues in the Hamaoka community, this chapter will present quantitative demographic data gathered from official sources (mainly, past data from the National Population Census and future projections from the National Institute of Population and Social Security Research, NIPSSR) translated from Japanese to English. The aim of this data is to describe Omaezaki City (Hamaoka-cho and Omaezaki-

cho)'s postwar population development. Table 3 below represents population change in this locality over the following intervals in Japan's recent history:

1950 – 1990: **The Postwar Era**	**1990 – 2030:** **Towards the 21st Century**
1955 – 1970 Depopulation	1990 – 2000 Stagnation
1970 – 1990 Expansion Construction of the NPP Began in 1971; Commercial Operation Began in 1976	2000 – 2010 Shrinkage 2010 – 2030 More Shrinkage 3.11 and The Fukushima Nuclear Disaster

Table 3. Population Change in Omaezaki City
Over Intervals in Japan's Recent History

The chapter will further show qualitative data based on the interviews collected during the fieldwork. While interviews centered on the informants' attitude towards the nuclear issue, many of the informants constantly made references to issues of depopulation and aging, which are increasingly posing challenges on the individuals, the community, and the local area. Some of the interviews therefore focused around the informant's understandings in regards to the effects of aging and depopulation on the local area on the one hand, and their attitudes towards the NPP on the other.

1. A Long History of Population Loss

Population shrinkage in Japan's remote rural areas started as early as the early 1950s. In the 1960s and 1970s, government officials recognized the population decline in rural areas and pushed local authorities to start the implementation of various projects aimed at regeneration (Knight 1994). During this process of modernization and urbanization, both Hamaoka-cho and Omaezaki-cho were lagging behind compared to other towns in Shizuoka prefecture. Farming and fishing stopped becoming a sufficient source of livelihood and many locals started taking a second job to increase their quality of live. The lack of economic activity in rural areas like Hamaoka-cho pushed many young people to urban areas. They were attracted to jobs with stable income, mainly in the second and third sectors. As a result, Hamaoka-cho was losing around 300 young people every year (Lesbirel 1998, 82).

The community was facing an existential crisis as shrinkage was deepening and broadening at unprecedented rates. According to Matanle and Rausch, who tackled the issue of depopulation and ageing in *Japan's Shrinking Regions in the 21st Century: Contemporary Responses to Depopulation and Socioeconomic Decline*:

> Population shrinkage is multidimensional and is a process that normally occurs within a cumulative self-reinforcing pattern of depopulation, economic disruption, and social deterioration, the outcome of which is a renewed — if not strengthened and accelerated — cycle of the emptying of local communities, the gutting of local economies, collapse in local reserves of social and human capital, and a decline in the quality of life experienced by those who remain. (Matanle and Rausch 2011, 19)

For the community, population shrinkage is thus more than a demographic phenomenon and is accompanied by the deterioration of the

financial landscape and other foundations of the community. Two general factors are to blame for the population shrinkage: low fertility rate and the out-migration of young people drawn to metropolitan areas.

1-1. Outmigration

Let us start with examining the latter. The majority of the migrants go to metropolitan areas centering on Tokyo, Osaka and Nagoya.[128] Some people migrate inside the same prefecture to urban centers such as Shizuoka City and Hamamatsu. Once young people leave their villages and hometowns, very few return. There are many factors that cause this outmigration. First, differences in income levels between farmers and industrial workers influence the outmigration of young people from a rural area such as Hamaoka-cho.[129] Second, the rapid economic growth of the manufacturing, construction and service sectors has created a demand for labor, and consequently the out-migration from rural regions accelerated, especially in isolated places like Hamaoka-cho and Omaezaki-cho.

It should be pointed out that, unlike the impoverished rural communities in the Tohoku region facing similar issues, rural areas such as Hamaoka-cho and Omaezaki-cho are parts of the Pacific Coast Manufacturing Belt, where much of Japan's economic activities took place in the immediate postwar period.[130] This did not play out in their favor. Compared to other remote areas, the close proximity facilitated and accelerated the movements of outmigration of young people.

The lack of income is not the only reason for the outmigration. The standard of living in the rural communities was jeopardized due to the population concentrating in urban areas. Kakiuchi and Hasegawa (1979) reported that rural communities were increasingly worried about the lack of

[128] See Kiuchi, Shinzo. "Recent Trends in Urban Geography in Japan". *Annals of the Association of American Geographers* 53.1 (1963): 93-102.
[129] See Kakiuchi, G. H., and Masami Hasegawa. "Recent trends in rural to urban migration in Japan: The problem of depopulation". *Tohoku University Science Reports Series 7: Geography/Tohoku Daigaku Rika Hokoku Dai-7 Shu Chirigaku* 29.1 (1979): 47-61.
[130] *Ibid*.

public services and facilities such as schools and hospitals. According to their report, isolated communities in Ehime Prefecture in the 1970s had to contact medical staff from Taiwan, because Japanese doctors were not willing to relocate to a rural village. Toka-machi, a rural community in Niigata Prefecture, is another example mentioned in the same report: the trip to the nearest clinic took around 30 minutes by car in the good weather and 2 hours during snow season (Ibid).

Similar problems were contributing to the outmigration in Hamaoka-cho and Omaezaki-cho. Both areas lacked educational and transportation facilities, and were characterized by a poor social environment. Town municipalities were facing such deteriorating socio-economic conditions that METI officials at the time designated the area as depopulating and underdeveloped. In Hamaoka-cho, bad living conditions and the difficulty of maintaining public services are some of the memories that are still present in the psyche of the elderly generation. According to Mr. Yoshimura (70), the farmer who lives in Hamaoka-cho, more than 30% of the population was working in farming in the 1950s while farmers today make about 5%. He complains that most farmers today are elderly, and agricultural workers are not always from the Hamaoka area. He adds,

> Life was very different back then and young people did not see any prospect in remaining. You look for jobs outside when your family does not own a land or at least a good business to take over in the future. Many of those who left Hamaoka were young… I know many people who left immediately after graduating from junior high or senior high schools. People like me who wanted to be farmers remained. But we were becoming a minority.

Similar to other host communities around Japan, agriculture and fishery in Hamaoka-cho and Omaezaki-cho had been carried on traditionally. However, those industries had gradually declined through the shift of industrial structure in the country, and it also caused a serious depopulation there. Job creation along with construction, operation and maintenances of the Hamaoka NPP have been attractive for the local community as the

presence of such a facility maintains the hopes of stimulating second and tertiary industries and stopping outmigration and depopulation.

Back before the construction of the NPP, many residents were becoming increasingly anxious about the lack of services, such as medical facilities, and the lack of cultural and social opportunities:

> The nearest dental clinic was in Kakegawa. It took more than an hour to get there at the time. Also, many people started comparing the area to other places they visited, and they would complain about not having social amenities and recreational opportunities like coffee shops or movie theaters.

From the perspective of older townspeople at the time, the revitalization of the local economy was very important, as this would have been the only hope for making young people stay or even return from their new urban residence. Interestingly, today the area still lacks the opportunities and amenities that encourage young people to remain. In particular, lack of railway station and inconvenient geographical features still push many young people to urban areas in search of educational, social and employment opportunities. Still an outsider cannot but be left with the impression that the ageing and population shrinkage seem to justify any policy – including NPP –, in such communities. However, from the perspective of townspeople and local politicians, the depopulation and its attendant consequences on the social and economic foundations have had far stronger impact in the past than a probable and, until the 2011 Fukushima crisis, an abstract nuclear risk.

1-2. Low Fertility

The second major issue causing population shrinkage is the low fertility rate, which is a national problem. A developed country would experience depopulation when the total fertility rate (TFR) — the average number of children born to woman over her lifetime — drops and remains below the

population replacement level of 2.1 children per woman over a period of time.[131] If the total fertility rate remains low over a prolonged period of time, depopulation eventually occurs as a result in a surplus of deaths over birth (Matanle and Rausch 2011, 19).

In the case of Japan, this phenomenon began following a brief baby boomer phase between 1947 and 1949. While urban Japan's population has increased during the period of rapid industrialization, rural areas were rapidly facing a depopulation crisis. The total fertility rate was 3.65 in the 1950s, but has continuously declined to stand at 1.26 in 2005. As of 2015, the fertility rate stands at 1.41. According to a recent report by the United Nations Development Program, the fertility rate in Japan is estimated to rise to 1.72 per woman in the next 30 years. However, this will remain below the replacement level of 2.1, which means that depopulation is expected to continue (UNDP 2015). The fertility decline will add more pressures on Japan's rural communities where decline in working force and aging population is causing serious social and economic contraction.

What is particular about an area like Hamaoka is the lack of amenities that support young families to have children. In reference to a comment about supporting childbearing made by one candidate for the council of assemblymen at Shiraha District during an oratory street speech in Omaezaki City, a mother of two children, Ms. Ozawa, who was listening to the speech with me, complained that all candidates are elderly. She adds,

> They come from a different generation, when childbearing and household chores were only the responsibility of women. I don't think they understand what it means to raise children nowadays. Can you imagine we still don't have a maternity hospital in the area? It is so inconvenient for young women like me.

Ms. Ozawa's comment underlines that not only the area is suffering from aging, but also still fails to provide the necessary environment for improving the situation.

[131] Espenshade, T.J., Guzman, J.C. & Westoff, C.F. *Population Research and Policy Review* (2003) 22: 575. doi:10.1023/B:POPU.0000020882.29684.8e.

2. Competing Risks: the NPP in a Shrinking Locality

What is striking about a community like Omaezaki's today is that it continues to face the same problems that were at the core of the narratives justifying the installation of the Hamaoka NPP: aging society and population shrinkage. Is it to say that the nuclear facility has had no effect on these two issues? Paying a closer look to the details of the local demographic evolution is necessary in order to understand how the NPP, while temporarily halting the most obvious ills of the population loss, did not manage to fundamentally change the dynamic of the area. Figure 5 shows population change in Omaezaki city from the postwar era. The highlighted figures illustrate a rapid depopulation, in Hamaoka-cho, between 1955 and 1970 followed by population growth in the following two decades.

Year		Total
1955	Hamaoka-cho	19816
	Omaezaki-cho	10361
1960	Hamaoka-cho	18,723
	Omaezaki-cho	10,171
1965	Hamaoka-cho	17,371
	Omaezaki-cho	10,050
1970	Hamaoka-cho	17,177
	Omaezaki-cho	10,005
1975	Hamaoka-cho	18,611
	Omaezaki-cho	10,708
1980	Hamaoka-cho	19,859
	Omaezaki-cho	10,915
1985	Hamaoka-cho	22,155
	Omaezaki-cho	11,324
1990	Hamaoka-cho	22,891
	Omaezaki-cho	11,346
1995	Hamaoka-cho	23,547
	Omaezaki-cho	11,769
2000	Hamaoka-cho	24,490
	Omaezaki-cho	11,985
2005	Omaezaki City	35,272
2006	Omaezaki City	34,999
2007	Omaezaki City	34,922
2008	Omaezaki City	34,900
2009	Omaezaki City	34,892
2010	Omaezaki City	34,762
2011	Omaezaki City	34,221
2012	Omaezaki City	33752
2013	Omaezaki City	33250
2014	Omaezaki City	32754
2015	Omaezaki City	32433

Table 4. Omaezaki City – Population Change

The rapid depopulation occurred mostly during the earlier decades of rapid economic growth in Japan (1950 - 1970). The population growth in the 1970s is due to the slowdown of rural-urban migrations in the wake of the construction of the NPP. As shown, the new facility did halt depopulation shrinkage with the creation of employment opportunities in both the nuclear industry and the secondary attendant one. However, the growth from the 1970s was not unique to a rural area like Hamaoka-cho, but a common phenomenon in most rural Japan due to consolidation of economic gains by the central and local governments, and the push towards more spatially balanced development through redistribution measures such as the local allocation tax (Ishikawa 1992; Shirai 2005).

In the late 1990s to 2010 however, local population was going through double-negative population disequilibrium. This pattern is characterized by both negative natural reproductive balance and continuing rural-urban migration (Matanle and Sato 2010, 196). Out-migration among young adults reduces the aggregate reproductive capacity of the community and contributes to further population aging and shrinkage. In Omaezaki City, the largest proportionate population drop in the recent years has been among the 0-14 of age, which fell from 20% in 1990 to 13.2% in 2015 (See Figure 6). This tendency will only accelerate in the future according to most estimates.

Distribution of the Age Specific Population in Omaezaki City (%)							
	1990	2010	2015	2020	2025	2030	2035
0-14 years old	20	14.0	13.2	12.1	11.3	10.6	10.3
15-64	65.8	63.3	60.2	58.3	56.9	56.0	55.2
65 and over	8.1	22.7	26.6	29.6	31.9	33.4	34.5
75 and over	6.1	12.2	13.2	14.6	17.9	20.3	21.8

Table 5. Distribution of the Age's Specific Population (%) in Omaezaki
Source: National Institute of Population and Social Security Research (NIPSSR).

On the other side of the demographic pyramid, the over-65 group has more than tripled, from 14.2% in 1990 to 26.6% in 2015, showing that Omaezaki City has become an aging community. Moreover, Figure 3 demonstrated that population shrinkage is increasing. Since 2000, the rate of out-migration of 15- to 29- year olds has also accelerated due to the economic growth in the metropolitan areas. The population of Omaezaki City declined by approximately 10% between 2000 and 2015. If we pay attention to young women who play a central role in childbirth and rising children, we find that the young female population (20 - 39) was at 3.139 (Figure 5), comprising less than 10% of the overall population (32.432 as of 2015) of Omaezaki City.

2-1. A Precarious Equilibrium

Now, how do the residents perceive the implications of population shrinkage in their everyday lives, and how is this perception interacting with the risk of a nuclear failure? During my conversations with informants, many mentioned ageing and population shrinkage as one major threat Omaezaki City is facing. Many are aware of the social and economic challenges this problem is already bringing to the community and how the shutdown of the NPP would further deteriorate the situation. In the context of the nuclear issue, some informants compared the current situation to the past when the area was underdeveloped, while others highlighted the importance of ensuring sound business and employment conditions to keep young people engaged in the local economy. Mr. Tanaka, hostel owner in Hamaoka, expressed the disadvantage of an aging community in very clear words:

> There are many old people around here. Even when it comes to the working force, a major portion is of men in their late 40s and 50s. Young people would work here only if there are stable and well-compensated jobs. The situation is not bad now but people fear their children would leave if good jobs become scarce. It is very similar to the situation in the 1960s when many young people left their families

behind for better jobs. I think if this happens, the local area will be mostly older people who do not produce nor buy very much.

Mr. Tamura's account, despite being from an employee at the NPP, makes apparent the system of dependency hosting the NPP has created in Hamaoka:

> Employment is a central component of the local economy. I think many people are not comfortable with the nuclear [plant] here, but they know that there is no alternative for now. To oppose the plant is like saying no to jobs and stability. It is like telling young people: "Go away." I don't think people want to experience more hardship in their life… You know, some jobs offer so little pay that I personally know many people who are forced to take up two or three temporary jobs to increase their income.

Mr. Tamura's account echoes with another informant's experience. Miki, a young woman who lives in Omezaki-cho, touched upon aging based on her personal experience. During our conversation that took place in the small, laidback surfer café where Miki works, she complained that what she makes is barely enough and that she is glad at least to have flexible hours so she can help at farms on an irregular basis. She adds,

> My brother and I have to chip in to support the family. He lives in Shizuoka City and I live with my parents and grandmother. My grandfather passed away 5 years ago… My mother used to do part-time jobs but now she completely stopped after my grandmother has been diagnosed with dementia. She is in need of constant care.

Some residents, in particular the elderly, are paying close attention to the recent deterioration of living conditions and the difficulty of maintaining public services. While busily working on his farm located 2 km away from the Hamaoka NPP, one farmer, Mr. Nagasawa (76) who opposes the nuclear restart, hurriedly mentioned to me that doctors avoid staying in the area:

> I did not know that Chuden contributes to medical facilities until I heard about it from my neighbor the other day. It is really nice facilities and all that but not many staff working there. Specialized doctors are gradually decreasing and many avoid working in the area. I suffer from rheumatism and have to regularly drive my car to a clinic in Kikugawa City.

Furthermore, the level of education is significant in shaping out-migration of young people from Omaezaki city. As of the time of writing, the city had no senior high school, making young students going to the school located in the neighboring Kikugawa City. Upon graduating from high school, most students leave Omaezaki to pursue further studies at the university and only few come back. To many young people, this remote area does not live up to their expectations, especially after honing up their skills and knowledge at the university. The elderly farmers I talked to lamented that almost no one wants to work on farms. Only major employers like Chubu Electric still offer jobs suitable to some of the newly graduates.

Thus, the nuclear power has a far-reaching impact on many aspects of the local economy. It is estimated that 42% of the city's revenues come from property taxes on the nuclear plant and subsidies related to the facility. Besides public works on roads, schools and hospitals, sound finance means more jobs in the public service, which includes local agricultural cooperative, local administration and school teaching. For example, it is common for the eldest sons to enter the public sector if he is expected to take over the household farms or businesses on the side. Such route, however, would be difficult if the city's finance decreased, which will bring in return more municipal rationalization measures.

Due to the suspension of the plant in May 2011, the municipal assembly had to pass an extra budget bill in June of the same year to cut 600 million yen ($7.7 million) in spending.[132] This meant fewer job openings in the

[132] Fearing the money would decrease, the "municipal assembly had to pass an extra budget bill to cut 600 million yen in spending" (*Asashi Shinbun*, 11/6/2011). http://ajw.asahi.com/article/behind_news/social_affairs/AJ2011110716746

public service than the previous year. Mr. Koto (70s), who runs the ramen shop that lies in a close proximity to the Omaezaki lighthouse, referred to the municipal merger as a case in point:

> The 2004 municipal merger resulted in a reduction of the jobs in the public service, as the city did not replace many retired officials. Also, the number decreased when some jobs moved to the new city office in the Hamaoka area [in reference to the location of the Omaezaki City office building]. There used to be more people moving here around lunchtime or in the evening when the old town building was still in use. Today the building is deserted and the city office does not care to send someone to mow the wild grass around the building.

2-2. Fears of Becoming a Ghost Town

As evidenced by these narratives and the preceding data, population shrinkage has been one of the most urgent challenges facing the community for a long time. Local residents have accepted hosting the nuclear facility more than four decades ago as an attempt to halt outmigration of the young people. While the nuclear facility has ameliorated this unaddressed situation, it was not sufficient to wholly remedy it. The Fukushima nuclear disaster occurred at a moment when the Hamaoka community was already caught up in a new wave of aging and population shrinkage that started to be visible close to the beginning of the 21st century. Local residents, therefore, do not want to become the isolated and remote community it had been once in the past. When discussing the possible shutdown of the Hamaoka NPP, the past experience of depopulation has become a point of reference for many residents, posing as a reminder of the bad consequences this phenomenon would bring to the community.

Indeed, some of my informants referred to cases in other regions of Japan, where local communities have been struggling to regenerate their localities following the disappearance of a certain major industry. In this

regard, Kamishi City in Iwate Prefecture is a case in point. Once called a "town of steel", Kamaishi City played a major role in Japan's postwar economic growth as it hosted Kamaishi Works (steel mills) of the Nippon Steel Corporation. More than 20 years have passed since the steel mills were closed, and Kamaishi is still trying hard to attract manufacturing firms while promoting local foodstuff. The efforts proved fruitless as the city's population was halved from 87.000 people in 1960, to 43.000 people by 2005. Moreover, the community is facing serious problems with population aging, as the share of elderly-single households was at 12.4 percent of the city's households in 2005.[133] Ms. Yamamoto, the inn owner, is afraid of a similar outcome:

> As long as there is no alternative, we cannot just simply oppose the nuclear facility and request its closure. What would be the alternative? Those who are running the municipality seem not to have a clue about what would keep this place [Omaezaki City] moving in the event of a shutdown. I think it will be hard for many people including myself, and I'm sure the media will call Hamaoka the new Kamaishi.

The memory of ongoing hardships faced by the Kamishi community where coal industry ceased to exist acts thus as a point of reference to my informant whose livelihood is threatened by the possible closure of the local nuclear industry. She is aware that the closure of the nuclear facility calls for an urgent community development and such prospect is not encouraging neither for residents like her nor local politicians.

Yubari, a former coal-mining town in Hokkaido, is another example that demonstrates how the collapse of a major industry constitutes another form of population shrinkage in Japan. Depopulation occurred in Yubari after the collapse of mining and an attempt of restructuring the town into a tourist destination (coined: *tanko kara kanko e* — from mines to tourisms) resulted in a disappointing failure (Seaton 2010). Another example is Takashima, Nagasaki prefecture, where the collapse of the coal mining industry triggered depopulation. The reconstruction and rationalization of the coalmine led to a

[133] See Thompson, Christopher S. "The Study of Hope in Kamaishi." *Social Science Japan Journal* 13.2 (2010): 241-247.

decrease in local population as many of those who lost their jobs were forced to move out to seek new lives. Between 1986 and 1995, the population was reduced from 6.000 people to about 1.100 (Tatsumi 2000).

The possibility of such a drastic depopulation looms large on the psyche of the local community in Omaezaki City. The collapse of a major industry does not only generate the outmigration of the employed population at such industry, but also generates more depopulation among other segments of the community. This indeed does not only concern those who work at the nuclear facility and their families, but also residents who run or work at shops and business lodgments who will likely have to close their business and look for new sources of income.

Mr. Iwata is a former high school teacher (76) who thinks the future of Omaezaki City would be better without the nuclear facility and believes that today is the right time to step up discussions on how to build a community not dependent on large subsidies and grants for hosting the NPP. His position is explicitly based on taking into account a broader context than the immediate surrounding he lives in. He says:

> I think the town can survive without the nuclear facilities. I know many people who share the same view and many started thinking about developing the town without the plant. But also, unfortunately, many people still think that Omaezaki would be financially a poor municipality without the nuclear industry. There are examples from the past that support their arguments. Historically, when Japan changed its energy policy and shifted from coal to oil, many towns such as Yubari in Hokkaido, and other towns in Kyushu, were subsequently impoverished following the closing of coalmines.

The comparison with the case of Yubari is interesting: the locality is now well known for being one of the poorest in Japan. Mr. Iwata thus seems to acknowledge how such an example could represent a strong argument in favor of those supporting the Hamaoka NPP.

This chapter has analyzed the problems of ageing and population shrinkage affecting the host community in Omaezaki City. In the past, the community struck on the decision to host a NPP in its backyard as an attempt to halt the wave of outmigration. The attempt was initially successful but not sufficient to reverse the number of population. Similar to other rural areas in Japan, the community has been facing for over a decade a new wave of depopulation that poses a serious risk on the foundations of the community. Local residents and politicians, who have become aware of the nuclear risk in the wake of the Fukushima disaster, cannot ignore the risk of population shrinkage and identity loss, which seems to be oftentimes more significant than a probable but still immaterial nuclear risk. Some informants explain about the need they feel to fulfill responsibilities towards their elderly relatives, while others worry about the lack of amenities that support childbearing and elderly care. Interestingly, the community is reflecting on the past experiences as an attempt not to repeat the same mistakes.

As highlighted in previous chapters, local acceptance of the nuclear facility was not only related to the long-term economic transformations, but also to demographic decline. In the wake of the 2011 Fukushima crisis, the demographic perspective has become particularly important as many host communities continue to face population shrinkage. Moreover, the suspension of the nuclear facilities and their potential permanent shutdown would result into outmigration flow that would further exacerbate the demographic reality of these localities.

CHAPTER 6
Trust and Responsibility Negotiated

This chapter examines how Omaezaki residents negotiate notions of trust and responsibility in the aftermath of the Fukushima nuclear disaster. In particular, it demonstrates how the perceived trust towards the local nuclear industry and how its attendant risks are also of great significance in shaping local risk understandings and the way perceived risk is articulated among local residents in the context of everyday life.

1. The Safety Myth Collapses

The 3.11 triple disaster that devastated the Tohoku region of Japan was unprecedented as it combined both natural and technological hazards. There have been clear differences, however, in how the authorities responded to each kind of hazard. While the government's response to the tsunami has been comparably effective, the way the government and Tokyo Electric Power Company (TEPCO) managed the nuclear accident was problematic in terms of the decisions initially made, which have hindered the subsequent recovery process.

In particular, Japanese authorities mishandled the evacuation process and avoided sharing adequate information about radiation levels and the nuclear meltdown with the public. For example, poor communication between the central government and residents in the towns of Namie and Tomioka near the crippled Fukushima Daiichi NPP was evident in the way the central government gave no guidance on how to evacuate compared to other towns (Futaba and Okuma), where the local government provided buses for evacuation. This negligence exposed people who had to remain outside for several days to radioactive particles blown in the winds at the time (*New York Times*, 8 August 2015).

The employment of such an approach that failed to take into consideration the interests of local residents in the devastated areas resulted in a breakdown of trust between the affected populations on the one side, and the government and TEPCO on the other (Bacon and Hobson 2014).[134] Soon after the Fukushima nuclear disaster, one survey shows that only 16 percent of respondents expressed trust in governmental institutions (Hommerich 2012, 52). The nuclear accident exposed the fragile political contract between the people and the state. Many have experienced marginalization and disappointment as citizens. Local residents still hold authorities accountable for the nuclear disaster and accuse them of careless monitoring of NPPs and of withholding important information.[135]

Indeed, the Fukushima nuclear disaster has led to a renewed and strong anti-nuclear voice among the affected local residents in particular, and the general public in general. Such criticism is not directed, as Beck (1992) argues, against the scientific side of expertise, but rather towards the political. In Fukushima Prefecture, following the government's declaration of safe voluntary evacuation zones, Kingston (2011) notes an increase in demand for Geiger counters among the affected communities. Moreover, Slater (2012) highlights public initiatives such as the establishment of informative websites about radiation levels in the affected areas. I argue that such initiatives indicate that the mistrust among the affected communities is directed towards the government as a representative of the scientific knowledge. Additionally, my conversations in October 2014 with some farmers from Iitate, a village in Fukushima prefecture that was totally, although belatedly, evacuated because

[134] It is important to remember that even before the events of 3.11, the Japanese public showed low level of trust towards elected officials. According to data collected by World Value Survey, only 27 percent of respondents expressed trust in the Japanese parliament in the mid-1990s, while in the early 2000s, only 25 percent of respondents stated that they trusted the national government as a whole. See Diamond, Larry, 2007. Building Trust in Government by Improving Governance. Paper Presented to the 7th Global Forum on Reinventing Government: "Building Trust in Government" Session V: Elections, Parliament, and Citizen Trust. Vienna.

[135] In her account that shows how the 1984 chemical leak in Bhopal, India, got intertwined with political, economic, and legal issues over time, Kim Fortun (2001) similarly describes how activist groups resisted the "naturalization" of the 1984 chemical leak in their attempts to hold industrial decision-makers accountable.

of radiation fallout,[136] also revealed the loss of trust between local people and the scientists who were flowing into their areas following the disaster. Interestingly, many farmers put into question the credibility of those scientists and refer to them as 'government lapdog scholars' (see also Yoko Ikeda 2015). Thus, the ongoing nuclear crisis at Fukushima Daiichi has highlighted the power relations among local communities, as many local residents believe that official safety assurances conceal political interests. Such perceptions are also shaped by past experiences in relation to the way scientists have always claimed that nuclear power is safe.

Beck's framework is, again, an adequate analytical tool in analyzing the disruption of the power relations in the wake of the Fukushima nuclear disaster. It highlights the ongoing struggles of the public with expert institutions over the incalculable risks produced by the modern scientific and political structure and institutions. A key point of Beck's theory lies in its clear distinction between disaster and risk. The Fukushima nuclear disaster is an actual disaster, whereas a probable nuclear accident, for example at the Hamaoka NPP, is a risk: a potential hazard or anticipated event. Through the lens of the Fukushima disaster we can observe how people are concerned about nuclear risk in the middle of an actual disaster. This view would be incomplete unless we look at the disaster as a *process*. Indeed, Hoffman and Oliver-Smith define disaster as,

> A process/event combining a potentially destructive agent/force from the natural, modified, or built environment and a population in a socially and economically produced condition of vulnerability, resulting in a perceived disruption of the customary relative satisfactions of individual and social needs for physical survival, social order, and meaning (2002, 4).

[136] Iitate village is located just outside the 30km evacuation zone, north-west of the Fukushima Daiichi NPP. The winds were unfortunately blowing in the direction of Iitate when the plant was sending radioactive material into the atmosphere following a series of hydrogen explosions. This has led to higher levels of radioactivity in the village than some districts much closer to the plant. For forty days the national government refused to acknowledge that reality as the evacuation zones were determined simply by distance from the nuclear plant (30 km radius), and so Iitate was evacuated much later than other areas.

Additionally, they define hazard as:

> The forces, conditions, or technologies that carry a potential for social, infrastructural, or environmental damage. A hazard can be a hurricane, earthquake or avalanche; it can also be a nuclear facility or a socioeconomic practice, such as using pesticides. The issue of hazard further incorporates the way a society perceives the danger or dangers, either environmental and/or technological, that it faces and the ways it allows the danger to enter its calculation of risk (Hoffman and Oliver-Smith 2002, 4).

All disasters have political qualities but modern technological risks and disasters are particularly exemplary. Beck has argued that industrial hazards are the creation of human actors. He asserts, 'it is not the number of dead and wounded, but rather a social feature, their industrial self-generation, which makes the hazards of mega-technology a political issue' (1992, 98). He adds, 'Hazards of the nuclear and chemical age have a social as well as physical explosiveness' (1992, 104). The perceived threat of technological hazards has created a highly conscious society towards prevalent risks and modernity's 'dark side' (Giddens 1990, 9).

On the other hand, Oliver-Smith has argued that a disaster shows how a society adapts within its social, economic, modified and built environments (1999, 27). In his view, disasters take place at the interaction of environment (natural hazard events) and the society's historically produced patterns of vulnerability. This means that a 'disaster begins prior to the appearance of a specific event-focused agent' (1999, 29). The central theme here is vulnerability. When communities are at risk from disasters, it suggests that deep political, economic and social factors exist that enforce pattern of vulnerabilities and thus place these communities at risk.

From a constructivist perspective, disasters do not only cause physical and economic destruction in people's livelihoods, but also 'bring a rapture of previous knowledge(s)… and propose a new truth' (Humphrey 2008, 360). This has certainly been demonstrated in the devastated areas in the Tohoku region in Japan following the triple disaster in 2011. It should be emphasized

that the revealed 'rupture of previous knowledge' has not only been transmitted to the general public, but more importantly to similar nuclear host communities that had not experienced a disaster of this scale yet. In the light of the Fukushima nuclear disaster, local residents in Omaezaki City were reminded how vulnerable their community is. This realization has generated great anxiety for many people but also triggered a desire for reconstruction and preparedness.

On 26 June 2011, METI organized a public forum in Genkai town, Saga prefecture, where the Genkai NPP is located. Broadcasted live on the internet and cable television, officials used the forum to brief local residents about safety measures while receiving online comments that supposedly represented local opinions about the nuclear restart. However, it turned out that many of the comments were posted upon a request from Kyushu Electric, which later admitted asking its employees as well as those working at related companies and subsidies to post comments that support the restart of the nuclear reactors (*NHK TV NEWS* July 30, 2011).[137] This campaign indicates just how worried electric utilities are about local sentiments in host communities after the Fukushima accident.

Indeed, seeing the devastation and the ongoing hardships experienced by the local residents living within the 30 km of Fukushima Daiichi NPP, host communities and neighboring host communities in other regions are not as supportive to nuclear power as they used to be. In particular, towns where there had been plans to build new reactors are showing anti-nuclear sentiments.[138] This shift indicates a widespread sense of distrust towards electric utilities. The distrust interestingly goes beyond the general public and encompasses host communities whose interest lies in the restart of the nuclear reactors. How do local residents negotiate their (mis)trust of the

[137] In the following days, Saga Governor Furukawa Yasushi admitted his regrets for telling Kyushu Electric executives before the forum took place how important it is to show pro-nuclear voices in the business community against anti-nuclear ones.

[138] On 4 August 2011, Minamisoma town in Fukushima prefecture announced that it no longer accepts subsidies given for the proposed reactors by the electric utility. The cancellation of the project though did not come as a surprise, given the fact that the proposed project is located in the devastated prefecture (*NHK*, August 4, 2011).

electric utility? Can they trust the results of the safety checks conducted by the utility after the Fukushima accident?

As has been shown in the previous chapters, local residents have been worried about the survival of the community as a result of different and competing risks and uncertainties including the issue surrounding the local nuclear industry. Many are becoming more reluctant to make the tradeoff between risk and socio-economic security, but not to an extent of refusing the restart of the facility. Even local residents opposing the restart are not uniform in their positions and rather have more ambivalent attitudes based on a more complex framework than the simplistic one usually portrayed in the mass media. The two sides – pro- or anti-nuclear – are therefore not so clearly drawn and separated.

The dichotomy of pro or anti-nuclear indeed often conceals many crucial problems. The nuclear risk is open to social negotiation in the community and the scientific interpretation of risk often neglects important social dimensions that local residents regard as central to their everyday lives. The social and economic context, such as the persistent weak employment foundations and population shrinkage of the community, is directly related to the way local residents perceive the nuclear risk. This chapter aims at demonstrating how the perceived trust towards the nuclear industry and how its attendant risks are also of great significance in shaping the local attitudes towards the nuclear facility. In other words, people perceive the nuclear risk based on their experience of the nuclear industry, which is in charge of controlling the nuclear risk, and have been doing so long before the Fukushima nuclear accident. This is why this chapter concurs with Wynne's argument that,

> More sense could be made of public responses to 'risks' by treating them as responses to the more grounded experience of technologies as both hardware and historically rooted social-organizational relationships (1992, 25).

In contrast to the narrow and abstract definition of risk and probability, I argue that social factors are indispensable components of risk(s)

understandings among individuals. As has been emphasized many times in the preceding chapters, one of the goals of this research is to understand the nuclear risk as a social phenomenon, i.e., in the context of the social life of the host community.

Therefore, in the midst of the amounting uncertainties and ambivalent attitudes towards the local nuclear industry, it is important to examine how local residents negotiate notions of trust and responsibility in the aftermath of the Fukushima disaster. Research has found that communities and societies of all sizes require certain level of trust to enable them to conduct communal and social activities (Putnam 1993, Fukuyama 1995). Trust is an essential component of successful cooperation, collective mobilization, good governance, and rapid economic development. Furthermore, trust mitigates potential risks and uncertainty that surround economic and social interactions.

This research views trust as an everyday strategy to manage everyday risk(s); while responsibility (blame) is examined according to the way it is imagined, assigned and redistributed. It should be emphasized that, unlike those living afar, local residents living in the immediate vicinity of the Hamaoka NPP do not see the nuclear risk separately from the more pressing issues running deep in their everyday lives. Notions of trust and responsibility are therefore imagined and negotiated in the context of competing risks at the local level.

2. Trust

Beck argues that laypeople's risk understandings of modern technologies such as nuclear power develop through a reflexive process. People initially trust experts and support the development of technology. However, once hazardous conditions appear, people become reflexive and highly aware of the potential catastrophic consequences of the technology (Beck 1992). Furthermore, according to Giddens, while people of the so-called 'simple modernity' did not examine their confidence in high technology, those of late modernity have become more reflexive. Reflexivity is here

defined as the regular use of knowledge which individuals continuously rely on to make sense of the social life. This reflexivity plays an important role as a constituent element in the organization of everyday life (Giddens 1990, 1991). Giddens thus characterizes late modernity in terms of 'active trust': trust which people have to invest or withdraw as they become aware of the uncertainty of modern science and technology (Giddens 1994, 14).

Following Beck's and Giddens's arguments, it is the 'scientific knowledge' that helps people to be reflexive. In other words, when people express trust towards those responsible for the development and operation of risky technologies such as a NPP, their trust is built either on reflexive calculation, *i.e.* weighing up arguments and counter arguments provided by the experts, or unexamined confidence towards scientific and technological authority.

However, such interpretations of trust in scientific authority imply that laypeople are rational as long as they accept the credibility of experts' advice on what is risky. Based on empirical research, Brian Wynne provides an important critique of Giddens's analysis of risk and trust:

> [Giddens] makes two mistaken and mutually reinforcing assumptions – that the earlier, ostensibly publicly uncontested status of expertise equaled public trust; and that the reflexive processes of late modernity in which expertise is widely and openly contested are a result of the choices that have to be deliberately made by people exposed as they are (on this view) to a new dimension of insecurity, namely the problematization of (supposedly) previously unproblematic expert authority. (1996, 48)

Using his fieldwork on farming communities in North Wales and their understanding of nuclear risk in the aftermath of Chernobyl, Wynne shows that the farmers' trust is not simply built on scientific knowledge, but it is also linked to social relationships and institutional integrity. Farmers accept scientific authority because their local identity, dependence on institutions, and lack of agency did not provide them with any other choice (Wynne 1992, 1996). In contrast to experts' description of laypeople as 'irrational', Wynne's

work shows that people assess risk based on their own rationality, which is not based on expert systems as Giddens claims. For laypeople, technological risks are understood in relation to the local context of everyday life and according to the perceived threat to the familiar social and economic relationships rather than experts' probabilistic risk calculations.

Further, Michael, in line with Wynne's position, examines laypeople's indifference towards scientific knowledge:

> When talking to laypeople about their scientific knowledge, in many cases we found that people simply do not possess any of the 'relevant' (at least for the investigator) scientific knowledge; they do not simply have a 'defective' body of quasi-scientific knowledge, they have none at all (1996, 107-108).

While there is abundant information on nuclear power and radiation available to both the general public and host communities in Japan, it is important to inquire whether Omaezaki residents try to grasp such information or whether they simply depend on guidance provided by the nuclear industry and local government. In this study on risk articulations in a post-Fukushima context, I found that local residents cannot be always consumed by the nuclear risk, especially when the nuclear issue almost never affects the conduct of the everyday life. As has been shown throughout the thesis so far, nuclear issue, especially after the Fukushima nuclear disaster, is one of many daily concerns for the Omaezaki residents, so much so that nuclear issue alone fails to generate risk awareness.

During the fieldwork, only two informants mentioned interacting with experts during meetings and responding to scientific information, yet such communication seems to provide only a partial context for the articulation of nuclear risk and its actual effects. It is therefore not the probabilistic calculations that make people (mis)trust government and nuclear technology, but rather a combination of factors that are related to social identity, everyday reality and geographic characteristics. It is a rational risk-benefit trade-off.

2.1- New Safety Regulations

Conversations with informants touched upon many of the issues related to safety and nuclear science communication. In response to the government's introduction of new regulatory requirements, Chubu operators introduced new measures to attain full compliance ahead of the nuclear restart (at the time of writing a nuclear restart is expected sometimes during Autumn in 2017). Main safety measures of the Hamaoka NPP include tsunami resistance, fire protection, consideration of internal flooding, and other measures to prevent core damage and containment vessel failures or suppress radioactive materials dispersions.[139]

The managers of the Hamaoka NPP acknowledge the damage done to public trust by Fukushima but vow to never let such an accident happen in Hamaoka. Since the suspension of the Hamaoka NPP, Chubu Electric has spent more than 350 billion yen on additional safety measures implemented around and inside the facility. In March 2016, it completed the construction of a 22-meter-high seawall to protect the plant from large tsunamis in the event that a major earthquake strikes in the vicinity (*Japan Times,* 31 March 2016). Despite all these efforts, many local residents are implicitly anxious and their trust is rather caused out of necessity than actual feeling.

Indeed, attitudes of informants regarding the sea embankment were rather mixed. While some accepted the fact that it is one part of the assiduous efforts Chubu Electric has been making to ensure the safety of the nuclear facility since 3.11, some complained that it was merely a cosmetic approach that would guarantee Chubu Electric a nuclear restart. Mr. Iwata (76), the retired teacher who has been opposed to the Hamaoka NPP since the Kobe earthquake, said that he does not trust the central government nor the local nuclear industry. He referred to the sea embankment as a sign of encroachment to the local environment and complained that it would not decrease the risk from a tsunami. For him, it is merely a cosmetic follow-up to the new governmental framework that was set up in response to the triple disaster.

[139] For more details on the new regulations, see the webpage "the Hamaoka Nuclear Power Station, Today and Tomorrow," operated by Chubu Electric Power Co., Inc.

> The problem in Hamaoka has never been about the tsunami. The area sits on a major fault-line and the main local concern has been always about the possibility of a huge earthquake that would cause a mega nuclear disaster. Chubu Electric cannot do anything about the earthquake so they decided to build a seawall to show that they are serious about safety issues. The irony is that such seawalls did not work in Tohoku areas, so why are they repeating the same mistake? It is pure waste of resources.

The Japanese government set up a new framework to spend more than 25 trillion yen over five years in response to the triple disaster. Despite the fact that around 25 percent of the allocated money was spent on unrelated projects, funds mainly targeted large scale projects in many of the Tohoku communities.[140] The aforementioned construction of concrete seawalls is one example among many projects, which are viewed by the central government and prefectural government as a prerequisite for reconstruction. However, independent reports have shown that more than 90% of the coastal embankments were not effective against the powerful 3.11 tsunami waves that destroyed many concrete walls in Kamaishi and elsewhere (Dooley 2014; Aldrich and Sawada 2015). In this sense, Mr. Iwata's account echoes the failure of such infrastructures to protect communities from potential massive tsunami waves.

Such view is similarly shared by the couple who runs a ramen shop in Omaezaki-cho. Mr. Kato says,

> This wall is meaningless if we think about the earthquake. Even in Ishinomaki, where the city had spent millions on a seawall in the past, the preparedness was not enough and the city suffered massive destruction.

[140] See Brasor, Philip, 2012. Scrutiny of Tohoku reconstruction funds needed. *Japan Times*, 23 September.

Indeed, before the events of 3.11, there has been always concerns about the nuclear facility to sustain a major earthquake. Neither the central government nor legal authorities sided with such concerns, as both always emphasized the capacity of the NPP to withstand seismic activities. For example, one district court ruled in 2007 against plaintiffs that requested the shutdown of the Hamaoka NPP. Judge Akira Miyaoka of the Shizuoka District Court wrote then in his 26 October 'Nuclear Power Day' verdict that 'The Hamaoka nuclear power plant is safe. You can shake it, but you can't break it.'[141]

Mr. Iwata says that he was far from relieved by the court decision at the time as the ruling placed too much trust on the government's safety standards and the nuclear plant's quake-resistant design. The Hamaoka NPP has been tested when the facility was struck by a magnitude 6.5 earthquakes on August 11, 2009. The extraordinarily large ground motion at Unit 5 reactor led to the release of radioactivity, which, according to Mr. Iwata, was eight times higher than normal. Chubu Electric initially denied the radiation release but admitted it later, claiming that the radioactivity was only three times higher than cautionary levels but lower than legally allowable levels.

While the scale of this incident was negligible compared to the Fukushima nuclear meltdown, it raised serious questions about the safety of the Hamaoka NPP and one wondered whether the government and nuclear power companies would learn the lesson from such an accident. Today, a new policy based on the "Lessons learned from Fukushima", such as the construction of sea embankments along coastal areas, is being pitched as if the more experienced the government becomes, the more able it gets to deal with similar accidents. However, Perrow reminds us that given the complex system of the nuclear power plant, any major accident will be a 'novel emergency', not a 'routine one' such as the familiar traffic accidents and fires.[142]

Yet, not all informants share such views. Mr. Tanaka (63), a hostel owner in Hamaoka-cho, expresses his appreciation that the company has

[141] See "Hamaoka Verdict: Passing Judgment on the Judge Nuke Info Tokyo No. 121", Citizens' Nuclear Information Center, November 14, 2007. (Accessed 23 January 2017).
[142] Perrow, Charles. *Normal accidents: Living with high risk technologies*. Princeton University Press, 2011, p. 175.

built a large sea embankment as a preventive measure that would minimize the risk of damage from a potential tsunami, though he agrees that such a measure is insufficient.

> I think the seawall is very convenient for the community, whether the plant is restarted or not. Even if the plant was permanently closed, it won't just go away anytime soon as decommissioning takes many years. In my opinion, transparency is the most important thing now. Chubu and the government should be quick to report and disclose any problem arising at the facility. What happened at Fukushima increased this sense of mistrust but I think we can work together to overcome it.

It is important to point out that the pragmatism of Mr. Tanaka's account may be a result of his hostel business's indirect dependence on the nuclear facility (See chapter 4). During conversations with him, it was clear that he was ready to support any measure that would bring the plant back into operation, which he sees as narrow attempts to restore economic health. For him, mistrust is not really an option.

> We must trust them and believe that they will do whatever it takes to ensure the safety of the plant and the area. After Fukushima, people at Chuden came to realize that times are changing and that local people are aware of and increasingly anxious about the nuclear risk. So they have to be better prepared and do all it takes to raise the standards because many people have become worried about the safety.

Mr. Tanaka's account indicates a renewed awareness towards the nuclear risk following the Fukushima nuclear disaster. While he may sense uneasiness with the nuclear facility, Mr. Tanaka considers the nuclear restart as an attempt to restore a condition he is used to and with which he can cope with.

Social media campaigns were one form of speaking out against the Hamaoka NPP after the events of 3.11. One popular platform is the "Stop!

Hamaoka Nuclear Power Plant" website, which was launched shortly after the events of 3.11. During the fieldwork, I talked to Mana (40s), who used to work at an non-governmental organization (NGO) overseas and now works as a translator and lives nearby Kakegawa City. Since the suspension of the Hamaoka NPP, Mana dedicates most of her time, together with a group of local activists sharing similar concerns, to campaigning for closing the Hamaoka NPP. Their campaign collected within 2 years over 8000 signatures through online petition (last update 2014). She hopes that closing the Hamaoka NPP would be the first step for an all-phase-out of nuclear energy in Japan. Unlike informants in the Hamaoka area who are constantly preoccupied with the management of their everyday life, Mana, considering the nature of her job, has a rather more cosmopolitan view that goes beyond advocating for the abolition of nuclear energy. She does not only support conscious energy consumption and full reliance on renewable energy, but also cares and writes about other social and political issues on the local, national, and global level. She explains that Naoto Kan's decision to suspend the Hamaoka plant brought hope to many people as it was the first promising change in national policy on nuclear energy. She says,

> Until 3.11, I never thought seriously about the nuclear power and its attendant risks. It is only after the accident that I started talking to people who were anti-nuclear long before the Fukushima accident and I realized that it was extremely difficult for them to have their claims that nuclear technology is flawed heard.

After the LDP returned to power in December 2012, the new government headed by Prime Minister Shinzo Abe put nuclear energy back on the political agenda with plans to restart as many reactors as possible. Mana expresses her disappointment in the Abe government's campaign to return to the status quo as it was before the events of 3.11. She claims that the government and the nuclear industry do not care about the local communities and just want to move on with their national agenda.

> Just before Fukushima happened, TEPCO was saying that everything was fine, everything would be okay, all systems would be in place and nothing would happen. It turned out afterwards that the main things they should have been doing have not been done properly. We know how many lies they said and how conditions have been broken inside the plant all the time. I don't believe a word they're saying anymore.

She adds,

> One hopes that the government would do an independent and comprehensive study about each plant, and that it is not the money that will decide whether the plant will stay open or not… But I have no trust at all and don't think any of this can happen.

One of the interviews with Mana in December 2012 touched on the seawall embankment and other countermeasures that Chubu Electric has started implementing at the suspended Hamaoka NPP. According to her, the massive structure shows just 'how far, and high, the government is willing to go to hold on to nuclear energy.' She adds,

> I live around 25 km away from the sea so I am not worried about the tsunami but still I admit that there has been a great deal of unease regarding the Hamaoka [NPP] since the Fukushima meltdown. One thing I find worrying is that I hadn't heard about any Hamaoka resident asking for the seawall. Chuden and the government just decided to build one. I also hadn't heard anything about Chuden pushing up the timeline to build the wall. They say it will take until 2016… which means another four years of waiting. This is totally unacceptable. What if a huge tsunami hits the area during this period and this in turn caused a fire or radiation leak at the plant? Still, the whole thing [seawall] isn't sufficient and I doubt it would even be effective. Even if it did prevent a direct strike from a tsunami, it occurs to me the water will still enter and swamp the plant.

Mana's view on why local communities have to be burdened with the nuclear risk and wait four years for the sea embankment reminds us of Umegaki's argument (2009): to whom the perceived benefits of economic growth-oriented policy (in this case energy development policy) go on the long term? And what will it be like for the people in the interim? The merit of this questioning lies in its exposure of the contradictions of such a development and, most importantly, its focus on people's lived experience as 'active participants in the making of their own lives in the effort to survive the interim' rather than the mere focus on the protection of individuals from disruptions.[143]

The distribution of iodine pills to the local population is another subject that emerged during a different conversation with Mana in 2014. In response to the government failure to distribute to thousands of people pills that could have minimized radiation risks from the March nuclear accident (*Wall Street Journal*, 29 September 2011), the Nuclear Regulation Authority (NRA) drew up new guidelines that instruct prefectures where NPPs are built to start distributing iodine tablets to the local residents of host and neighboring communities living inside the 30 Km evacuation zone, as a precautionary measure. The number of population living in every designated zone varies, with the designated zone around Hamaoka being the second most populated after Tokai (See table 7).[144]

[143] Michio Umegaki, "East Asia in a Human Security Perspective," in *Human Insecurity in East Asia*, ed. Umegaki et al. (Tokyo: United Nations University Press, 2009), p 7-8.

[144] Local residents do not need to take the tablets unless they are instructed to do so in the event of a nuclear accident. As of July 28, 2014, Kagoshima prefectural government and Satsumasendai local government distributed the iodines tablets to 4,700 residents living within 5 Km of Kyushu Electric Co's Sendai plant in Satsumasendai, Kagoshima Prefecture. From September 11, 2016, Shizuoka prefectural government started distributing iodine tablets to local residents living within 5 Km of the Hamaoka NPP. Omaezaki and Makinohara local offices for the Nuclear Emergency Preparedness are in charge of the distribution to the 48,000 residents living in Omaezaki City and part of Makinohara City. See Shizuoka Shimbun (2016), "Iodine tablets to be distributed in the 5 km zone of the Hamaoka Nuclear Power Plant starting September 11", http://www.at-s.com/news/article/social/shizuoka/hamaoka/269270.html. (10/08/2016) and JAPANTODAY (2014), "Residents within 5 km of Kyushu nuclear plant given iodine tablets," https://www.japantoday.com/category/national/view/residents-within-5-km-of-kyushu-nuclear-plant-given-iodine-tablets. (28/07/2014).

NPP	Power Company	Number of Reactors[145]	Population living inside the 30Km Evacuation Zone[146]
Tomari	Hokkaido Power Company	3	83,150
Higashidori	Tohoku Power Company	1	71,532
Onagawa	Tohoku Power Company	3	222,849
Kashiwazaki -Kariwa	Tokyo Electric Power Company (TEPCO)	7	435,433
Fukushima Dai-ni	TEPCO	4	149,720
Tokai	Japan Atomic Power Company	1	931,537
Hamaoka	Chubu Electric	5	860,000
Shika	Hokuriku Electric Power Company	2	170,040
Tsuruga	Japan Atomic Power Company	2	275,075
Mihama	Kansai Electric Power Company (KEPCO)	3	201,042
Oi	KEPCO	4	139,662
Takahama	KEPCO	4	180,322
Shimane	Chugoku Electric Power Company	3	440,802
Ikata	Shikoku Electric Power Company	3	135,019
Genkai	Kyushu Electric Power Company	4	255,529
Sendai	Kyushu Electric Power Company	2	232,118
Total (excluding the population living in the 30 Km zone around Fukushima Dai-ichi NPP)			4,668,049

Table 7. Chart made by the author based on Population Data

[145] Including those nuclear reactors under-construction.
[146] As of October 31, 2012.

Mana further adds,

> The real issue here is not if the pills are effective or not, but if nuclear power plants are safe. No matter what the NRA or other agencies say, the plants are not safe. This includes the Hamaoka [NPP] which actually has recorded incidents before 3.11. I have met activists and scientists in the region who have been trying to shut it down for years with little effect. There are hundreds of thousands living in the area so it is a major disaster waiting to happen.

Mr. Igarashi (50s) who runs a hostel in Omaezaki-cho shares a similar opinion on the issue of safety and iodine pills. When asked about his views regarding the countermeasures implemented in order to go forward with the nuclear restart, he says,

> The nuclear power plants are more important to our government than we the people. It is as simple as this.

Mr. Igarashi further says that many people including himself do not exactly understand what should be done in case of a nuclear emergency. In particular, he refers to the evacuation scenarios discussed in the media, of which the most efficient one would take 32 hours and 25 minutes for all the residents in the evacuation area to leave their homes after a potential disaster.[147] With a smile, Mr. Igarashi points out the contradictions in the government's advice to local residents before and after 3.11.

[147] An independent body at the Shizuoka prefectural government reported that it may take almost two days to evacuate all residents living inside the 30km designated zone around the Hamaoka NPP in the event of a serious accident. According to the report, it is highly likely that portions of residents will be exposed to radiation, referring to a study based on evacuation simulation. Among 12 different models estimating how long it would take to evacuate all 860,000 people based on different factors, such as traffic level, the most efficient scenario is 32 hours and 25 minutes, in which all the people in evacuation area leave their homes immediately after the disaster. However, following this model would put the people under a higher risk of radiation exposure as the evacuees would be stuck in their cars for almost 31 hours (Asahi Shimbun, 27/04/2014).

> Anyone who believes in such unrealistic scenarios is delusional. Before Fukushima, our emergency plan was to open doors and windows so we can escape in case of an earthquake, and to close our windows in case of a radiation leakage. Now that we saw how these two disasters can be combined, I do not know what to do anymore!

Mrs. Ozawa (40), the housewife who lives in Hamaoka-cho and is worried about the safety of the area, has been devoting her time to reading about nuclear issues since the Fukushima accident. Her account is particularly interesting in how she mentions how Fukushima made her lose the trust she used to have towards the two institutions that she credits for telling her nuclear power was safe: school and government.

> We have been always told at schools that nuclear power is safe and that we should be proud that our town contributes energy to the country. I remember even writing a positive essay about it during secondary school. With all the mess happening today, I thought that the government would decrease the dependence on this source of energy, but I was mistaken. Who is going to trust these institutions if they keep putting the nuclear industry first?

With the establishment of the Nuclear Regulation Agency (NRA), one can argue that the 2011 Fukushima crisis has acted as a mechanism for change at the nuclear safety regulatory level. These newly established safety regulation practices indeed seem to represent a rift inside the so called 'nuclear village', which has fostered industry-friendly regulatory practices prior to the Fukushima nuclear disaster. Using its independent legal status, the NRA commission has aimed at establishing less friendly relationships with the nuclear industry, with regulation practices characterized by costly safety requirements and operational transparency. Some observers argue that on the long run these reforms in the administration will place the nuclear policy on a different direction.[148]

[148] See Vivoda, Vlado. "Japan's energy security predicament post-Fukushima." *Energy*

At the local level, however, the new safety package fails to win the hearts and minds of the local residents living in close vicinity to the Hamaoka NPP. Conversations with my informants show that the new measures including the sea embankment, the distribution of iodine pills, and the evacuation plan among others, are seen merely as a cosmetic exercise that does not reduce the nuclear risk nor reflect the voice of local communities.

While the Fukushima nuclear accident has undoubtedly changed the attitudes of local communities towards the local nuclear industry, many local residents, as will be shown in the next section, are still having an ambivalent attitude that often translates into supporting the nuclear restart. This is due to the social dependency on the nuclear facility, which means that residents have few options and little room for negotiation.

2.2- Trust and Social Dependency

The relationship between trust toward and social dependency on the nuclear industry is an essential element that needs to be taken into account in order to understand local residents' understandings of risk. Social dependency does not mean that local residents blindly trust the industry and its controlling agencies. That is to say, supportive attitudes toward nuclear power cannot always be translated into an acceptance of the nuclear risk or trust of the authorities in charge. I argue that informants are ambivalent about the local nuclear facility and the authorities that are meant to be in control. This ambivalence is often the reason why the majority of local residents refrain from protesting about the nuclear industry. While in some cases it is based on direct relationships and personal experience — having a family member or a friend working at the plant, for instance[149] —, trust in the

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Policy 46 (2012): 135-143. Also, see Hayashi, Masatsugu, and Larry Hughes. "The policy responses to the Fukushima nuclear accident and their effect on Japanese energy security." *Energy Policy* 59 (2013): 86-101.

[149] Wynne (1992) also found in a study of responses to scientific expertise after the Chernobyl accident that people shaped what they were prepared to believe according to its

operators of the Hamaoka NPP often implicitly indicates a lack of alternative on the side of the residents, whose stance might be totally different in private.

In contrast to the attitudes of general rejection toward the nuclear industry that the affected population in Fukushima Prefecture show, local people in Hamaoka articulate their trust toward the nuclear industry according to their social identity. Living in a geographically marginalized and economically vulnerable area, many Hamaoka residents are aware of their weak position compared to the general public concerned by an abstract nuclear risk after the Fukushima nuclear disaster. Mr. Horikawa, the operator of the local restaurant in Hamaoka whose business indirectly benefits from the activities of the NPP, says,

> I know many engineers and scientists who have been working there [at the Hamaoka NPP] and living in the area for years now. They are good people that I can trust. Also, I'm sure they value their lives as much as I do. If they can work inside the plant without worrying, it would be meaningless for me to worry then.

Although Mr. Horikawa acknowledges the dependency of his small business on the nuclear industry, he does not attempt to explain his trust towards local operators in economic terms. His account rather implies how his social relationships and tangible interactions with some of the plant's employees serve as a point of reference for trusting the people who work at the plant. Further, Mr. Horikawa employs a strategy of sameness when it comes to the way he believes that he and other Chubu employees share similar values to life in the context of the physical proximity to the nuclear facility (see Chapter 3).

Moreover, during one conversation with Mr. Horikawa, he admits that he barely understands any of the nuclear science often distributed to the local residents in the form of information pamphlets and other information outlets. 'Such information is usually written in scientific jargon,' he complains. This concurs with Wynne's position that 'risk communication or any other scientific

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correspondence with the social networks with which they identified themselves. See also Chapter 4.

information is never, and can never be, a purely intellectual process, about reception of knowledge per se" but always a part of a "social package' (Wynne 1992, 281).

In contrast to the above-mentioned account of Mr. Horikawa, Mrs. Yamamoto, who runs a business hotel in Hamaoka-cho and supports the restart of the Hamaoka NPP, expresses her distrust in local operators and politicians.

> I support restarting the Hamaoka [NPP] because my business would be damaged in the scenario of a permanent shutdown. This does not mean that I blindly trust everyone in the plant or the local government. Trust is very relative in this sense. Until 2011, I haven't really felt that local politicians had any impact on my day-to-day life. It's only with the suspension of the plant and what it would entail on my personal life that I realized they might have an impact, so I decided to vote for Mr. Ishihara [pro-nuclear incumbent mayor] in the 2012 local election for the first time.

From the perspective of Mrs. Yamamoto, besides being relational, trust is also a condition for this trade-off between nuclear risk and economic benefits. As can be detected from her account, the nuclear risk has not been a significant issue in the context of her everyday life until the Fukushima nuclear disaster and the subsequent suspension of the Hamaoka NPP.

Although the dependency on the local nuclear industry has been clearly revealed in the aftermath of the nuclear disaster, informants' accounts show mixed feelings about depending on this hazardous industry. Sentiments of trust towards the local industry and local politicians seem sometimes to be genuinely stemming from long-established social relationships and long coexistence with the industry, but are also generally thought of as a prerequisite for any chance to maintain the status quo: supporting the operation of the nuclear industry as a condition for the existence of the local community in the absence of any viable alternative in the present and near future (see Chapter 4). As Mrs. Watanabe, the cafe owner whose business

relies indirectly on the nuclear industry, says, ‘we cannot live in peace if we do not believe what they say.’

There has been some deep disappointment expressed all over Japan about the way TEPCO has been handling the disaster in Fukushima. This sense of disappointment has been extended to Chubu Electric and the way it handled risks and minor accidents in the past, despite the fact that it is a main contributor to the social and economic life of the local community. Some informants express their concerns about the safety of the plant and whether they would know something was amiss in case of an accident. As Mr. Nagasawa, the farmer who lives in a close proximity to the Hamaoka NPP, puts it,

> Many, including myself, think that TEPCO and the central government are not saying the whole truth about the nuclear meltdown. It is probably much worse than what they claim. If local people in Fukushima cannot do anything about such catastrophic disaster, what can we do in case of a minor leak? There is nothing much we can do!

Another informant, Ms. Sugiyama (40s), who works as a nurse at the municipal clinic, says,

> I’m afraid of radiation leaks and worried about the safety of my children. Of course economy and jobs do not matter when one’s health is at stake. If safety is not assured, I’d rather live in an economically depressed area than an unhealthy one. Health is the most important.

The Fukushima nuclear disaster has brought back memories of minor accidents that Chubu Electric often failed to immediately report to local residents. While anti-nuclear residents who have long been suspicious of and explicitly against the nuclear industry often accuse the local operators at the Hamaoka NPP of secrecy, the majority of residents seem to have more ambivalent attitudes, with many only paying attention and questioning the industry based on what happened in Fukushima. Such attitudes underline

implicit anxiety and an increased sense of uncertainty that go beyond the usual probabilistic scientific risks.

Experts tend to view anti-nuclear public as ignorant while those who support the technology are considered more informed. This representation of support and opposition frequently views local residents living in a close proximity to a NPP as more familiar and knowledgeable of the technology and its risks, while those living far away are supposed to focus on the nuclear risk because of their ignorance.[150] This research however found more complex attitudes towards the nuclear facility among local residents. For example, the majority of my informants do not seem to be really equipped with a better and more significant knowledge about the nature of the nuclear industry. Indeed, some informants appear during the conversations to be ignorant about the industry and its practices. The representation of support and opposition between "locals" and those living "away" is therefore contradictory. Miki (30s) the cafe manager and surfer who lives and works in Omaezaki-cho says,

> I wish it [the Hamaoka NPP] was built somewhere else but now it is too late. Many people around here don't have sufficient knowledge about it.

She adds,

> Myself, it was only after the Fukushima nuclear accident that I started reading for the first time about the history of the siting process in Hamaoka in the 1960s. It is almost unbelievable to think that Chubu tried first to build the plant in other locations but could only succeed in this area.

Furthermore, it is striking how even local residents who support the restart of the Hamaoka NPP do not express high levels of trust regarding the authorities. This seemed to be the case since before 3.11. Their acceptance is often based on a tradeoff between nuclear risk and the urgent and more pressing socio-economic needs. This tradeoff itself is very often viewed in a

[150] See Slovic, Paul. "Perception of risk: Reflections on the psychometric paradigm." in S. Krimsky & D. Golding (eds.), *Social Theories of Risk*. Praeger. pp. 117--152 (1992).

negative way. The account of one informant who has supported the local nuclear industry until 3.11 indicates how some local residents indeed feel and resent the monopoly of the nuclear industry on the local employment sector.

> We can go on and on like this forever. When someone says something bad against them [Hamaoka NPP operators], he/she gets the reply that the area will lose employment and revenues. I guess we must say enough is enough and break free from this cycle and tell the authorities that they cannot keep controlling our future.

While there is a certain sense of empowerment showing in this account, it cannot be considered representative of the general stance captured during the conversations with the informants. It was clear to me that there is a general sense of helplessness, of inability to influence and change the status quo in the community. If the residents feel powerless to control their own lives, who do they see as responsible? The following section examines the notions of responsibility and blame within the context of negotiated trust.

3. Responsibility

According to Bickerstaff and Walker (2002), the notion of responsibility in the context of environmental risk has two main dimensions. First, when people assign blame, they identify an actor (individuals or institutions) as a cause or agent. Second, a sense of responsibility has a normative element of duty. Thus, the mitigation of a probable nuclear accident will succeed if individuals and institutions act morally and legally on the duties or obligations assigned to them.

It is important to address the causes and effects of local residents' ambivalence towards responsibility. This uncertainty is related to the perceptions of resident-operator relations, residents-local politicians and residents-state relations. In other words, the local reality and level of trust are

significant parameters in shaping how responsibility is imagined and negotiated.

It is also important to highlight the distinction between how local residents in the Tohoku region imagine responsibility for the Fukushima nuclear disaster, and how local residents in Hamaoka, who have not experienced any nuclear disaster, imagine the responsibility. This, again, is a distinction between a responsibility for an actual disaster and a responsibility for a risky environment or an unanticipated crisis combined with nuclear risk amplification. Indeed, my findings from multiple rounds of fieldwork in Shizuoka prefecture and Fukushima prefecture show that informants hold TEPCO and the government responsible for the 2011 Fukushima nuclear meltdown and for failing to take preventive measures against the disaster. However, during conversations with informants in the Hamaoka area, where the main concern of this research lies, informants often recount different narratives of blame and responsibility for an unaddressed situation that has been problematic long before March 2011. This section will mainly focus on such narratives.

3.1- Shifting the Blame

Freudenburg (1993) tells us that the reason for the failure of institutions to carry out their responsibilities lies in the process of social differentiation and the resulting social division of labor. In this sense, individuals become accountable to govern risk(s), independently from organizations and institutions. While Giddens (1990) highlights the increased dependence on experts to identify and manage technological risks, Beck discusses responsibility, similarly to Freudenburg, in the context of the social division of labor. In contemporary societies, the production of new technological risks is associated with material and social problems that are difficult, and often impossible, to understand, and this causes difficulty in identifying who is responsible: '[In] the highly differentiated division of labor, there is a general

complicity, and the complicity is matched by a general lack of responsibility' (1992, 33).

Nuclear power is the best example of the technological risk Beck refers to. The notion of responsibility, according to Beck, becomes paradoxical in the context of risk society:

> Risk societies are characterized by the paradox of more and more environmental degradation — perceived and possible — coupled with an expansion of environmental law and regulation. Yet at the same time, no individual or institution seems to be held specifically accountable for anything (1999, 149).

In what Beck describes as the process of individualization, which is an important feature of risk societies, he argues that institutions systematically shift the responsibility to manage risk and to deal with dangers to individuals (Beck, 1999; Beck-Gernsheim, 2000). Therefore, rather than simply retreating to established responsibilities of institutions for the management of technological risks, it can be inferred, based on Beck's argument, that residents face an extremely complex chain of causes and effects in which relations of responsibility are constantly being negotiated at both the individual and institutional levels.

During conversations with informants, there has been strong criticism towards the central government for continuously using top-down approaches without taking into considerations the entailed consequences on the livelihoods of residents living in Omaezaki City. In a tone that echoes the discourse of the so-called "nuclear village", the powerful iron triangle of pro-nuclear Liberal Democratic Party (LDP), parts of the administration, and nuclear industry, that fostered industry-friendly regulatory practices, Mr. Tamura (40s) and Mr. Kawashima (50s), who both work at the Hamaoka NPP, blame Prime Minister Naoto Kan and his government for the unequal treatment Chubu received compared to other power companies.

> Naoto Kan made unfounded claims about our area and without any consideration he said that we live in a dangerous place. Actually his decision was not based particularly on concerns about the safety of the local residents or even the broader area but purely on strategies to advance his political agenda. (Mr. Takuya, engineer)

> I think the Prime Minister's request at the time carried too much weight and put our company in a very difficult position. Although we complied and suspended the operations at the plant, we considered the decision as unfair especially when one considers the fact that the meltdown [in Fukushima] occurred due to the negligence of another company. (Mr. kawashima, technician)

After requesting Chubu Electric to shut down the Hamaoka NPP in May 2011 because of its location on a major fault line, Prime Minister Naoto Kan faced pressure from the "nuclear village" to resign. In this sense, Kan emerged during the crisis management as a threat within the pro-nuclear energy discourse in Japan. Such opinion is also evident in the attitudes of those whose livelihoods depend on the plant. The above-mentioned statements show disappointment in the way the central government reacted in regards to the Hamaoka NPP. Both informants question the government's decision to pick particularity on the Hamaoka NPP at the time. While all of Japan's nuclear reactors were suspended over the next 12 months of the disaster, Hamaoka NPP received the foremost and highest attention as the government based its decision on the possibility that a major earthquake might hit the Tokai area within the next 30 years. From the perspective of the two informants, assigning blame to the Kan's government makes sense as they believe his position is generating uncertainty in regards to their careers and their everyday life. Interestingly, the two informants further attempt to distance their employer (Chubu electric) from TEPCO, the operator of the Fukushima Daiichi NPP, which is accused in the light of the disaster of lacking in safety culture and having poor risk management skills.

Similar criticism emerged as well during interviews with informants who indirectly benefit from the Hamaoka NPP. Mr. Horikawa (50s), who runs

a restaurant in Hamaoka-cho, blames the government for the uncertainty surrounding his business following the suspension of the Hamaoka NPP.

> I blame the government for all this mess. Yes I'm making a living from the plant, but the government does not care about people like me and suddenly decides that the plant is dangerous and needs to be suspended without discussing any compensation for us.

Mr. Horikawa further points out the contradiction in the central government's position in 2011 who, until the Fukushima accident, consistently showed full support towards the operation and the expansion of the nuclear facility. Interestingly, Mr. Horikawa does not specifically distinguish between the Democratic Party of Japan, the ruling party from 2009 until 2012, and the Liberal Democratic Party (LDP). He simply speaks of "the government" as a powerful body of politicians controlling the fate of Hamaoka from the capital, Tokyo.

> Those people just discovered that the plant is dangerous? We knew that it was a dangerous facility long before the Fukushima disaster. We have always supported nuclear power and sided with Chuden and the government against anyone who wanted it [NPP] closed...and politicians in Tokyo always gave their blessing to power companies for building reactors. It is really strange to hear them say the opposite now!

Mr. Tanaka (60s) the hostel owner in Hamaoka-cho, who also benefits from the operation of the Hamaoka NPP, blames the central government's decision to single out the area as dangerous despite its geographical similarity to other host communities in Japan.

> Everyone knows that earthquakes are not a special feature of this area so one can say that the central government just wanted to create a better self-image in front of the general public. We have always told

> ourselves and our children that we should be proud that Hamaoka contributes to the national energy policy...But our contribution as it turned out is not appreciated and there is probably no politician in Tokyo who cares about all these years of sacrifice or even about the reputation of this area...I think it does not matter if we trust them or not. What matters is that we trust people who work at Chuden and live among us in this community. We trust those who care about Hamaoka and work hard for the community.

In addition to the central government, some informants blame the mass media for picking on negative news and highlighting their locality as a 'dangerous area" (see chapter 3). The full coverage generated negative media images that produced a higher awareness of Omaezaki City and portrayed the presence of Hamaoka NPP as a source of risk to the community. Mr. Nagasawa (70s), one of many farmers who had to deal with harmful rumors after 3.11, says the following:

> If anyone cares about my opinion, I would say that the government and the media are both to blame. Many farmers in Fukushima will be compensated for the damages of radiation but no one will compensate any farmer in Hamaoka. This is because we actually didn't have any radiation so it is unfair to say that this area is dangerous without any justification.

While the above accounts put blame on the central government during the height of the crisis following the events of 3.11, some informants seem to extend their blame to the central government without particularly emphasizing the events of Fukushima. In other words, some informants admit that the central government has always taken advantage of the weak position of the community in order to advance nuclear development.

Some informants do not talk about the central government but pointed directly at the influential power enjoyed by the utility company and the

consequence of the city's economic dependency on the local nuclear industry. Ms. Sugiyama (40s), the district nurse whose job relies on the nuclear revenues, does not see any difference between the company and local politicians when it comes to nuclear issues.

> Both Chuden and the municipality are usually on the same line when it comes to nuclear policy. Have you seen any politician refusing a proposal by the industry? They put on a show that there will be a process of discussions and negotiation but in fact everything is decided beforehand.

3.2- Self-Governance in Question

Moreover, two informants talked about how local politicians are powerless and incapable of making an independent decision from the central government. Significantly, in his previous account, Mr. Tanaka does not extend blame to the local operators or local government, but instead expresses his trust towards them as an attempt to emphasize his familiarity with the nuclear industry at the local level. Such accounts highlight the tensions between autonomy and heteronomy in this region.

Mr. Iwata, the retired teacher who lives in Hamaoka-cho and has been opposed to the nuclear facility since the Kobe earthquake, notes that many local residents sought for a long time a better and more viable alternative to the nuclear industry that would bring a genuine autonomy.

> I know many people who have been opposed to the nuclear policy and to the way the city always follow the orders of the central government. I think the majority including myself blames the government for putting always pressures on our city to accept nuclear reactors. Nothing much has changed after the Fukushima disaster. The government continues to assume that our safety and welfare can be bought with money.

According to Mr. Iwata, the autonomy of local government is a “myth”. He points out the city’s dependency on central fiscal spending and nuclear subsidies to a degree that the scope of decision-making at the local level is diminished. It seems indeed extremely difficult for local politicians to object to the central government's requests within a certain policy without causing unwanted damage in another policy domain (see Chapter 2).

A similar opinion is held by Mr. Shimizu (60s), a recently retired municipal staff, who worked during his career at many departments inside the municipality, including the nuclear policy and public relations department. One of Mr. Shimizu’ tasks centered on risk communication which involved publishing and distributing a quarterly newsletter that deals with issues of environment, energy and radiation surveys. The newsletter often features photos of local activities like smiling children at kindergarten or green tea farmer in their natural surroundings. Mr. Shimizu says with black humor that the events of 3.11 made locals interested in his work. He nevertheless expresses relief that his retirement came into effect one year before the Fukushima nuclear disaster, as it spared him from any potential clashes with anxious local residents. Within a couple of weeks of the triple disaster, the office where he used to work received more than 1000 inquiries via phone calls or direct visits. He says,

> From the position of the public relations office, saying that the nuclear plant is safe suddenly became very difficult. I feel sorry for all the staffs who had to deal with this difficult situation. I think they did their best and told people that Hamaoka was safe after Fukushima and things were under control.

Mr. Shimizu agrees with Mr. Iwata that the government relentlessly expects from the city to comply with its nuclear policy-related requests. Having switched his views towards the local nuclear facility in light of the nuclear meltdown, Mr. Shimizu says that the local government in Omaezaki City should have a clear anti-nuclear stance that would free the area from the chain of dependency. He says:

> If I were in the position of making a major decision, I would follow the path of Makinohara City and request the decommissioning of the plant. I think more efforts should be made in creating new resources from other sorts of industries although this would not happen without the support of the central government.

Mr. Shimizu admits that transition to a nuclear-free community requires the full support of the central government, which so far does not seem to be evident. The politics of subsidies is a case in point. According to Mr. Shimizu, this top-down approach has always been a key strategy used by the central government to pressure municipalities such as Omaezaki. Indeed, the central government threatens such localities to not provide any subsidies if local governments do not act quickly and make a decision regarding any proposed expansion in nuclear reactors.

In 2008, the government started promoting "Pu-thermal" operation at NPPs which means the use of mixed oxide (MOX) fuel of uranium and plutonium in thermal (light water) reactors. This manufactured fuel utilizes plutonium that is extracted from reprocessing the spent light water reactor fuel.[151] Referring to the time when the central government requested a quick decision on the Pu-thermal operation from Omaezaki municipality, Mr. Shimizu explains how central government pressures the municipality of the host community to make a decision regarding the nuclear policy while simultaneously creating division among the host community and neighboring local communities.

> I feel sorry for local politicians because they do not have much say in the decision-making process and this can be blamed on how the central government put pressures on the local government, even overlooking the amount of work local politicians spend to promote the nuclear energy, which is always framed to the residents as a national policy. For the use of the Pu-thermal negotiation, the central

[151] For example, MOX fuel for Genkai Plant Unit 3 of Kyushu Electric Power, Ikata Plant Unit 3 of Shikoku Electric Power, and Hamaoka Plant Unit 4 of Chubu Electric Power had been fabricated at Melox fuel fabrication facility in France and started "Pu-thermal" operation by the end of fiscal 2010.

> government required the four cities [Omaezaki City, Makinohara City, Kakegawa City and Kikugawa City located within 10km radius of the reactor core] to make a decision as quickly as possible. While Omaezaki City usually gives its consent to such request after a safe review is conducted, the final decision is usually delayed since Omaezaki City must obtain the understanding of the surrounding cities. This is usually a sensitive matter that requires mutual understanding. It is easy for politicians in Tokyo to say this and that, but local politicians are on the frontlines when it comes to such decisions.

Mr. Shimizu complains that before the Fukushima nuclear meltdown "none of the politicians in charge of nuclear policies bothered to come in front of the media and put the nuclear power issues out in the open." He further explains,

> Members of the parliament did not discuss them [nuclear issues] because they never lead to votes. All they care about is Tokyo to receive its precious electricity. This is why things have been always sensitive with our neighbors.

Mr. Shimizu says that this has always made it difficult for the locals in the surrounding cities to understand the national policy especially that the media tended to pick up only negative aspects of the nuclear issues. Mr. Shimizu believes that now is the time for local government to ask for reforms and state their demands clearly.

> It is hard to make people believe in a prosperous coexistence with nuclear plants after Fukushima. This worked in the past but now it is almost impossible and local governments have the responsibility to make the central government understand.

While this opinion comes from someone who has been involved in the municipal affairs for more than two decades, the following comment from Mr. Ito, the retired textile factory manager who lives in Hamaoka-cho, also

highlights the regional division among the local communities surrounding the nuclear facility:

> I think anyone visiting our town can say that it has nice clean roads and grand public facilities, especially when comparing it to Makinohara for example. I have many acquaintances living around in neighboring towns who now refer to such differences.

While there have been regional differences among the four cities of Omaezaki, Kikugawa, Makinohara and Kakegawa in regards to the political economy of the local nuclear development, such differences did not have a role in shaping the attitude of local residents towards the nuclear power. However, local politicians from neighboring towns and cities often use such differences in treatments in order to delay or object the implementation of proposals coming from METI and Chubu Electric. It is hard to find out whether local residents started to pay attention to such differences only after the events of 3.11 and the exposed structure of the nuclear industry around Japan. However, the following comment from Mr. Kato (70s), who lives in Omaezaki-cho and runs the ramen shop that lies in a close proximity to the Omaezaki lighthouse, shows that some residents payed attention to such differences long before the events of 3.11. Mr. Kato expresses his dissatisfaction towards the public works of Omaezaki-cho in comparison to those of Hamaoka-Cho, while blaming the discrepancy on the municipal merger between Omaezaki-cho and Hamaoka-cho in 2004, which put Omaezaki-cho at a disadvantageous position.

> Since the 2004 municipal merger, we have been having poor and slow public services in the Omaezaki area. If you walk around Hamaoka you can easily spot the difference, with new buildings everywhere and the roads being cleaner and in better conditions. Hamaoka and Omaezaki are treated differently. The roads in Hamaoka are well maintained while maintenance works are always delayed in Omaezaki. Even the green plants around the old town building have withered.

Similarly, Mr. Igarashi (50s) who runs a hostel in Omaezaki-cho speaks of the merger as having placed residents of Omaezaki-cho in an unfavorable position.

> I don't remember when the municipal merger exactly happened but I know that it has been always unfair to Omaezaki. Once I went to buy green tea at a shop in Hamaoka and the guy arrogantly told me that, "Omaezaki has been enjoying tax revenues from Hamaoka". He said Omaezaki has a cable TV "thanks to our Hamaoka". It is very disappointing to know that people of Hamaoka think in such way about Omaezaki.

Indeed, one can see the benefits of the nuclear facility manifested in better roads and public facilities, which include a library, a community center, and a swimming pool, when walking the roads of Hamaoka. Some communities question why the City, and in some cases why one part of the city (Hamaoka-cho), is more favored than their localities even though they share the same risk from any nuclear failure. At the municipal level, Makinohara City in particular raises such question of why there is a difference in treatment when the city is actually closer in proximity to the reactor core of the nuclear facility than the eastern side of Omaezaki City.[152] While residents such as Mr. Kato and Mr. Igarashi blame the local government, the municipal merger, and the nuclear industry for this treatment, other informants such as Mr. Iwata, Mr. Shimizu, and Mr. Ito consider local politicians powerless and shift the blame towards the central government. From their perspective, the government employs a top-down approach that controls decision-making process as it puts pressures on local governments in a way that leads to frictions and divisions among communities.

[152] Makinohara City, which borders Omaezaki City and is located within the 5 Km of the Hamaoka NPP, is in favor of a permanent shutdown of the nuclear facility. While this anti-nuclear stance has existed before 3.11, it was intensified and reinforced by the Fukushima accident. A similar pattern can be observed in Saga, Kagoshima Prefecture, where the Genkai NPP is located. Despite the supportive attitude of the host community, the neighboring town is against the restart. This contrasting attitude in each municipality can be explained by the generous energy subsidies along with the revenues received from fixed property tax in each hosting community.

3.3- Generational Rift

In contrast to the above-mentioned accounts that assign blame towards the central government, two accounts from the younger generation seem to see the actual responsibility in the older generation, which agreed in the first place to host a nuclear facility. Such accounts do not deny the responsibility of the central government nor the interests of the nuclear industry, but attempt to assign blame to the residents who were in charge of the situation four decades ago. Takuya (20s) the sufer from Omaezaki-cho says:

> I don't want to blame Chubu or the politicians [for hosting a NPP in the locality] because they are just doing business. I think that the old town people are to blame for accepting to bring something dangerous to the local area. Now we young people have to live and deal with it even though it was not our decision to bring such a dangerous technology to Hamaoka in the first place. I know old people were also looking after the town's interest at the time but they are the one who have accepted it and allowed this to happen. It is the old people who are at fault.

This account sees no meaning in holding Chubu responsible for the situation. Having somewhat pragmatic views, Takuya sees the utility company as just looking after its own interests. He instead blames the older generation for not refusing to host the plant in the past. Like many residents of his generation, my informant views the nuclear industry, which existed before he was born, as an investment made by the older generation at the expense of the future generations. Only those who are born in the late 50s and beginning of the 60s have a vague memory of the plant when it was being constructed in 1970. The people who are responsible for the initial negotiations during the siting are at least two generations older than my informant.

Mrs. Ozawa (40s), the housewife who lives in Hamaoka-cho, holds similar views as Takuya in demanding that the older people who accepted to host the plant in the past bear some responsibility. However, she notes that the responsibility is shared also by the nuclear industry, the central government, and local politicians. She particularity complains about local politicians being "too soft" with the nuclear industry and incapable of understanding the needs of the younger generations.

> Did you see any young politician here? There is none. Probably the average age is 60 or 65 [smile]. All politicians are senior citizens who come from different times when childbearing and household chores were the responsibility of women. They avoid talking about the nuclear issue and focus instead on childbearing and creating a suitable business environment. I do not think they understand what it means to start a family nowadays. So it is very rare to see them opposing the plant. They just stress the importance of safety with no opposition whatsoever.

If these younger informants put the blame on older generations, how do the latter imagine responsibility in relation to the nuclear issues? The accounts of Mr. Nagasawa (70s), the farmer who lives in Hamaoka-cho, indicates a sense of pride for being part of a period when local residents made an investment as a contribution to the community.

> The acceptance of the plant was an attempt to bring life back to this community which population was rapidly dwindling. I think people made good decisions based on the resources they had. We didn't have much alternatives. Maybe we still don't. But this area survived and prospered thanks to my generation who accepted to host the plant.

While he has not been involved in the decision-making process that paved the way for the construction of the Hamaoka NPP, Mr. Nagasawa considers himself part of the generation responsible for the area's transformation due to the nuclear industry. Unlike Takuya or Ms. Ozawa who

hold older people responsible, Mr. Nagasawa assigns responsibility to the central government and the nuclear industry.

> We have always been proud in being part of this area that produces energy and contributes to the national policy. I hope that the government recognizes and values what we have been providing all these years. The events of Fukushima do not reflect good intentions on the part of the government and the nuclear industry towards the local population who made enormous sacrifice for the sake of the national policy.

Mr. Nagasawa is left with no option but to wish for a hypothetical feeling of gratitude from the government. His discourse of sacrifice thus diffuses away from his generation the responsibility that the younger informants quoted above intends to assign to him and his peers. In this ever-shifting blame articulations, there seems to be no simple way towards conciliation.

The Hamaoka host community has been growing distrustful, anxious, and sceptical about the local nuclear industry. This partly stems from the way the Fukushima disaster has been managed by TEPCO and the government, but is also provoked by the exposure of the power relations that continue to shape the making of the nuclear industry. Conversations with informants confirm what Beck argues about criticism not being directed against the scientific experts but against the political (1992).

Moreover, informants' accounts show that the acceptance of the nuclear industry in the past as well as the support of the nuclear restart following the Fukushima disaster and the suspension of the NPPs around Japan are the result of dependency, local identity, and lack of viable alternatives on the side of the local community. Trust therefore is a strategy to manage everyday risk(s) and is linked to social relationships and personal experiences. These narratives of trust and mistrust contextualize the

dichotomy of pro or anti-nuclear discourses, which often neglects the social dimensions that local residents regard as central to their everyday lives.

The support of the nuclear restart thus cannot simply be considered an expression of a trustful and satisfactory relationship between the local residents and plant operators, or local residents and government institutions. This has been evident in the narratives regarding the new safety regulations, which are viewed by most informants as merely cosmetic. The distribution of iodines pills to the surrounding population, for example, far from appeasing anxieties was on the contrary sometimes seen as a proof of the impossibility to avoid future nuclear accident or radiation leaks. Indeed, though the NRA claims that the distribution of the tablets is an important measure against potential nuclear disasters, the proposal sends mixed signals to the local population who does not regard it as a convincing disaster preparation. While the pills might bring some reassurance for residents living in close proximity to the NPPs, their effectiveness depends on many factors, such as timing, each person's age and general health, and absorption rates. As a result, such measures tend to put more pressure on residents in the event of an actual crisis instead of assisting them efficiently, leaving them responsible for protecting themselves against radiation.

Additionally, the chapter shows the ways informants in Hamaoka negotiate responsibility in relation to nuclear risk. It focuses on how the notion of responsibility is imagined before and after the Fukushima nuclear disaster. In general, people blame TEPCO as being responsible for the catastrophe and METI for inadequately monitoring the nuclear industry. In Hamaoka too, informants blame the large national structure for a lack of transparency and insufficient information disclosure by both TEPCO and the government.

However, these critical views on the government's ties with the nuclear industry paradoxically coexist with the tendency to blame Prime Minister Naoto Kan for deciding the closure of the power plant. Some informants indeed express resentment against the Prime Minister for making what they see as unfounded claims about the dangerousness of their area and highlighting it as risky on a national level. From this perspective, Kan’s decision to shut down the Hamaoka NPP was not based on concerns about the safety of the local residents but was purely political. He was seen as

merely trying to score points with the general public as an attempt to boost his political career.

Some informants display different narratives of blame and responsibility rooted within actual and/or imagined recollections of the past. Some narratives blame the central government for not taking into account the persistent sacrifice made by the host community since the siting of the plant in the late 1960s. These informants displays a deep sense of being part of a bigger whole when expressing their pride in their local area providing electricity for the country. Simultaneously, such accounts also highlight the tension between a local government perceived as powerless and a seemingly all-powerful central government. They thus tend to claim that local politicians are incapable of protecting their own citizens, which in return pressures local communities in a way that lead to further tensions and divisions. Accounts by informants from younger generations on the contrary blame the elderly for bringing the nuclear facility without taking into consideration the burdens it would load on the shoulders of their generation and their children's. These contrasting accounts show a generational rift between the young who had no say in the hosting of the plant and the elderly who explain their choice in terms of sacrifice and concern for their area's future socio-economical health.

As these accounts illustrate, informants are not unified in identifying who is responsible and who is to blame for the crisis they are going through. Indeed, the way informants assign blame and hold an individual or an institution responsible is often fragmented, and tends to be directed towards a wider structure represented by the central government, the media, and sometimes towards local politicians, plant operators, and certain members of the community as well. Deep-rooted dissatisfactions towards top-down approaches and lack of effective communication thus translate into a general distrust of the authoritative figures, even among residents who voice their support of the nuclear complex. This concurs with Wynne's argument, that trust in the nuclear industry and the government is a necessary condition for "satisfactory existence" on the local level (Wynne 1992)

CONCLUSION

Following the Fukushima nuclear disaster, there have been numerous studies, even in English, that focus on the affected communities living around the crippled Fukushima Daiichi NPP (Gill et al. 2013; Hindmarsh 2013; Bacon and Hobson 2014). However, far less attention has been given to host communities living far away from Fukushima; they have not experienced any major accident since the 2011 nuclear disaster, yet their localities have been doomed 'at risk' after the 2011 nuclear disaster and consequently experienced a heightened level of concern in regard to the existing facilities there. This thesis is an attempt to fill the gap in the literature which has largely failed to highlight the complex positions of local residents living nearby nuclear facilities around Japan, where the shadow of a Fukushima-like disaster has quietly but significantly disrupted the conduct of everyday life. This thesis also represents the first qualitative study on the local views of residents living around the Hamaoka NPP in English.

The Omaezaki community is one of these communities that have been living without significant controversy or protest. In this thesis, I argue that one source of threat alone cannot consume people's concern entirely. Especially if that threat is not tangible, people tend to evaluate it only in a comparative framework where other threats are more or less equally assessed. My second argument is that the diffusion of risks — political, economic, social, personal and nuclear among others — plays a significant role in shaping the behavior of an ordinary resident.

Qualitative research is useful in examining risk understandings associated with the presence of nuclear power in the lives of local residents living in a close proximity to a NPP. Drawing upon the work of Beck (1992), Giddens (1990, 1994), Tulloch and Lupton (2003), I have conducted qualitative, place-based (case study) interviews with local people, while taking into consideration the centrality of local context which involves temporal and

spatial dynamics. Capturing the local context is helpful to avoid certain models of risks understanding that focus only on the nuclear risk, for example, as residents being pro- or against- the nuclear facility, or the idea that local understanding can be always explained by economic imperatives. The thesis uncovers that the basis of the residents' understanding lies on a complex calculation of losses and gains amidst an array of risks and uncertainties. Indeed, local support of the nuclear facility rests on individual and community concerns that are not necessarily pro-nuclear. Thus, the thesis also calls attention to one obvious but crucial point, which often escapes government officials and experts: residents do more than just support or oppose local nuclear industry.

Past research on Japanese host communities have mainly focused on the relationship between the nuclear industry and the political economy of hosting municipalities, that is, on the 'cycle of dependency' (Kainuma 2010; Kamata 2001; Aldrich 2008; Hasegawa 1998). While building on their important research, this thesis attempts to integrate a more multifaceted discussion on local residents' view points within the local context of residents' everyday lives. The main aims of the thesis are to capture the complexity of risk understandings among local residents living close to a NPP and examine how residents have developed ways to live normally in the shadow of the nuclear facility that only appeared risky in the wake of the Fukushima disaster.

The results of this thesis suggest that local residents of the host community do not have a uniform perception of the Hamaoka NPP. Locals perceive the facility in a range of different ways that go beyond the usual polarized and simplistic *pro*- and *anti-nuclear* stances, and such views are too complex to be portrayed through, for example, the local mayoral election. Local perceptions are based on an assemblage of interconnected factors, within which familiarity, local knowledge, perception of social and economic benefits, local identity, trust relationships between residents and local plant operators, all play significant roles.

The Hamaoka case is an example of a nuclear host community with seemingly pervasive low concern towards the nuclear facility. Similar to the general Japanese public, the majority of informants viewed the nuclear facility as *insignificant* in the context of daily life prior to the Fukushima nuclear

disaster. In the wake of the Fukushima nuclear meltdown, the suspension of the Hamaoka NPP, and the sustained media coverage of the area, residents of Hamaoka suddenly found themselves experiencing a spoiled sense of place due to the physical presence of the nuclear facility. The ever-more visible nuclear risk has signaled a fundamental shift in the way informants view their local community as they now fear the place and technology that they once viewed positively (Beck 1992; Giddens 1990, 1991). The sense of pride that the Omaezaki community historically enjoyed was suddenly threatened because the area became known more for its nuclear problem and related health issues (risk society) than for its energy contribution to the national economy. Omaezaki residents have therefore become 'reflexive' (Beck 1992), perceiving the nuclear industry and its attendant economic activities differently from the way they used to in the past. At the local level, this reflexivity was reinforced when the area was labeled as 'dangerous' by the media and outsiders, and this in turn generated discomforting feelings for local residents.

Indeed, almost all informants claim that the area had been 'marked' by the NPP, which was seen as having a negative impact (especially through harmful rumors) on the quality of life. Informants refuse the negative image that has emerged after 3.11 amidst national and regional media attention. Some downplay the negative effects while highlighting how the nuclear facility produces welcome impacts and creates valued characteristics in the area. While being highly concerned about the nuclear facility in the wake of the Fukushima disaster, many informants seem to have a heightened sense of identity in contrast to outsiders who tend to focus solely on the abstract nuclear risk, and view the facility as well as the town in a negative and often stigmatizing way. None of the informants therefore were willing to abandon Omaezaki because of their historical, social, and economical attachment to the place they call home. Personal values and expectations served as the underlying reasons for informants to continue pursuing a normal life in Omaezaki. Furthermore, informants identify the employment opportunities, local subsidies, social relationships, and availability of public facilities in the areas as things they value.

The nuclear risk still fails to resonate with most of my informants, as they still downplay it and continue to support the restart of the facility. Based on their accounts, they seem to resign to the presence of the NPP as not to gain any benefits but as an attempt to avoid losing what they already have. This is the subtle difference that I attempt to show in this thesis. The pragmatic acceptance of the nuclear plant can be seen as a coping strategy, which Beck (1992) refers to as 'turning inwards' because people find reassurance in different activities with no link to the nuclear risk. It is important to note that this pragmatic acceptance and the threat denial have been going on for a long time. The Fukushima disaster has only highlighted this acceptance of the local nuclear industry on the side of the residents who lack viable alternatives, in contrast to the anti-nuclear general public. Indeed, the fear of losses generates a sense of disempowerment and limits the chance for strongly articulating the perceived nuclear risk. Consequently, my informants focus their attention on more urgent visible everyday concerns.

Moreover, residents may not be able to articulate perceived nuclear risk due to the nuclear industry being a major contributor to the local economy. This does not mean that each resident benefits from the industry. I found that while some informants benefit from the plant through direct employment or secondary industry, other informants do not have any benefit from the plant. Their support, however, is a result of the fear of unanticipated consequences from not keeping the status quo. In this regard, the 'dependency breeds dependency' aspect is relevant to the area at the municipal level and for those who benefit from the plant, but it is not a complete explanation when one considers that the majority of residents do not receive benefits.

My findings do not always show strong correlations between the perception of economic benefits and local attitude towards the nuclear facility. Notions such as 'our town is remote', 'dependent on the nuclear industry', and 'vulnerable to economic shocks', are some of the references emerged during the interviews. Interestingly, informants, including those who do not benefit from the plant, talked about such concerns before talking about their views on the nuclear facility. They brought up the Hamaoka NPP when they wanted to talk about the fear of losing a job and potential loss of subsidies. One explanation is that many tend to listen to their peers without being personally

affected. In this sense, the social environment is shaping the attitude of the residents towards the facility.

Hosting the nuclear facility more than four decades ago was seen as an attempt to halt outmigration of the young people. While the presence of the facility has ameliorated this situation, it was not enough to wholly remedy it. Today, the Omaezaki community is caught up in a new wave of aging and population shrinkage that started to be visible close to the beginning of the 21st century. While not always noticing ageing problems or not being personally affected by them, my informants are concerned about becoming the isolated community it had been once in the past. When discussing the possible shutdown of the Hamaoka NPP, the past experience of depopulation has become a point of reference for many residents, posing as a reminder of the bad consequences this phenomenon would bring to the community.

Informants are generally well aware of the risk involved in hosting a NPP but are also confronted with difficult decisions to make, which have visible consequences on everyday life. This reaffirms Beck's (1992) discussion in the context of modernization where the individuals are caught up in a complex network of causes and effects in the risk society. Thus, it is not safety alone that is causing distress. While acknowledging that nuclear power is a risk and as such anxiety provoking, residents are still reluctant to raise their voices against the plant, fearing an unexpected outcome on their livelihoods. Many residents indeed think that speaking against the NPP may cause unintended collateral damage in other corners of their lives.

What is apparent is that informants' accounts are characterized by 'uncertainty' and the 'lack of ability to decide'. It appears evident in the informants' narratives that the threat of a nuclear accident is overshadowed by the more urgent and deep-running concerns of everyday life and their wish to sustain the pre-3.11 economic and social conditions. Some accounts remind us of the concept of individuation, which emerges out of a society characterized by liquid modernity (the condition of globalization), as people are left on their own to make any improvement in their living conditions (Bauman 2000). In the context of the nuclear host community, individuation is apparent in the informants' efforts to narrowly protect their interests and secure a decent livelihood they always considered normal – in the vicinity of a

nuclear facility. Under condition of limited choices, they make efforts to find individual solutions to problems that are beyond their control. As Beck aptly puts it, 'how one lives becomes a biographical solution to systemic contradictions' (Beck 1992, 137).

There are two key conclusions that can be drawn from the findings. The first is that the social reality of local residents' everyday life, which can be traced to historical, social, and economic factors, minimizes concern about nuclear risk. The second conclusion is that risk is socially constructed through the interactions of individuals, communities, plant operators, and government institutions. This perspective remains absent particularly within the post-Fukushima literature on Japanese host communities. In contrast to the experts with their objective discourses and technical skills in measuring the nuclear risk, ordinary citizens have to consider the multiple, short and long-term risks in their everyday lives. In other words, one source of threat (nuclear) alone simply cannot consume residents' concerns entirely. Especially if that threat is not perceived as imminent, people tend to evaluate it only in a comparative framework where other threats are more or less equally assessed.

At the time of writing, the future of the nuclear industry in Japan is still unclear. Since retaking power in 2012, the Liberal Democratic Party (LDP) government of Prime Minister Abe Shinzo has relentlessly been pursuing the restart of Japan's nuclear industry. The first step towards this goal has been achieved with four reactors being put back online: Kansai Electric's Takahama reactor no. 3, Kyushu Electric's Sendai reactors no.1 and 2, and Shikoku Electric's Ikata reactor no.3. Electric companies, including Chubu Electric the operator of the Hamaoka NPP, have applied to the government for approving the restart of another 19 reactors (*Mainichi Shimbun* Jun 5, 2017). In Omaezaki too, the restart of the Hamaoka NPP remains to be seen. While the nuclear restart faces widespread opposition at the regional and prefectural level, the local picture is different. In a climate of heightened uncertainty in the post-trust Fukushima era, local residents seem to be opting for the nuclear restart as evident in the results of the last two mayoral elections held respectively in 2012 and 2016. Whatever the future may hold, the nuclear facility will likely remain in the community for

the foreseeable future.

As risk management gains importance in a post-Fukushima context, there is need for a holistic type of risk management and risk communication strategies that would results in a safer environment for local people. Traditional nuclear-issue-centered risk calculation, presented through expert practices, operates on a large scale understanding of the problem. To downscale such understandings, there is a need to take into account the complexity of everyday life and the multiplicity of risks encountered at the local level. In particular, any governmental intervention for the sake of risk management has to take the diversity of risks into account in order to understand particular agencies and dependencies at the local level.

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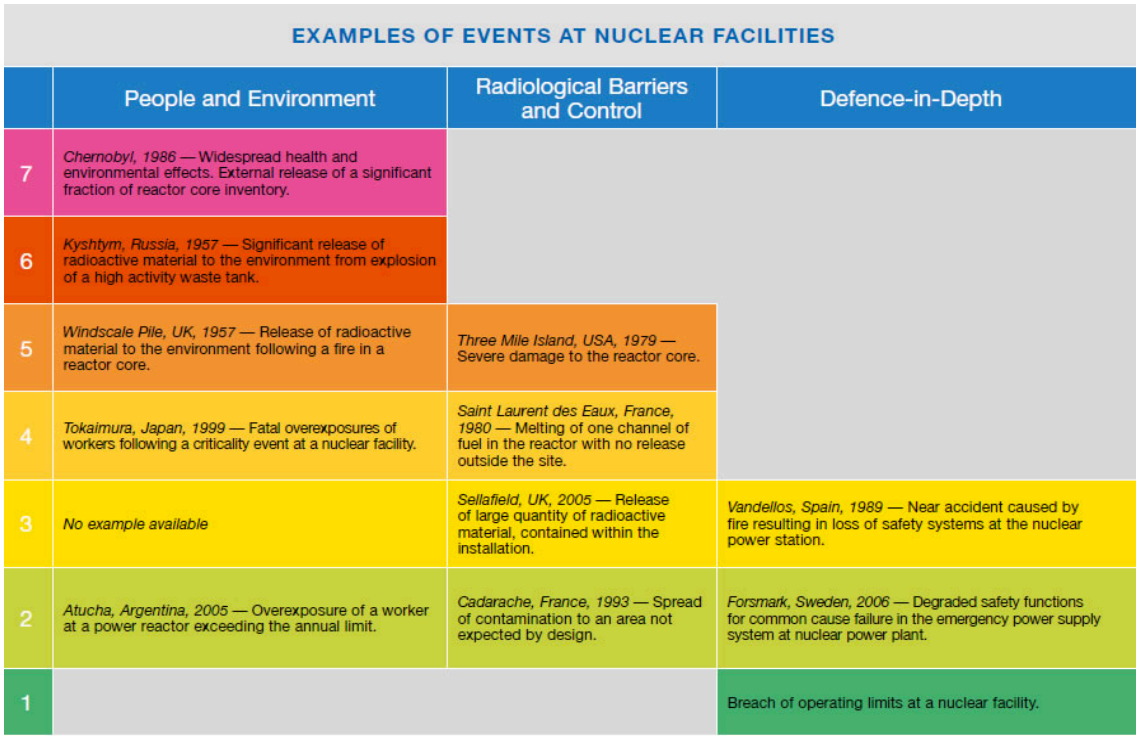
APPENDIX

1. Nuclear Incidents in Perspective

Nuclear incidents are rated on the International Nuclear and Radiological Event Scale (INES). The scale goes from one to seven, with on being a minor incident and seven being a major incident. To put it in perspective, there have only been two level seven incidents: Chernobyl incident (1986), and the Fukushima incident (2011). Three Mile Island Incident (1979) was a level five, the Tokaimura incident (1999) was a level four, and the easier Tokaimura Incident (1997) was a level three incident.

Year	Incident	Nation	Rating
1979	Three Mile Island	United States	5
1986	Chernobyl	Soviet Union	7
1991	Mihama	Japan	2
1995	Monju	Japan	not available
1997	Tokaimura	Japan	3
1999	Tokaimura	Japan	3
2011	Fukushima	Japan	7

Table: Major Nuclear Accidents in Japan and Abroad that Affected Japanese Nuclear Policy



EXAMPLES OF EVENTS AT NUCLEAR FACILITIES

	People and Environment	Radiological Barriers and Control	Defence-in-Depth
7	*Chernobyl, 1986* — Widespread health and environmental effects. External release of a significant fraction of reactor core inventory.		
6	*Kyshtym, Russia, 1957* — Significant release of radioactive material to the environment from explosion of a high activity waste tank.		
5	*Windscale Pile, UK, 1957* — Release of radioactive material to the environment following a fire in a reactor core.	*Three Mile Island, USA, 1979* — Severe damage to the reactor core.	
4	*Tokaimura, Japan, 1999* — Fatal overexposures of workers following a criticality event at a nuclear facility.	*Saint Laurent des Eaux, France, 1980* — Melting of one channel of fuel in the reactor with no release outside the site.	
3	*No example available*	*Sellafield, UK, 2005* — Release of large quantity of radioactive material, contained within the installation.	*Vandellos, Spain, 1989* — Near accident caused by fire resulting in loss of safety systems at the nuclear power station.
2	*Atucha, Argentina, 2005* — Overexposure of a worker at a power reactor exceeding the annual limit.	*Cadarache, France, 1993* — Spread of contamination to an area not expected by design.	*Forsmark, Sweden, 2006* — Degraded safety functions for common cause failure in the emergency power supply system at nuclear power plant.
1			Breach of operating limits at a nuclear facility.

International Nuclear and Radiological Event Scale
Source: International Atomic Energy Agency

2. Japanese Nuclear History Timeline

Decade	Date	Event	Details
1950	1952	San Francisco Peace Treaty	Japan allowed to research nuclear power
	1955	Hamaoka town officially formed through the merger of five small villages (Ikenshinden, Sakura, Kitaki, Asahina and Niino villages)	Population: 9816 (3401 households --- Left behind by developers after the war; The location of the area is inconvenient with no railroads reaching the city --- "In 1950s and beginning of 1960s, the name 'Hamaoka' did not ring a bell when brought up in Shizuoka or Hamamatsu city. This town was certainly some kind of marginalized unknown place to many people." (Mr. Yoshimura (70s), Farmer from Hamaoka)
	1952	Private nuclear power utility companies	Central government gave private nuclear utility companies monopolies in nice regions
	March 1, 1954	Lucky Dragon Incident	A US hydrogen bomb test contaminates the Japanese tuna boat *Daigo Fukuryuu-maru*. Of all the 23 crewmembers who were exposed, only the chief radioman died of radiation

			sickness
	March 1954	Government Funds Nuclear Power Research	National Diet approved Nakasone Yasuhiro's request to fund nuclear power research (235 million yen)
	October 26, 1954	Nuclear Power Day	Government created a holiday to recognize the importance of nuclear power
	January 1956	Japan Atomic Energy Commission Established	Formed the commission that plans and denies basic policies for promoting nuclear power research, development, and utilization
1960	1963	Local Community rejects proposed nuclear plant	Ashihama in Mie prefecture rejects a proposal for a nuclear power plant
	1966	First Japanese commercial nuclear reactor	Japan Atomic Power Company opened the first commercial nuclear reactor in Tokaimura
	1967	Hamaoka chosen by Chubu Eelctric for siting NPP	State of economy of Hamaoka in 1967 when the planning of the nuclear power plant became public: population 17361, area 53.91 Km2, 3415 households --- Main source of income was thus farming (70% of the population produced rice, tea, melon and tobacco) with a large proportion of part-time farmers --- The town was indeed facing a

			depopulation crisis, as it was losing around 300 young people every year to other urban regions --- A depopulated town, with a very weak and negligible tax base that accounted only for 37% of the town finance --- Southern part of Shizuoka comprising Hamaoka and Omaezaki and other towns was labeled by MITI as 'underdeveloped'
1970	1973	OPECS Oil Shocks	Expands the role of the central government in promoting nuclear power
	1974	Three Power Source Development Laws (*Dengen Sanpo* Laws)	Government passed invisible taxes on electricity use to fund pro-nuclear agendas, such as spending money on improving communities that host NPPs
	1979	Three Mile Island Incident (USA) --- Japan: opposition to nuclear power but without any impact on the government's pro-nuclear policy	Nuclear accident in Pennsylvania, United States. Rated a level 4 (out of 7) nuclear incident on the INES scale
1980	1986	Chernobyl Incident	High profile nuclear incident in USSR during the Cold War.

			Convinced many nations that nuclear energy was not safe. Rated a Level 7 accident
1990	1991	Mihama Incident	Nuclear accident in Mihama, Fukui Prefecture. A small amount of radiation escaped into the atmosphere. Rated a Level 2 accident
	1994	MITI spends more on NPPs	MITI stated to eliminate the maximum restrictions on how much utility companies could spend on siting NPPs/public relations budget increased ten times
	1995	Monju Incident	Nuclear accident in Monju, Fukui Prefecture. Malfunction caused a fire and explosions, and leaked radiation
	1997	Tokaimura incident	Nuclear accident in Tokaimura, Ibaraki Prefecture. A fuel-reprocessing plant malfunctions caused a fire and explosions that released radiation into the atmosphere. Rated a Level 3 accident.
	1999	Tokaimura incident	Nuclear accident in Tokaimura, Ibaraki Prefecture. Three workers poured a uranium solution into a mixing tank and reached criticality. Radiation leaked into the atmosphere. of the workers who were blasted by radiation, two died within year. Rated a Level 4

			accident
	2004	Mihama Incident	Workers exposed to steam following a pipe rupture. Five workers died and six were injured.
	April 1, 2004	Omaezaki city is formed through the merger of Hamaoka town and Omaezaki town	
2010	March 2011	Fukushima Daiichi Incident	The Tohoku Earthquake caused a tsunami off the coast of Japan. The Tsunami knocked out the Fukushima Daiichi Power Plant's backup generators, making it difficult to cool the reactors and reactor rods. Explosions released radiation into the atmosphere. Rated a Level 7 accident
	May 11, 2011	Suspension of the Hamaoka NPP	Decision was based on the possibility that an earthquake of 8.0 magnitude or higher might hit the Tokai region within the next 30 years.