

# Chapter 2

## Gaining Acceptance of Nuclear Facilities

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## Chapter 2

### Gaining Acceptance of Nuclear Facilities

In January 2019, the Institute of Energy Economics, Japan (IEEJ) organised workshops for gaining a better acceptance of nuclear power in Japan with the participation of opinion leaders from the municipalities that have hosted nuclear facilities in Europe for a long time. The workshops in Japan took place in three locations: Maizuru City in Kyoto, a prefecture that does not have a nuclear facility but is a neighbouring municipality of a nuclear facility; Omaezaki City in Shizuoka Prefecture which hosts nuclear facilities; and Tokyo to compile the opinions presented at the two workshops.

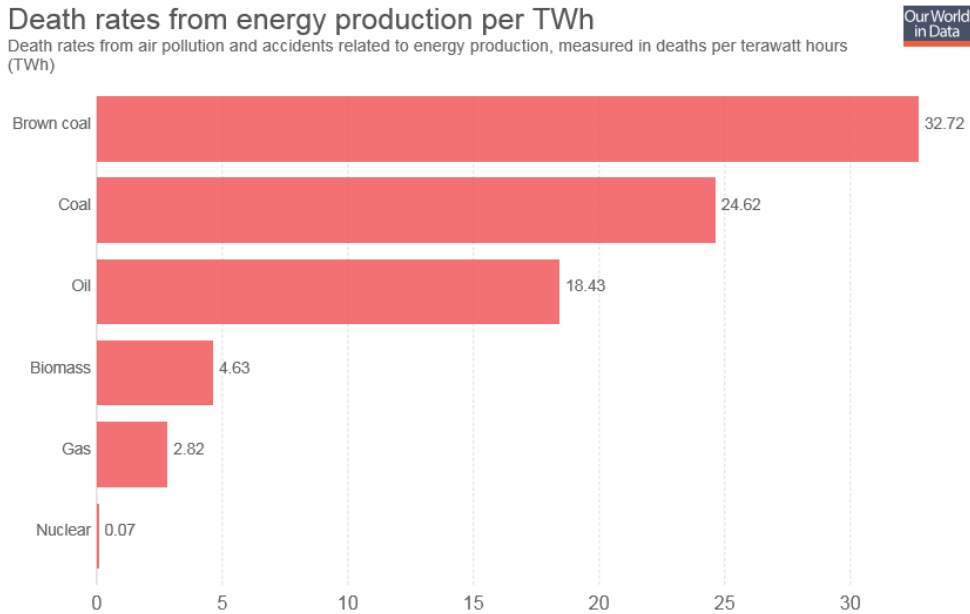
Chapter 2 discussions based on the presentations by the opinion leaders at the workshops, first describes the background to the acceptance of nuclear power in the three European countries of Finland, France, and Sweden on a scope that is broader than in Japan. This is followed by discussions on how municipalities that host nuclear facilities and their neighbours deal with nuclear power in Thailand and Japan, which are members of ERIA.

#### **1. Experiences and cases in Finland**

As noted in the results of an opinion survey in Chapter 1, the acceptance level of nuclear power is relatively high in Finland. The opinion leader from Finland explained the background to the country's acceptance of nuclear power as follows: 'For more than half a century, Finnish people have accepted nuclear power based on the awareness of the risks involved in nuclear power because they felt it had its advantages. Those who are against nuclear power only question the issues of waste and dangers and say we should ban nuclear power and develop renewable energy. However, I believe nuclear power is the safest and most efficient energy amongst all energy technologies that involve risks.'

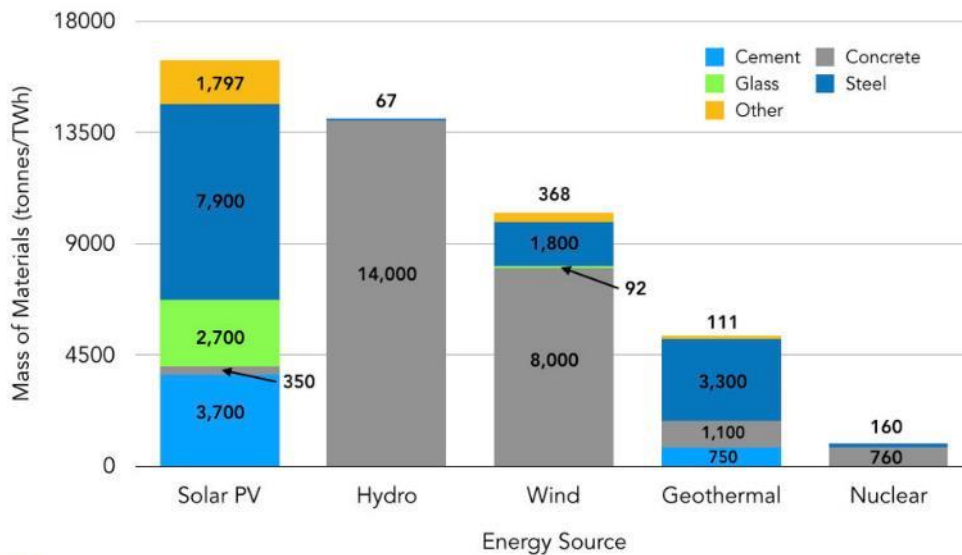
Certainly, the safety of nuclear power is frequently questioned, but it is also important to change viewpoints. Even if we take the impact of the Chernobyl accident into consideration, which is said to be the worst nuclear accident in history, the number of fatalities per generated electricity from nuclear accidents is far smaller than other energy production, as shown in Figure 2.1. Also, regarding waste, coal and other fossil fuels pose different problems by discharging pollutants and greenhouse gases into the atmosphere. There are also reports that toxic chemicals are released during the manufacture of solar panels. As shown in Figure 2.2, the amount of waste generated per terawatt hour of power generation is smaller for nuclear power than for coal, biomass, or other energy production. The Finnish government has explained these facts along with the data to its citizens over and over again. This would be one of the reasons of the wide acceptance of nuclear power amongst the public.

**Figure 2.1. Fatalities in Energy Production**



Source: Markandya, A. and P. Wilkinson (2007), *Our World in Data*, <https://ourworldindata.org/grapher/death-rates-from-energy-production-per-twh> (accessed 13 March 2019).

**Figure 2.2. Materials Throughput by Type of Energy Source**



Source: Desai, J. and M. Nelson, Are we Headed for a Solar Waste Crisis?, *Environmental Progress*, <http://environmentalprogress.org/big-news/2017/6/21/are-we-headed-for-a-solar-waste-crisis> (accessed 12 March 2019).

Finland is the first country in the world that granted permission to build a final repository for radioactive waste, which is currently under construction. The opinion leader from Finland gave the reasons why a nuclear facility, that is a final radioactive waste repository, was accepted by the public, as outlined below:

- Clear responsibilities
  - i) Each producer of nuclear power-generated electricity is responsible for its own nuclear waste management.
  - ii) The Ministry of Employment and the Economy holds the highest power of control and supervision over nuclear waste management in Finland.
  - iii) The Radiation and Nuclear Safety Authority (STUK) supervises the safety of nuclear power generation.
- Long-term and stable policy on nuclear waste management
- Strict safety requirements, credibility, and independence of the safety authority (STUK)
- Strong expertise on nuclear sector – also in the future

Meanwhile, Finland's approach to nuclear and radiation emergency reflects well the social acceptance of nuclear power in this country.

Based on the understanding that the ultimate responsibility to secure the safety of a nuclear facility rests with the business operator, evacuation drills are held frequently with the participation of local residents. The regulatory authority is involved in the training of nuclear power plant staff, and a large-scale evacuation drill is held once every 3 years with the involvement of hundreds of institutions. Belarus and other neighbouring countries are engaged in the evacuation plan because information sharing and collaboration across the border is essential in the case of a major accident that would require evacuations. As mentioned later, there are cases in Japan where multiple municipalities are engaged in wide-area collaboration in emergency evacuation planning. Finnish cases of multinational and wide-area collaboration should provide a helpful perspective for Asian countries.

## **2. Experiences and cases in France**

As noted in the results of an opinion survey in Chapter 1, the acceptance level of nuclear power is very high in France. The opinion leaders from France cited major reasons of the background to the country's acceptance of nuclear power: 'Information disclosure and dialogue implemented by Commission Locale d'Information (CLI) for more than 30 years; the significant authority of the central government in contrast to the relatively small authority of local municipalities; low electricity prices; and understanding of the French people, especially those living in areas close to a nuclear facility, that the nuclear power is a major industry and that nuclear power plants in France are operating safely.' And they cited the reasons for opposition are: 'promotion of clean energy, panic after Fukushima, political disputes that have no relationship with economic affairs, and misunderstanding that nuclear power is at the opposite end of renewable energy and that nuclear power is not clean energy.' In a multiracial nation where individuals hold different and divergent views, meetings are not

perceived as a device designed to forge a consensus in French. People express their views at briefings for local residents and public meetings but will relegate the final decision making to the decision-making authority, which may be a characteristic of French people.

In France, many of the opponents of nuclear power are not calling for the immediate shutdown of nuclear facilities. In areas without a nuclear facility, many want such facilities phased out by 2025, whilst the majority opinion in municipalities with nuclear facilities is to stop nuclear power plants after 2035.

The French opinion leader told the workshop participants, ‘The policy to cut the ratio of nuclear power from 75% to 50% is a political judgement that lacks any concrete strategy. This is not a safety issue; some nuclear power plants had to be shut down due to the decision of the central government and operators and local residents do not support this decision.’ The opinion leader described the French governance system and factors that played an important role in the process of the country’s acceptance of nuclear facilities and on residents’ concerns regarding ‘whether we are sufficiently prepared for an accident,’ as shown in 1) – 3) below:

1) *How did the French governance system enable to introduce a nuclear facility and to dialogue with public?*

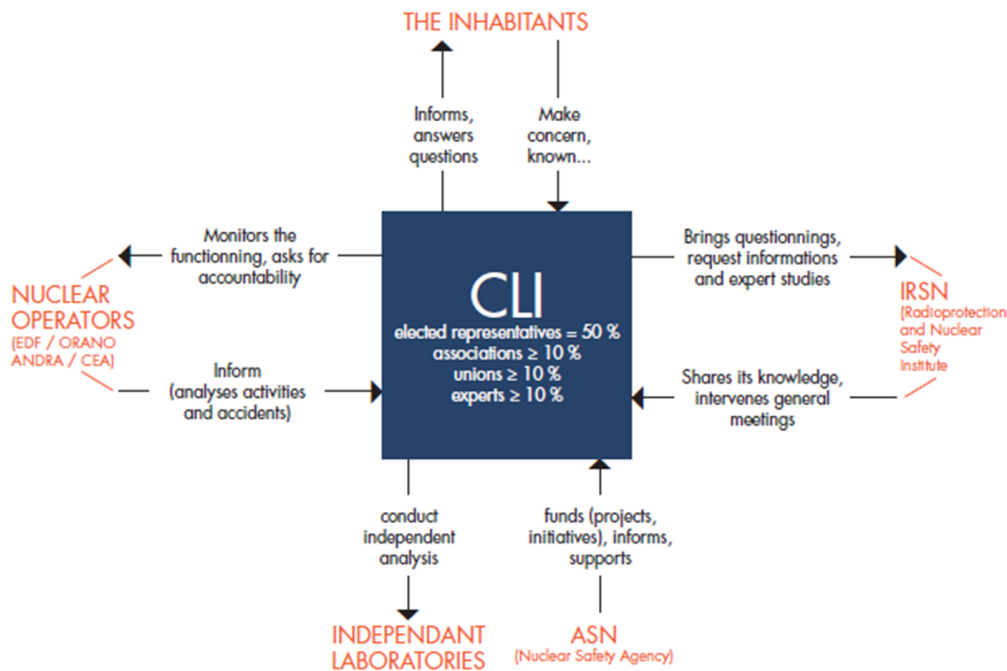
- *The ‘Commission Local d’Information’ (CLI) / Local Information Committees*

CLIs are consultation and information organisations in charge of basic nuclear facilities (Figure 2.3). Their mission is to monitor and concentrate efforts in the field of nuclear safety, radiation protection, and the impact of nuclear activities on people and the environment, and to promote public information on safety.

There are today 35 CLIs in France. They can order expertise, including epidemiological studies, and carry out any measurement or analysis in the environment relating to emissions or releases from a site’s facilities. The operator shall inform the commission of any incident or accident mentioned in article 54 of this law as soon as possible. The CLI is chaired by the president of the conseiller général (head of the French Département) or by an elected member of the CLI, whom he designates for this purpose. Each CLI is composed of four colleges of local resident-elected, representatives of environmental protection associations, representatives of nuclear workers’ unions, and experts such as scientists, doctors, business leaders, and academics. The French government believes in the importance of promoting discussions on the local acceptance of nuclear facilities by engaging both proponents and opponents. This is the reason why nuclear opponents including Greenpeace take part in CLI, an independent organisation that has no affiliation with the nuclear plant operator.

The operator must disclose all information on accidents and other events to CLI. CLI has worked to enhance information transparency: all CLI members have equal access to information; results of CLI meetings are promptly delivered in news releases; all topics, which can be registered by anyone in advance, are taken up for discussion; and CLI information is made public via the web.

**Figure 2.3. CLI and its Interlocutors**



Source: Druetz, Y. (2019), Presentation at the open workshop on 'Nuclear Public Acceptance' held in Omaezaki City, Japan on 24 January.

- *Commission Nationale du Débat Public (CNDP) / French National Public Debate Commission*

The CNDP’s mission is to inform citizens and make their opinion represented in the public debate. More specifically, the CNDP gives citizens a voice to development projects or equipment of national interest that have significant impacts on the environment and whose socio-economic issues are important. This process is made either in the context of a public debate organised by the commission and for which it appoints a particular internal commission, or in the context of a consultation for which it appoints a guarantor.

The CNDP is composed of 25 members from different backgrounds: parliamentarians, local elected representatives, members of the Council of State, the Court of Cassation, the Court of Auditors, associations, employers, and unions. These members are the first guarantors of its neutrality and are not intended to pronounce on the merits of the projects. They are the ones who, collectively, make the decisions after reviewing the files.

For example, in the nuclear field, the CNDP has conducted since November 2018 a public debate on nuclear waste and is working to report the risks of inconsistency in the 2019–2021 schedule for nuclear waste in the government’s plan.

- *Autorité de Sûreté Nucléaire (ASN) / French Nuclear Safety Authority*

The independent administrative authority set up by law 2006-686 of 13 June 2006 concerning nuclear transparency and safety (known as the ‘TSN law’) is tasked, on behalf of the State, with regulating nuclear safety and radiation protection in order

to protect workers, patients, the public, and the environment from the risks involved in nuclear activities. This reliable authority also contributes to informing the citizens.

The key figures of ASN are:

- More than 508 staff, with close to half of them in the 11 regional divisions.
- 311 inspectors distributed amongst the regional divisions and the departments
- A total budget of €84.4 million, and €84.3 million budget devoted to L'Institut de Radioprotection et de Sûreté Nucléaire (IRSN) analysis and assessment work
- More than 1,751 inspections of nuclear installations, radioactive material transport and in the medical, industrial and research sectors
- 19,894 inspection follow-up letters published on the website

2) *Why is nuclear power important for the country and communities?*

The development of a large nuclear-powered fleet has enabled France to reduce its imports of fossil energy to produce electricity. Thus, the electricity production from nuclear sources contributes, in its own way, to the purchasing power of consumers. Thanks to nuclear power, French industries benefit from one of the lowest electricity prices in Europe (25% cheaper on average). This asset mitigates the risks of relocation and lack of competitiveness of small and medium-sized enterprises that could cause more expensive energy.

Comparison with the German energy system that phased out its nuclear power plants and has now had to build, since 2007, 26 new coal-fired plants that increase CO<sub>2</sub> emissions. Even the European Union has admitted a 'mistake in state aid decision for German coal plants.'

3) *Can we prepare for accidents safely enough?*

- Yes, we can, by preventing upstream from all serious risks. One of them is the intrusion inside the nuclear installations by protesters or with, for example, a terrorist attack by airplanes. These risks can be easily solved politically and militarily. In France, the senior military officers have been reassuring when auditioned by the French Parliamentary Commission of Nuclear Safety and Security in July 2018. They answered that they had no serious data or information showing that terrorists target the French nuclear installations.
- Keeping the plants safe is also possible by not taking the intrinsic dangers of the nuclear industry as risks. For example, environmental associations often warn of the supposedly dangers of the spent fuel pool's security. One of their arguments is that the walls would not be thick enough, if a plane crashed or a rocket targeted the spent fuel pool. Although specialists interviewed in France, especially from the military field, say that there is no realistic risk on this issue.
- Keeping the plants safe is also to be done by focusing on the risks at the shutdown and dismantling phases, as well as at the transport of radioactive materials. Some

people argue that safety can be enhanced by shutting down nuclear power plants entirely. This may be true if we only consider the possibilities of an accident occurring on the scale of Fukushima, however, simply stopping nuclear power plants would not necessarily ensure safety.

- During a visit to Fukushima, I (the opinion leader from France) learned that some residents decided to remain in Fukushima based on their own judgement, and that their radioactive doses are not so high. We also need to consider the necessity and method of evacuating senior residents.

Based on the factors outlined above, the French opinion leaders propose the following requirements for the public acceptance of nuclear power:

- The conditions for the acceptance of a nuclear facility include safety first, information disclosure, and the ability to participate in all decision-making processes.
- Focus on safety and security. Risks and dangers should be considered separately. It is possible to reduce risks by perceiving and taking measures against dangers.
- Discussions should not be a confrontation between pro- and anti-nuclear ideas but should encompass future impacts from a multilateral perspective including the impact on employment, economic development, energy security, safety assurance, and other areas.
- Data for discussions should be prepared to ensure transparency and confidence, devoid of information asymmetry.
- The establishment of a dialogue scheme like CLI is effective. Even when opinions are in disagreement, it is important to respect and trust – and not fight against – each other.
- We all know that it is difficult for people to accept ideas when they get emotional. It is easy to raise objections.

### **3. Experiences and cases in Sweden**

As noted in the results of an opinion survey in Chapter 1, Swedish citizens on the whole do not regard nuclear power utilisation as favourable, although the nation procures about 40% of its electricity from nuclear power. However, the acceptance level of nuclear power is high in municipalities where nuclear facilities are located, such as Östhammar and Oskarshamn. The opinion leader from Sweden stated the following concerning the reasons for the high acceptance in such municipalities: ‘The small population and a high level of autonomy that enable municipalities to negotiate directly with the government by bypassing the counties, the circumstances that make Sweden special, their competence to directly negotiate with the government on decision-making particularly on matters regarding nuclear power and hence the high level of administrative transparency, the right of discretion on their decision-making processes, good relationships developed with citizens based on their high confidence in operators, and citizens’ participation that helps reflect their opinions.’ This section reviews the background to the relationship between residents and stakeholders concerning nuclear



facilities in Sweden based on the views of opinion leaders in Östhammar, which became the second city in the world to accept a high-level radioactive waste (HLW) repository after Finland and Oskarshamn, where a nuclear power plant is located.

1) *Experiences and cases in Östhammar municipality*

With a population of some 21,400, Östhammar is a relatively large municipality in Sweden. Over many years, the operator has held a series of dialogue discussions with residents in the area. At present, the construction permit for an HLW repository is under review. Also, expansion works to the disposal facilities for intermediate-level waste (ILW), which is lower in radiation level than HLW, and for low-level waste (LLW), are underway.

Östhammar City changed its municipal organisation in the 1990s to encourage discussions on the introduction of a nuclear facility. After the city agreed to accept the facility in 2001, SKB, the operator for the final radioactive waste repository, selected Forsmark in Östhammar as the construction site in 2009. In 2009, the municipality took steps by establishing a new organisation for review.

Although municipalities have the right of veto on the establishment of a nuclear facility, they have actively taken part in discussions requesting complete transparency regarding the judgment of the central government. When the explanations and actions of the industry or the government lack transparency, it may exercise its right of veto.

The opinion leader in Östhammar stated how the municipality has actively participated in the discussion with the nuclear industries and the central government. He said that the residents in Östhammar have wanted to participate and be an active part in the whole process of decision making, from start to a final decision. He stressed that the conditions for the acceptance are, first of all, a clear statement from the government before decision making, openness and transparency in the authorities' decision making, and to understand what assessments the authorities do when making decisions and writing statements to the government.

The opinion leader pointed out some lessons learned from the discussions:

- Persistence is required since the process takes long time.
- Financing is necessary, both for the waste management and for participations from various kinds of organisations.
- Participation from NGOs is desirable.
- Clarifying roles of each participants is necessary.
- Voluntarism is crucial to keep sustainable discussions for a long time.
- Openness and transparency are important, and the cooperation between the municipalities as well.

2) *Experiences and cases in Oskarshamn municipality*

In the early 1980s, the Swedish government decided to store all spent fuels in the country in Oskarshamn, one of the regions hosting nuclear power plants. At present,

the spent fuel elements are stored at an intermediate storage facility called the 'Clab.' The storage at the Clab is provisional and not permanent. Some residents voiced concerns about the Clab becoming a permanent facility. Eventually, however, it was decided that the spent fuel elements would be disposed of at the final repository in Forsmark.

Undeveloped land and farming villages spread across Oskarshamn, a city with the population of 27,000. Thanks to the numerous good-standing companies located in the city, Oskarshamn is much wealthier and has a higher level of education than other municipalities. These businesses contribute to the economic development of the surrounding communities.

Because of their extensive experience co-existing with nuclear power, residents willingly take part in discussions on nuclear facilities, which help support the mechanism of residents' opinions being reflected in the process. When a nuclear operator proposed Oskarshamn City in an encapsulation plant project for radioactive waste disposal, the city consented to its construction. Moreover, the discussions were attended by assembly members from both the ruling and opposition parties for Oskarshamn City Council's Local Competence Oskarshamn, a committee for enlightenment. A task group was set up for safety and security, local development in the field of nuclear facilities, municipal development, auditing the application, and other topics. The group is engaged in multi-layered examination and consultation as it continues to examine ways to have a positive impact on economic development.

The opinion leader from Oskarshamn pointed out some municipal standpoints in search of a solution for the waste problem as follows:

- Oskarshamn is a municipality with extensive experience of the nuclear industry.
- Oskarshamn does not accept that the temporary solution for waste storage Clab becomes permanent or semi-permanent solution, since it has had strong support from the inhabitants to participate in the discussion.
- With their strong position Oskarshamn will safeguard the local perspective in the decision-making process.

The active and sustainable form of the stakeholder involvement in Oskarshamn Municipality is called 'The Oskarshamn Model'. The model has well informed citizens and politicians under such concepts as:

- Full openness, participation and influence are the key issues.
- The Municipal Council is the local client.
- The citizens and the environmental groups are resources.
- The authorities are the experts.

The opinion leader talked about the success factor behind and lessons learned from The Oskarshamn Model, 'It takes many years to form a consensus on the acceptance of a nuclear facility. Dialogue is important, as is the transmission of information. Stakeholders will need to conduct dialogue on a continual basis. All processes must be

transparent and predictable. Confidence and transparency are important; as experts, operators, government and regulatory organisations have the responsibility to give a clear answer to any questions that may be posed by residents.'

#### **4. Experiences and cases in Thailand**

One of the issues confronting Thailand is the pressing need to develop new power sources to meet the rapid expansion in electricity demand that accompanies economic development. At the same time, there is a growing trend in the nation to review its energy policies, given the aggravation of air pollution and depletion of natural gas resources at home.

The power development plan approved by the government in 2007 (PDP2007) included a project to introduce four nuclear reactors totalling 4,000MW as a power source development option. Preparations got underway to start the commercial operation of two units in 2020 and 2021, respectively. The PDP2010 disclosed in 2010 positioned nuclear power as an important source of alternative energy in consideration of steps to deal with the growing electricity demand, improvement of energy security, and the necessity of clean energy, amongst other things. All combined, plans were mapped out to sequentially start the operation of five 1,000MW reactors at nuclear power plants between 2020 and 2028. Thereafter, following the accident in Fukushima, the government decided to postpone the introduction of nuclear power generation. The ratio of nuclear power given in the latest version (2018-37) of the 'Power Development Plan (PDP2018),' released in January 2019, is 0%.

While PDP2018 does not include a plan to introduce nuclear power, the activities outlined below are underway in Thailand:

- *Public Understanding on Base Load Power Plants*  
Education and information for the local community and for each household
- *E-KNOW Energy the ICONIC Contest*  
Essay and VDO Contest on Base Load Power Plants as tools to assist public understanding of nuclear power as base load power
- *MoEn-JICC Seminar on Public Understanding of Nuclear Power Plants in Thailand*

The opinion leader from Thailand said that a broad range of people including experts and ordinary citizens took part in facility visits, essay contests, seminars, and other events, which helped to improve the public understanding of nuclear power. Participation of the people in these events often prompted them to change their views about nuclear power.

#### **5. Experiences and cases in Japan**

Many regions in Japan have nuclear facilities. The International Atomic Energy Agency (IAEA) international standards stipulate the establishment of zones in case of an accident at a nuclear power plant: Precautionary Action Zones (PAZ) and Urgent Protective Action Planning Zones (UPZ). The PAZ is an area within which preparations should be made to implement

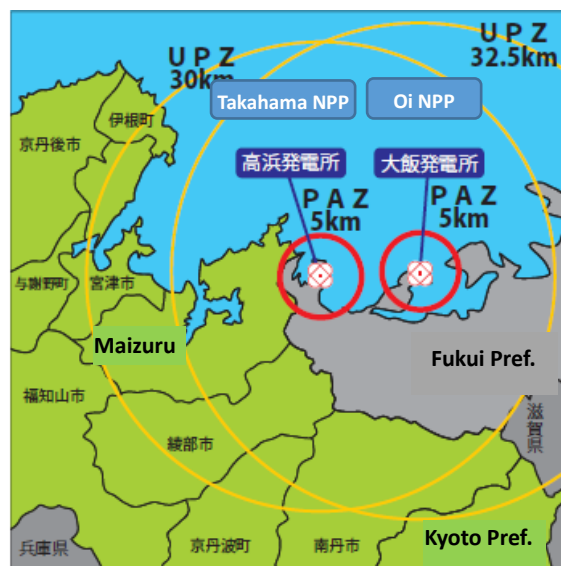
precautionary protection including evacuations before the release of radioactive substances, and the UPZ is an area where preparations should be made to implement urgent protective measures including indoor evacuation. Based on the IAEA international standards, the Nuclear Emergency Response Guideline in Japan defines the PAZ and UPZ as areas within approximately 5 kilometres (km) and within approx. 5–30km from a nuclear plant, respectively. The guideline mandates municipalities inside the UPZ to formulate evacuation plans.

This section discusses the evacuation measures adopted by Kyoto Prefecture and Maizuru City, municipalities that do not have a nuclear facility but neighbour a municipality that has such facilities, and measures of Omaezaki City, which is deeply involved in nuclear power as a municipality with a nuclear facility.

1) *Experiences and cases in Kyoto*

Kyoto Prefecture is the sole neighbouring municipality in Japan that has a PAZ. Its population inside the UPZ exceeds that in the prefecture that has the nuclear facility (Figure 2.4).

**Figure 2.4. PAZ/UPZ of Takahama and Oi Nuclear Power Plants**



NPP = nuclear power plant, PAZ = Precautionary Action Zone, UPZ = Urgent Protective Action Planning Zone.

Source: Kyoto Prefecture, Brochure to Prevent Nuclear Disaster (11 April 2014), <http://www.pref.kyoto.jp/kikikanri/documents/kyotofusiori01.pdf> (accessed 15 March 2019) (in Japanese).

Following the formulation of the Nuclear Emergency Response Guideline by the government, the Kyoto government revised its regional disaster prevention plan in 2013. Consequently, each local municipality within the UPZ in Kyoto formulated or revised their regional disaster prevention plans. The Kyoto government has published a brochure titled ‘Brochure on Nuclear Disaster Prevention’ (Figure 2.5), which contains basic knowledge on nuclear disaster prevention and the content of the revision of the prefecture’s regional disaster prevention

plan. At the same time, local municipalities in the UPZ have prepared and released a similar brochure in the same format. In 2015, the Kyoto government prepared 'Instructions on wide-area evacuation associated with nuclear emergency' and signed a safety agreement with the nuclear plant operator establishing regional councils.

**Figure 2.5. Brochure on Nuclear Disaster Prevention in Kyoto Prefecture**



Source: Kyoto Prefecture website, <http://www.pref.kyoto.jp/kikikanri/documents/kyotofusiori01.pdf> (accessed 14 March 2019) (in Japanese).

Whilst the reviews of safety measures at nuclear power plants are implemented by the Nuclear Regulation Authority, each municipality is responsible for evacuation planning in the event of an emergency. As part of the steps to enhance the effectiveness of evacuations, municipalities with a nuclear facility and those in the UPZ conduct comprehensive nuclear emergency drills. Although the Kyoto government has signed a safety agreement with plant operators, Kyoto and other nearby municipalities do not have the right to consent or refuse to a nuclear restart (prior consultations on the restart of the operation of a facility that has been stopped due to request for safety measures, etc.), unlike Fukui Prefecture where the nuclear facility is located. This is an example of the differences in the content of an agreement signed between a nuclear power plant and a municipality where a nuclear facility is located and that concluded between the plant and a nearby municipality. And so, the Kyoto government established a regional council to fill the information gap by getting briefed on safety measures implemented at the nuclear power plant and communicating their request to the plant, etc. Kyoto is the only municipality that carries out such measures amongst all such peripheral municipalities in Japan.

The measures on evacuation plans currently adopted by the Kyoto government are as shown below. As many issues including the communication system, securing of personnel during evacuation, and the identification of their roles remain unresolved, the Kyoto government

says it will work to formulate better evacuation plans in consideration of anxieties felt by residents.

- Emergency drills and plan formulation
- Development of evacuation routes (ongoing)
- Preparation and distribution of evacuation guidebooks

The section below shows the questions raised by residents during a public meeting held by the Kyoto government for safety measures associated with nuclear power generation and evacuation plans. The questions indicate that people living in nearby municipalities have concerns similar to residents in municipalities with a nuclear facility.

- Various safety measures are in place, but how can you say that an accident like the one at Fukushima could never happen? (You cannot say that for sure, can you?)
- It is said that Japan has enough electricity. Why then do we need to operate a nuclear power plant? (We probably do not need one, right?)
- How will the conversion to renewable energy be promoted?
- Would the resident evacuation plan for a nuclear emergency ensure a safe evacuation?
- Evacuation plans should be formulated first before restarting a nuclear power plant.
- We were told that buses will be used for evacuation in principle. Can you secure enough buses for that purpose?
- Roads could collapse in the event of an earthquake. How are you going to secure the evacuation routes if that happens?
- What ideas do you have on measures to prevent traffic congestion associated with evacuation in the event of a nuclear emergency?
- Is nuclear power generation really cost competitive even when accident scenarios are taken into consideration?
- How long would it take for us to return home after we evacuate?
- Are sufficient countermeasures against terror attacks in place?

## 2) *Experiences and cases in Maizuru and other UPZ cities*

Maizuru City is the only municipality that has a PAZ in Kyoto Prefecture, and almost all areas of Maizuru City come under the UPZ of Takahama Power Station. The measures adopted by Maizuru City are as follows:

- The Maizuru government has decided evacuation order zones based on its own scenario. The evacuation order for each zone will be issued one-by-one.
- The city assumes on southwards and westwards evacuation destinations so that residents can be evacuated to different destinations depending on the spread of radioactive substances.
- In 2017, the city prepared the 'Residents' Evacuation Plans (Summary Version),' a brochure for residents that outlines the ideas behind and method of evacuation (Figure 2.6), which was distributed to all households in the city.
- The city is taking efforts to promote the public understanding of evacuation plans including an outreach lecture for town planning (briefing). Any other media channels will be employed to promote the understanding of residents on the topic.

- The city has developed facilities equipped with positive-pressure devices, air purifiers, and other necessary equipment at schools, civic halls, and other institutions for senior citizens, hospitals, and for other people who need special care. The development of more facilities is underway.
- Iodine pills are given out in the PAZ and equivalent zones so residents can take them as a precautionary measure. As for UPZ residents, the pills will be distributed during evacuation at the gathering places. The city plans to expand the areas subject to pill distribution. A sufficient number of pills are stockpiled, including those for temporary visitors.
- The city has conducted an emergency drill at least once every fiscal year after the accident in Fukushima. Various efforts are taken to facilitate the participation of more residents including shifting the zones targeted in each drill. During the drills, participants are engaged in a wide range of activities such as establishment and management of headquarters for disaster control, opening and management of temporary shelters, evacuation of those who need special care, screening, monitoring, preparation of meals and information sharing.
- The city will continue to review everything to create highly effective plans to protect its citizens.

Figure 2.6. Brochure of Residents' Evacuation Plans, Maizuru City



Source: Maizuru City website, <https://www.city.maizuru.kyoto.jp/kurashi/cmsfiles/contents/0000002/2765/01siraku.pdf> (accessed 15 March 2019) (in Japanese).

Problems that have arisen in evacuation planning and evacuation drills in Maizuru City include the shortage of materials and equipment and personnel to guide the evacuation. The municipality has devised ways to deal with the problems, for instance, by utilising existing resources (buses, buildings, and volunteers) that were assigned for use in the measures against natural disasters. Municipal workers take advice from experts on radiation and nuclear safety to equip themselves with sufficient knowledge on the importance of evacuation plans that would be required to brief residents on the matter.

Furthermore, the city also needs to foster cooperation with municipalities that have plans to accept evacuees, which can be located dozens of kilometres away. The municipality that will become the evacuation destination will not be known until an accident occurs. For this reason, Maizuru City and other municipalities in Kyoto Prefecture have been working continuously to share information with municipalities in Hyogo, Nara, Shiga, and other prefectures that are potential candidates for accepting evacuees.

For regions and countries that have no nuclear power plants but are next to a town (country) that has one, the example of Kyoto Prefecture and Maizuru City may provide insights in the field of evacuation planning and resident briefings.

### 3) *Experiences and cases in Omaezaki*

For almost half a century Omaezaki City in Shizuoka Prefecture has prospered in tandem with the Hamaoka nuclear power plant, which is located in the region.

The Hamaoka Unit 1 started operations in 1974 when Omaezaki City was still named Hamaoka town. When the accident in Fukushima occurred, Units 3 to 5 were in operation and a plan to construct Unit 6 was underway. About 2 months after the accident in Fukushima, the then Prime Minister Naoto Kan requested the suspension of all units at the Hamaoka nuclear Power plant, and that suspension is still in effect. Hamaoka is the sole power site that suspended its operations at the request of the government. Omaezaki City asked the government and regulatory authorities to conduct a rigorous and swift safety assessment and called for an explanation of the necessity of nuclear power plants. Figure 2.7 shows the document created by Omaezaki City at the time that illustrates the relationship between 'Nuclear Power and Our Lives.'

In Omaezaki City, the citizens, operator, and municipality have been working together to build a comprehensive, energy-oriented city. The municipal government has formulated the Omaezaki City Energy Vision as it aggressively promotes measures to revitalise the community. Also, the city hosts public meetings on nuclear power to address citizens' questions and concerns (Figure 2.7).



Figure 2.7. Snippet from Omaezaki City PR Magazine



Source: Omaezaki City website, <https://www.city.omaezaki.shizuoka.jp/material/files/group/4/172.jpg> (accessed 14 March 2019) (in Japanese).

Figure 2.8. Public Meeting in Omaezaki



Source: Omaezaki City website, [https://www.city.omaezaki.shizuoka.jp/kurashi/kurashi\\_tetsuduki/energy/genshiryoku/ikenkoukan.htm](https://www.city.omaezaki.shizuoka.jp/kurashi/kurashi_tetsuduki/energy/genshiryoku/ikenkoukan.htm) (accessed 14 March 2019) (in Japanese).

The nuclear power plant in Omaezaki City was built after Chubu Electric Power Company made a proposal to and received a positive answer from the town. The plant was not constructed in response to local requests, which set the municipality apart from many others that have a nuclear facility in place. For Omaezaki City, the decision to accept a power plant proved to be a monumental undertaking with significant consequences. The city officials believed that the citizens' acceptance of the government's energy policies depended on whether they could identify with the social significance of a nuclear power plant and, needless to say, assurance of safety. For the municipality, the construction of the nuclear power plant had to be an opportunity that provided an impetus for industrial promotion, improvement of welfare for its citizens, revitalisation of the regional economy, training and employment of local human resources, advancement of education and culture, and the development of infrastructure in addition to the establishment of a stable foundation for long-term financing. Looking back on its history, Omaezaki City has held talks with

neighbouring municipalities, fisheries cooperative associations, and other stakeholders as the need arose and chose the path towards mutual prosperity whilst protecting the position of individual parties.

Omaezaki, an opinion leader, said that, after launching a wide range of measures in preparation for the construction, the municipality learned the lesson that ‘for all matters, consensus-building depends on understanding and consent.’

Changes in the Japanese government’s energy policies following the accident in Fukushima completely altered the way of life in the region that previously lived in harmony with the nuclear plant. Chubu Electric, which suspended the operations of the Hamaoka nuclear power plant at the request of the government, later launched large-scale safety enhancement works including the construction of a 22 metre-high tsunami protection wall. However, the suspension of operations was continued even after the safety enhancement works were completed. As Chubu Electric has not made any investment beyond such works, the number of people working at the plant has been on the decline. Tough conditions for the area continue with its impact being felt in industries that include accommodation facilities and restaurants in the siting area. The opinion leader in Omaezaki City says, ‘Regardless of whether you’re pro- or anti-nuclear in the discussions, the overriding desire amongst local citizens is to live in peace.’

Omaezaki City is one of the municipalities that was most directly affected by changes in the government’s energy policies. The approaches adopted by the town that relies heavily on nuclear power should provide a helpful reference for future discussions on the introduction or discontinuation of energy facilities in Asia.