

Chapter 3

Opportunities and Barriers for Enhanced Public Acceptance

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Chapter 3

Opportunities and Barriers for Enhanced Public Acceptance

In November 2019, IEEJ organised workshops to gain a better understanding 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: Kashiwazaki City in Niigata Prefecture and Tsuruga City in Fukui Prefecture which host nuclear facilities, and Tokyo. The Tokyo workshop compiled the opinions presented at the earlier two workshops.

Kashiwazaki City and Tsuruga City are hosting municipalities of NPPs. The approaches adopted by these municipalities could provide a helpful reference for future discussions on the introduction or discontinuation of nuclear energy facilities in Asia.

The five opinion leaders invited from the US, Finland, and the UK were:

1) From the United States

- A co-founder of 'Mothers for Nuclear', a US-based environmental non-profit-making organisation focused on building a global community of support for nuclear energy from the standpoint of mothers and nuclear engineers.

2) From Finland

- A member of the steering committee of Innovation for Cool Earth Forum (an international organisation working to prevent global warming), who was formerly against nuclear energy but has recently been involved in its promotion.
- A chairperson from the Eurajoki Municipality Council in Finland, which was the first in the world to accept a spent fuel final disposal facility (currently under construction).

3) From the United Kingdom

- A senior lecturer of the Nuclear Futures Institute at Bangor University, which is at the heart of the Menai Science Park in Wales.

- An advisor to governments, who has many years of experience working in the energy sector and strategic economic development issues across the world, and also who has been committed to the people and challenges of Cumbria in the UK.

Before the invitation, the project leader from IEEJ visited the three nations to discuss the major issues in the draft proposals with the invited opinion leaders, so that the workshop participants could focus on those essential issues to better promote nuclear PA. Opinion leaders from the three nations were invited to participate in the three workshops. The workshop participants included energy-related policymakers, local government officials, and researchers from Cambodia, China, the Lao People's Democratic Republic, Malaysia, Mongolia, and Myanmar. These countries are all members of ERIN, an organisation that includes the 10 ASEAN member states plus Australia, China, India, Japan, the Republic of Korea, Mongolia, New Zealand, and the US – 18 countries in all – and is affiliated with ERIA.

a. Workshop in Kashiwazaki

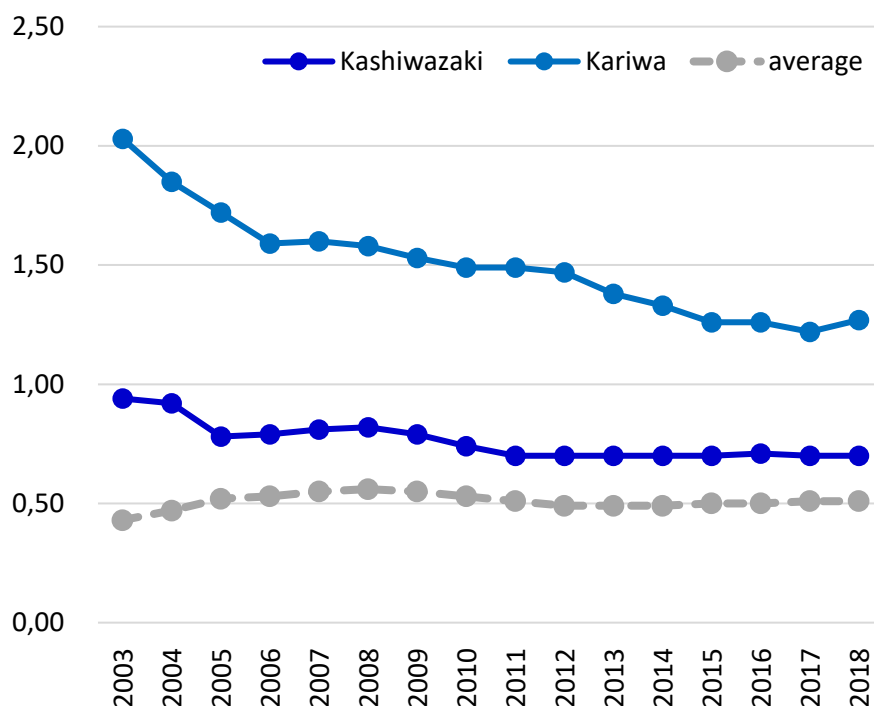
For about 50 years Kashiwazaki City and Kariwa Village in Niigata Prefecture have prospered in tandem with NPPs, which are located in the region. There are seven NPPs in the region of Kashiwazaki City and Kariwa Village. After the accident at Fukushima Daiichi NPP, all plants suspended operation, and Units 6 and 7 of the Kashiwazaki–Kariwa NPP are under safety review for compliance with the new regulatory requirements.

According to literature from Kashiwazaki City, the beginning of the relation between the region and nuclear power goes back to 1967. In that year, the decision was made to conduct a site survey for the location of the NPP, and the Tokyo Electric Power Company Holdings (TEPCO) officially proposed to enter the site 2 years after that. The construction of Unit 1 of the Kashiwazaki–Kariwa NPP started in 1978 and the operation began in 1985. In parallel with the movement of Unit 1, the construction of Units 2 and 5 began in 1983. The construction of Unit 3 started in 1985, and the construction of Units 6 and 7 started in 1991 and 1992, respectively. The operation of these units commenced accordingly as construction progressed, including the latest Unit 7 in 1997. The seven units had operated smoothly at the NPP for about 20 years. In 2002, inappropriate works of TEPCO concerning its self-inspection records were revealed, and

the operation of all units at the Kashiwazaki–Kariwa NPP stopped. Although all the units restarted operation once it was revealed that TEPCO falsified data and did not publish past troubles, the public was losing trust in the operator. Meanwhile, the Niigata Chuetsu-oki earthquake occurred in 2007 and all the units suspended operation. TEPCO installed aseismic reinforcement in the units, and accordingly they restarted operation after 2009. In 2012, after the accident at Fukushima Daiichi NPP, all units stopped operation. Although the review of compliance of Units 6 and 7 with the new regulatory requirements completed in 2017, the operator has not received agreement from the local governor and the operation has not restarted yet.

Kashiwazaki City and Kariwa Village financial indexes are shown in Figure 3.1. (A financial index is an indicator of the financial strength of local governments. If the index exceeds 1.0, the local government has strong financial strength).

Figure 3.1: Kashiwazaki and Kariwa Financial Indexes



Source: Ministry of Internal Affairs and Communications.

https://www.soumu.go.jp/iken/shihyo_ichiran.html (accessed 3 March 2020) (in Japanese).

Whilst their financial status is better than the nationwide average, it has been stagnant since 2011, when the Fukushima Daiichi accident occurred.

The five invited opinion leaders and seven ERIN member participants visited Kashiwazaki City in Niigata Prefecture, which has been hosting NPPs for about 50 years, to participate in a workshop with three local opinion leaders (Figure 3.2).

Figure 3.2: Kashiwazaki Workshop (NPPs hosting municipality)



Source: IEEJ.

The chairperson and two vice chairpersons of the Committee for Securing Transparency of Kashiwazaki–Kariwa Nuclear Power Station participated in the discussion in Kashiwazaki. The committee was formed with the aim of ensuring transparency of the power station and restoring trust in response to the falsification problem of TEPCO in 2002. It is operated based on the policies of not asking about the pros and cons of the nuclear power station itself, not having an authority, and disclosing information in principle. The committee consists of fewer than 25 members, who are recommended by groups and communities that are based in the area and approved by the committee. The central government, prefectural government, municipalities, and the operator also participate as observers and explainers. The committee has been in operation for about 15 years, during which about 200 regular meetings and management board meetings have been held, about 100 magazines have been published, and nine inspections have been carried out. So far, the committee has submitted a total of 17 proposals, written opinions, and requests on troubles in NPPs, national policies concerning nuclear power and energy, nuclear safety regulations and measures, and emergency response plans. It is desirable not to draw a conclusion but rather reflect findings derived from discussions on each role by sending supporting, opposing, and neutral information at the same time, sharing the information with local residents and observers in person, and carrying out calm and objective discussions with mutual respect.

Transparency became a topic in the discussion. Whilst it is considered that various opinions are necessary to ensure transparency, it is difficult to transmit information so that the general public can understand it. They discussed operators having set a position of risk communicator as a way to address this problem.

Trust was another topic discussed. Regulators are not trusted, and scholars are not considered neutral in Japan. One opinion suggested that operators should strive for obtaining the trust of local residents. The national government began to shift its responsibility to operators' shoulders after the Fukushima accident. Another opinion was that this is inconsistent with the fact that nuclear power has been considered a national policy and the government must be responsible for providing proper explanations.

b. Workshop in Tsuruga

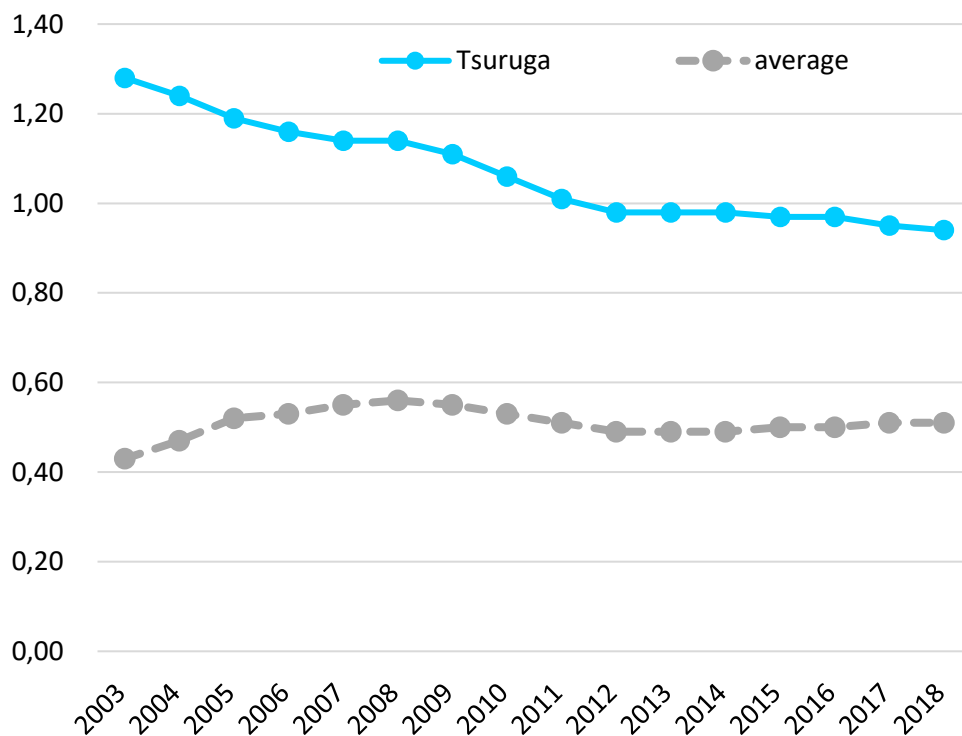
For about 60 years Tsuruga City in Fukui Prefecture has prospered in tandem with NPPs, which are located in the region. At present, Tsuruga City hosts four NPPs. One of them had commenced decommissioning before the accident at Fukushima Daiichi NPP, and the other two after the accident. The remaining Tsuruga nuclear power station Unit 2 is under safety review for compliance with the new regulatory requirements.

According to literature from Tsuruga City, the beginning of the relationship between the region and nuclear power goes back to 1962 when it was decided the location of a new NPP was to be on Tsuruga Peninsula. In 1970, Unit 1 of Tsuruga station started commercial operation. At the same time, in 1968, the land adjacent to Tsuruga station was selected for a candidate construction site of the advanced thermal reactor Fugen. The commencement ceremony was held in the same year as Unit 1 of Tsuruga station started operation. In 1982, the construction of Tsuruga station Unit 2 began and the operation started in 1987. Simultaneously, the construction of the fast breeder prototype reactor Monju started in 1985. Monju reached criticality for the first time in 1994. In 1995, the reactor was shut down due to sodium leakage from the secondary cooling system and had stopped operation for a long period until it commenced again 14 years later in 2010. Fugen discontinued operation in 2003 and decommissioning commenced, whilst the preparation work for the construction of Tsuruga station Units 3 and 4 started in 2004. In 2012, 1 year after the accident at Fukushima Daiichi NPP

occurred, all NPPs in Fukui Prefecture were shut down. The Nuclear Regulation Authority, which was established after the accident, said that the possibility of the crush zone, located right below Unit 2 of Tsuruga station, being an active fault cannot be denied (it had not previously been considered an active fault). Therefore, operation of the NPP in Tsuruga has not yet commenced up to the present day. Unit 1 of Tsuruga station, which had been in operation for over 40 years, stopped operation in 2015 and decommissioning commenced after that. An inspection omission of the facility was found in Monju in 2012 and the regulator recommended changing the operator. In 2016, the government decided to commence the decommissioning of Monju. The establishment of a new research and test reactor in the Monju site is being considered by the government, which will support nuclear power research and human resources development.

The financial index of Tsuruga City is shown in Figure 3.3.

Figure 0-1: Tsuruga Financial Index



Source: Ministry of Internal Affairs and Communications.
https://www.soumu.go.jp/iken/shihyo_ichiran.html (accessed 3 March 2020) (in Japanese).

The financial status of Tsuruga City, as in Kashiwazaki–Kariwa, whilst better than the nationwide average, has been stagnant since 2011, when the Fukushima Daiichi accident occurred.

The experts visited Tsuruga City in Fukui Prefecture, which has been hosting NPPs for about 60 years, to attend a workshop with two opinion leaders (Figure 3.4).

Figure 3.4: Tsuruga Workshop (NPPs hosting municipality)



Source: IEEJ.

The Tsuruga City branch head and director of the Fukui Council for Peaceful Nuclear Use participated in the workshop discussions as local opinion leaders. When NPPs were constructed one after another in Fukui Prefecture, a campaign against nuclear power rose during the 1970s. In response, the council was established with about 300 members with the need of cooperation of not only municipalities but private and individual groups to promote people’s understanding. The council consists of the headquarters located in Tsuruga and five branches including the Tsuruga Branch. The council aims to gain appropriate knowledge and deep understanding, build comprehensive energy to improve the economy and quality of life, and nurture local patriotism through their activities. It holds study sessions and discussions on the use of nuclear power for peace with operators and scholars, and performs inspections at nuclear-related facilities including NPPs and geological disposal research centres. The council also carries out public relations activities to enhance understanding for appropriate information on nuclear power generation and participates in symposiums in areas where electricity generated in NPPs is consumed. It promotes understanding of nuclear power and radiation throughout Japan, helps communities prevent harmful rumours in areas where NPPs are located, and promotes activities

to enhance young people's understanding of next-generation issues of energy, with the hope that people will eventually respect and appreciate the fact that areas in which NPPs are located support Japan's economy.

The economy of areas where NPPs are located was talked about in the discussions. Whilst NPPs provide an advantage of strengthening the local economy, political decisions are important in installing them (the government loses trust from inconsistency). The necessity of diversifying the source of income and examples of introducing a new industry were explained to prepare for the decommissioning of NPPs which will happen eventually.

The transmission of appropriate knowledge was another topic that was discussed. The use of visitor centres and camps to increase knowledge, and learning lessons from the past failures in communication were mentioned as examples, and some participants pointed out the importance of education for future generations, which will affect future public opinions.

Regarding the Fukushima accident, some foreign participants said there were no casualties from radiation, whilst local opinion leaders responded that saying 'no casualties, it is good' should be avoided, because people have not been able to return to their communities.

In addition, in Tsuruga, the participants toured the Institute of Nuclear Safety System, and Monju NPP owned by the Japan Atomic Energy Agency to give them a greater understanding of the situation in Japan. Participants of the tour grasped the following points:

- As a trend of Japan's public opinions after the accident at the Fukushima Daiichi NPP, negative opinions increased.
- A strong correlation can be seen between the sense of insecurity towards nuclear and the thought in the use of NPPs. On the contrary, the sense of insecurity has decreased over the long term, whilst the use of NPPs in actual numbers has not changed much.
- Research on public opinions implies that they are also affected by individuals' values.

Other knowledge grasped on the tour included measures against coolant leakage at NPPs taken by operators, measures against terrorism such as a plane crash, and the idea of risks during decommissioning procedures.

c. Workshop in Tokyo

The findings of the two workshops in Kashiwazaki and Tsuruga were summarised and led to the draft policy proposals considered at the final workshop in Tokyo (Figure 3.5).

Figure 3.5: Tokyo Workshop



Source: IEEJ.

1) Experiences and cases in the United States

As an opinion leader and expert from the US, the founder of the environmental group that promotes communication concerning nuclear power and environmental preservation participated in the local discussion meeting and the Tokyo workshop. She made comments from the viewpoint of an engineer at Diablo Canyon NPP in California, and of a mother.

Comments of opinion leaders and experts in the US that were heard during the visit in advance and the outline of explanation in the Tokyo workshop are as follows:

- More than 1 billion people in the world still have no access to reliable electricity. There are advantages and disadvantages in different sources of electricity, and it is impossible to solve all problems with a single source. This means that a balanced energy mix is necessary.

Renewable energy, which has a clean image, is considered hopeful. However, in reality, occupied valuable plots of land are needed to install renewable energy facilities. Renewable energy is an intermittent power source, and it requires backup power supplies. Most of the supplies emit carbon dioxide and are covered by thermal power generation that causes air pollution. Nuclear power can save valuable land as the energy density is large. It can generate power without depending on time and wind conditions, with low carbon emissions (Table 3.1: Emissions of Selected Electricity Supply Technologies (gCO₂eq/kWh)) and at reasonable cost (Table 3.2: Total Electricity Supply Cost).

- The most difficult issue concerning nuclear power is the low level of support from the public and problems provoked by anxiety. In order to deal with the issue, it is important to promote discussions on the value of nuclear power with many different people and make a shift from anxiety to hope.
- Because of a lot of continuous trouble, the Rancho Seco Nuclear Generating Station in California was decommissioned in 2009. In addition, solar power generation was initiated in a neighbouring larger site. However, electricity was in short supply and power generation had to depend on a natural gas power plant in the vicinity. This is the reality, which is not known to people.
- It is important to diversify advocates who can speak about nuclear power and energy by exchanging opinions with various groups including politicians, social groups, environmental activists, and academia. In the US, only the operators have implemented PA activities of nuclear power for a certain period and various values have not been shared.
- Nuclear power PA depends too much on technical experts. Technical communication makes people feel concerned. Nuclear power PA requires economists and marketing.
- PA should be connected with what people think is important for efficiency. It is also necessary to understand the fears which opposing people feel.
- It is also useful to use various communication channels and employees of NPPs should try to communicate by themselves.
- In the future, it will be important to have communication between various people by sharing availability, low carbon, and high reliability as common values. It is also important not to

use energy policy issues as materials for political ideals.

Table 3.1: Emissions of Selected Electricity Supply Technologies (gCO₂eq/kWh)

Options	Direct emissions	Infrastructure & supply chain emissions	Biogenic CO ₂ emissions and albedo effect	Methane emissions	Lifecycle emissions (incl. albedo effect)
	Min/Median/Max	Typical values			Min/Median/Max
Currently Commercially Available Technologies					
Coal—PC	670/760/870	9.6	0	47	740/820/910
Gas—Combined Cycle	350/370/490	1.6	0	91	410/490/650
Biomass—cofiring	n. a. ^a	–	–	–	620/740/890 ^b
Biomass—dedicated	n. a. ^a	210	27	0	130/230/420 ^b
Geothermal	0	45	0	0	6.0/38/79
Hydropower	0	19	0	88	1.0/24/2200
Nuclear	0	18	0	0	3.7/12/110
Concentrated Solar Power	0	29	0	0	8.8/27/63
Solar PV—rooftop	0	42	0	0	26/41/60
Solar PV—utility	0	66	0	0	18/48/180
Wind onshore	0	15	0	0	7.0/11/56
Wind offshore	0	17	0	0	8.0/12/35

gCO₂eq/kWh = grams of carbon dioxide equivalent per kilowatt-hour.

Source: Intergovernmental Panel on Climate Change (2014), Annex III Technology-specific Cost and Performance Parameters, Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the IPCC. <https://www.ipcc.ch/report/ar5/wg3/> (accessed 26 November 2019).

Table 3.2: Total Electricity Supply Cost

	% of Total Supply	% of Total GA	Total Unit Cost (cents/kWh)
Nuclear	57%	41%	7.7
Hydro	23%	12%	6.2
Gas	8%	14%	18.8
Wind	9%	15%	15.9
Solar	2%	15%	51.3
Bioenergy	1%	2%	23.6

Note: Percentage (%) of total GA excludes CDM costs.

CDM = conservation and demand management, GA = global adjustment, kWh = kilowatt hour.

Source: Ontario Energy Board (2018), *Regulated Price Plan Supply Cost Report*.

<https://www.oeb.ca/sites/default/files/RPP-Supply-Cost-Report-20180501-20190430-correction.pdf> (accessed 26 November 2019).

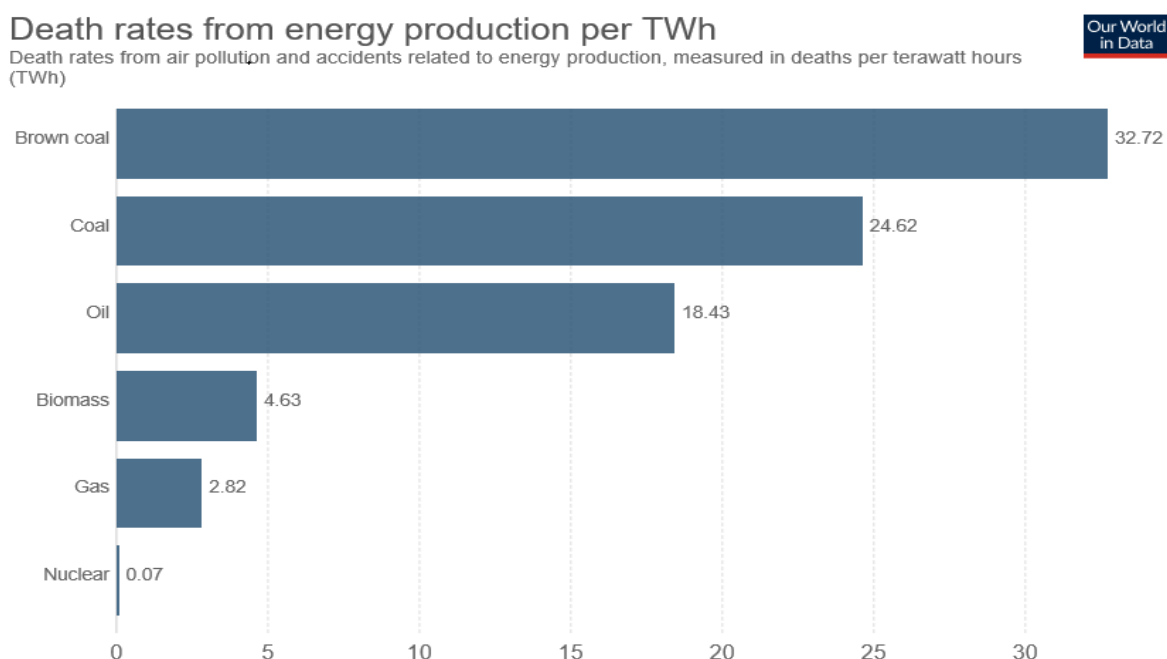
2) Experiences and cases in Finland

Representatives from NPPs and areas of final disposal sites and environmental experts with experience as a European Commission member participated in the local discussion meeting and the Tokyo workshop as opinion leaders and experts from Finland.

An NPP started operation in 1978 and has continued for about 40 years in Olkiluoto, Eurajoki. In the early 2020s, the first final disposal site for spent nuclear fuel in the world will commence operation. The planning of the final disposal site started during the 1980s and investigations were conducted for research and development and site selection. In 1999, local residents supported final disposal and the government agreed with the disposal. In Finland, each municipality has the right to veto. The percentage of supporters was smaller than that of opponents when the planning first started, but surpassed opponents at the time of agreement. The stance of residents has not changed much since.

The support rate for nuclear power in Finland is high, as mentioned in Chapter 1. Most people consider nuclear power dangerous. However, damage from air pollution caused by fossil fuels is obvious. Nuclear power does not pollute the air and the death rate per unit power generation is considerably smaller compared to that of fossil fuels (Figure 3.6). Although the opposition party overstates the impacts of radiation from an accident, the natural radiation dose in Finland is slightly higher than the world's average, and it is self-evident that the radiation level in areas where the evacuation order was lifted after the accident at Fukushima Daiichi NPPs is no problem. Whilst the use of materials per unit power generation is considerable for natural energy, only a little is consumed for nuclear power (Table 3.3) and the amount of disposal is small. Opinion leaders and experts from Finland think from their own experiences that this appropriate information would increase the number of supporters of nuclear power.

Figure 3.6: 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 26 November 2019).

Table 3.3: Range of Materials Requirements (fuel excluded) for Various Electricity Generation Technologies

Materials (ton/TWh)	Generator only				Upstream energy collection plus generator			
	Coal	NGCC	Nuclear PWR	Biomass	Hydro	Wind	Solar PV (silicon)	Geothermal HT binary
Aluminum	3	1	0	6	0	35	680	100
Cement	0	0	0	0	0	0	3,700	750
Concrete	870	400	760	760	14,000	8,000	350	1,100
Copper	1	0	3	0	1	23	850	2
Glass	0	0	0	0	0	92	2,700	0
Iron	1	1	5	4	0	120	0	9
Lead	0	0	2	0	0	0	0	0
Plastic	0	0	0	0	0	190	210	0
Silicon	0	0	0	0	0	0	57	0
Steel	310	170	160	310	67	1,800	7,900	3,300

Key: NGCC = natural gas combined cycle; PWR = pressurized water reactor; PV = photovoltaic; HT = high temperature

Source: US Department of Energy (2015), *Quadrennial Technology Review 2015*.
<https://www.energy.gov/quadrennial-technology-review-2015> (accessed 26 November 2019).

The comments of opinion leaders and experts from Finland that were heard during the visit in advance and the outline of the explanation in the Tokyo workshop are as follows.

Chairperson of the Eurajoki Municipality Council:

- NPPs and the final disposal site are located in Olkiluoto. Nuclear power is in an important position for the local community. The population of Eurajoki municipality where Olkiluoto is located is about 10,000. On the contrary, 15,000 people visit the visitor centre annually.
- Nuclear power in Olkiluoto is supported thanks to the good operation and advanced safety culture at the plant, residents being used to and appreciating nuclear power, active and open communication with the operators, and trust for the operators with a policy of unconditional transparency.
- The Green Party and Greenpeace in Finland have an understanding of nuclear power.
- It is not bad that there are opposing opinions. They bring attention to points that people with the same opinions do not notice, and this sometimes leads to improvement.
- A small community is more suitable for summarising an opinion. Not all people have the same opinion, but as people with different opinions gather and discuss things, they deepen mutual understanding.

Member of the steering committee of Innovation for Cool Earth Forum:

- When I was studying in Austria in the 1970s, a national referendum was held concerning the commencement of NPP operation in Austria and it was rejected by a 50 to 47 vote. The opposition movement became active and the Chernobyl accident occurred in 1986, which naturally provoked people's opposing points of view. At that time, men supported nuclear power and women opposed it, and there was a gap between the elderly and young people. After that, I turned to support it, as I realised that the shutdown of nuclear power generation would have led to the increase of power generation through fossil fuels.
- One can hardly talk about nuclear power without discussing identity politics. In other words, if your thoughts do not follow your own ideas, you will lose your identity. However, this is wrong.
- Not using nuclear power might leave various issues for future generations.

- Wind and solar power are not dispatchable power sources and require a vast amount of backup. Not many people know that prices become high because of that. Even experts should review themselves if they know the correct information and publish sufficient information by trying to always learn correct information.
- Energy demand all over the world might increase, but it will never decrease. In addition, we need to reduce global warming gas emissions. In Germany, the amount of CO₂ emissions continues to increase, even though renewable energy is expanding. It is our obligation to own energy sources that can provide a stable supply of low carbon energy.
- Radioactive waste is the common issue to be solved in countries that have commenced nuclear power operation, even if they have stopped it. To solve this issue, it is necessary to develop technologies to reduce waste, and the importance should be acknowledged as common understanding.

3) Experiences and cases in the United Kingdom

A lecturer of the Nuclear Futures Institute of Bangor University in North Wales in the UK (where Trawsfynydd and Wylfa NPPs are located) and a regional development advisor with experience of involvement from the viewpoint of coexistence of the nuclear power industry and the community participated in the local discussion meeting and the Tokyo workshop as opinion leaders and experts.

Wales has its own language and unique local characteristics different from other parts of the UK. Rural fields are spread all over North Wales and other than the energy industry, the country depends on forestry, agriculture, and tourism. The Trawsfynydd NPP commenced power generation in 1965. It stopped power generation in 1990 and is under a decommissioning process. Wylfa NPP started operation in 1971, stopped in 2015, and is under a decommissioning process. On the other hand, the construction of two new NPPs was proposed and was expected to start operation in the mid-2020s. However, the plan has temporarily ceased due to financial problems.

With financial support of the Welsh and British governments, Menai Science Park, an academic research institute, was established for the development of local science technology in the early

2000s. The Nuclear Futures Institute of Bangor University, the central structure of the park, was founded in 2017. It develops nuclear power skills in the NPP site area.

The comments of opinion leaders, experts, and their colleagues in the UK which were heard during the visit in advance and the outline of explanations at the Tokyo workshop are as follows.

Senior lecturer of the Nuclear Futures Institute at Bangor University:

- When the Trawsfynydd NPP was constructed, there was no prior consultation and people were mentally affected. On the contrary, it was a good example that the plant communicated with local residents when it commenced decommissioning. It was originally managed by the national government but later privatised, which reduced people's feeling of distrust.
- The Wylfa NPP had a few accidents and had suffered from exaggerated media reports. PA improved after a visitor centre was established but it closed after the September 11 attacks.
- It is important to share the advantages with the community, not to surprise people, to publish information in an understandable manner, and to ensure transparency by letting employees from the NPP talk.
- The Menai Science Park was created to promote regional development and human resources development as the outlook for the nuclear power industry in the UK worsened. The park carries out scientific and technological research in various fields and it is open to the community. Families with children often visit. The commercial and research facilities are 'part of the environment' and the park blends well with the natural surroundings. Many young people are learning science and technology after growing up in the area. In the long term, the park will contribute considerably to human resources development in the UK's science and technology fields.
- The views of society towards nuclear power facilities have significantly changed from a few decades ago. They started to change during the 1990s, and independent community groups started to do activities locally, which observe activities of operators, sometimes represent residents' opinions, and speak to operators and the regulation authority. Neutral people with knowledge and experience and legal experts participate in these groups. People trust

them as they see business activities from a viewpoint different from operators. Operators are not trusted whatever they say.

- The keyword to gain trust is independent. Because we act spontaneously and are not told what to do by anyone else, we could gain continued trust.
- Conditions for local success are consistent policies, being accepted by the community, leadership in the community, and active personnel from the private sector. The benefits of the general public include having access to a highly-reliable and low-cost power supply through nuclear power and employment. To the contrary, there are some risks. Employment expansion can be expected through the spinout of the nuclear power industry to other industries such as robotics and medicine. It is necessary to consider how information is transmitted with consideration of factors affecting public awareness.

Advisor to governments:

- Energy is a means, not a purpose. Examples of purposes to be realised are jobs, wealth, health, and the environment.
- For nuclear power and the regulation authority to be trusted, it is important that people recognise that they are created by people, not by the government.
- Using a third party like Brian Cox, a renowned English physicist and pop star, is necessary to deliver messages to people.
- Nuclear power requires policies beyond political difference and consistent policies even when the government changes.
- Education, research, and development are carried out at the science park built near the NPP in the UK. Cooperation with small and medium-sized enterprises and innovation have been in progress.
- The key to the future use of nuclear power is international. No country can solve nuclear power and energy issues alone. Nuclear power can be linked to international development of businesses other than the nuclear power industry by deepening cooperation with other countries in the field.

4) Experiences and cases in Japan

An expert from a community group independent from the government participated in the Tokyo workshop. The expert is one of the members that established a committee between those with supporting, neutral, and opposing opinions after the Fukushima accident based on experiences of being involved in PA activities of nuclear power, and has been engaged in activities in Kashiwazaki where nuclear power is located as well as the energy plan by the government. The following discussion is the introduction of this meeting by the expert.

Members of this committee include environmental groups and universities as well as members of peace and sports groups. It was held as a place for people with various positions and ideas including supporting and opposing opinions to discuss and have conversations without reaching a conclusion about future energy such as nuclear power and renewable energy. Meetings were held in Tokyo and in rural areas including those where NPPs are located and the surrounding areas and some meetings were held specifically for young people. The community expert's own organisation organised meetings specifically for young people and for women, inviting those related to the government as observers and explainers. Kashiwazaki City where NPPs are located became interested in holding such a meeting, and a symposium was held in Kashiwazaki with experts, public figures, and business persons who are interested in and taking measures against energy issues. These activities in Kashiwazaki later led to regional revitalisation.

Based on the experiences from these activities, the expert said that they had recognised the necessity of the acceptance of the public in social decision making, and since then, they have been trying to create shared opportunities by holding unofficial discussions based on the Chatham House Rule between the government and non-governmental organisations.

The outline of explanations given by the expert is as follows:

- Many of the participants in government meetings on the energy mix are over 60 years old, and less than 20% of them are women. For that reason, we held meetings for mainly young people and women only.
- Discussion is avoided in Japanese culture. Opinions are considered the speaker's personality and when an opinion is denied people feel that their personality is denied.
- Communication concerning nuclear power issues became difficult due to the strong

connection with the vested interests of operators, a rising sense of doubt towards policies without the presence of the general public, unclear seriousness of the government, and doubt about technical belief.

- Although we recommended the government assign a person in charge of communication, it was not accepted. Things never go smoothly when they try to communicate only in an emergency. It is important to have an ongoing relationship.

5) Discussion

Based on the meetings held in Kashiwazaki and Tsuruga, the following points were discussed in the Tokyo workshop:

- There was a question about how to transmit information on the risk of nuclear power. The 'fear' of risk affects people mentally, and technical methods of nuclear power alone have no effect on mental problems. Therefore, a method should be found to understand risk by comparison and consider its economic impact.
- There was a question about who should be involved in nuclear power discussions other than engineers. For example, appropriate groups could be people in the arts fields, visual artists, literary scholars, and pop stars who do not have biased views.
- Opinions of the public are significantly affected by third parties. Therefore, third parties should talk about what will be lost if nuclear power is not chosen. They need to use simple words to describe awareness of the problems with comparisons.
- Using unofficial opportunities including dinner and drinking parties, providing information that people want to know are methods to develop good communication with opponents and young people. Using social networking platforms for young people is important.
- The science park has been successful in inviting companies that are not related to nuclear power. This is because of its policy of business expansion in cooperation with research and development of the university. A specific activity example of the science park in Wales is to use the surrounding forest resources and combine woods with radiation exposure.

Participants from the ERIA countries pointed out that raising people’s consciousness, improving the knowledge level of both the government and people including technical knowledge, and active building of relationships with local people are considered important.

d.Communication with media

A press conference was held after each workshop (Figure 3.7).

Figure 3.7: Press Conference after Kashiwazaki Workshop



Source: IEEJ.

For nuclear power PA, it is important that the media is proactively involved in order to transmit information to the people. In the press conferences, the following opinions were exchanged:

- There was a question about why the Eurajoki municipality in Finland accepted the construction of the final disposal site. They explained that the strong will of the municipality for acceptance, the location of the NPP, and economic reasons led to the acceptance, but it does not always mean there are many benefits.
- For the question about the efforts of operators in communicating with local residents, they explained that there was good communications between the municipality and operators in Eurajoki from the beginning. Information is disclosed in an abnormal situation and operators hold public hearings to communicate with local residents.

- To the question about the relationship between supporters and opponents in Western countries, the answer was that many of the opponents are not locally based and active discussions take place on social media.
- There was a question about the education of young people. They explained that education on how to understand information collected from social networking was provided, and they thought it was important to nurture people who can judge things properly.
- There was a question about the relationship between mothers' consciousness of protecting children and nuclear power. They explained that many mothers are beginning to understand the value of nuclear power by knowing the risk of not using nuclear power.
- The answer to the question about whether nuclear power should be promoted or withdrawn in the future was that it is important to keep a balanced energy mix based on the situation of each country.

e. Draft policy proposals

Draft policy proposals at the Tokyo workshop are introduced below; these draft policy proposals are the starting points to the policy proposals that IEEJ introduces in Chapter 4 of this report:

- Independent groups are crucial to get reliance from local residents. People do not believe what the operators say. The independent groups consist of various kinds of experts, such as academia, members of parliament, professors, and so on.
- The international nature of the nuclear industry is important. Partnerships and technologies in nuclear power can and do lead to business opportunities outside own country and indeed outside nuclear power for economic diversification. That is a factor often neglected in looking at the pluses and minuses of the nuclear industry.
- Sharing the common discussion base with various groups, such as political groups, social groups, environmental groups, academic groups, and so on, is important. It could build a diverse base of advocates to help deliver pro-nuclear messages, and could build public trust.
- Do not let political manoeuvres derail energy policy.

- Continue to develop advanced technologies to solve the problem of waste and radioactivity, because the radioactive waste should be reduced even when phasing out nuclear power.
- Learning facts with actual data is the first thing to start discussions of energy use, growing energy demand, radioactivity levels, and so on.
- Having different opinions is acceptable if they can produce different views or solutions. It is easier to get acceptance from a small community because of smooth communication.
- It is recommended that the assignment of a person in charge of communication for an ongoing relationship.

Rather than using a lecture format, these workshops were structured so that people going through similar experiences or those who may require PA in the future could jointly deliberate policy proposals for nuclear PA.

Whilst local opinion leaders have spoken about their experiences on PA of nuclear power at many workshops and international symposiums, the workshops held in Japan were unique in that they involved researchers from Asian countries as well. By listening directly to discussions between opinion leaders in countries that have introduced nuclear power, such as Europe, the US, and Japan, policy researchers and advisers from the East Asia Summit countries were able to grasp the issues of nuclear power facilities.