Summary of Project on Organising a Workshop to Promote Stakeholder Involvement in Host Municipalities of Nuclear Power Plants

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1. Background and Objectives of the Project

Several countries in Asia are considering the introduction of nuclear power to meet their rapidly increasing energy demand while addressing climate change. In initiating and operating nuclear power plants in a specific municipality, improving the social acceptability of nuclear power and promoting the discussion of the use of nuclear power are essential. For example, in the United States (US), which has the largest nuclear power capacity in the world, regulators and operators have overcome various obstacles – such as the Three Mile Island Unit 2 reactor accident in 1979 – to achieve development of both nuclear safety and effective use by improving the image of nuclear power within the public sphere.

In Asia, in the wake of the Fukushima Daiichi accident in 2011, some countries have reduced or withdrawn nuclear power within their borders. Moreover, in Japan, where the nuclear capacity factor had improved in the past, restarts have been delayed due to various judicial decisions against the proliferation of nuclear power. Thus, to examine ways to improve stakeholder involvement in, understanding of, and acceptance of nuclear power, various stakeholders in Japan and opinion leaders from developed countries where nuclear power facilities are located held discussions at a recent workshop and symposium sponsored by the Economic Research Institute for ASEAN and East Asia (ERIA).

2. Summary of the Workshop and Symposium

In May 2024, the Institute of Energy Economics, Japan (IEEJ) organised a workshop and symposium to foster a better understanding of nuclear power with the participation of opinion leaders from developed countries that have hosted nuclear facilities as well as various stakeholders from Japan. The workshop took place in Genkai Town in Saga Prefecture, which hosts nuclear facilities, and the symposium took place in Osaka, which is a large electricity-consuming area.

The five opinion leaders were:

- **United States.** Two co-founders of Mothers for Nuclear, a US-based environmental non-profit organisation focussed on building a global community of support for nuclear energy from the standpoint of parents and nuclear engineers.
- **Finland.** A delegate of the Consultative Commission on Industrial Change at the European Economic and Social Committee and former member of the European Parliament, who was against nuclear energy but has recently been involved in its promotion.
- **United Kingdom.** The Sector Lead of Nuclear and Aerospace at Somerset Council, which is the hosting municipality of the Hinkley Point C nuclear power station, and

senior lecturer at the Nuclear Futures Institute, Bangor University, which is at the heart of M-SParc in Anglesey, Wales.

The three Japanese stakeholders were:

- chair of the Special Committee on Nuclear Energy, Genkai Town Council;
- a vice-chair of the Genkai Chamber of Commerce and Industry; and
- chair of the Genkai Board of Education.

2.1. Workshop

Genkai hosts the Genkai nuclear power plant, operated by Kyushu Electric Power Company, which consists of four units. At present, units 3 and 4 are operating, while the operation of units 1 and 2 has been terminated as they are being decommissioned.

In 1966, the Genkai Town Council decided to invite the siting of a nuclear power plant. It submitted a petition to Saga Prefecture to promote its hosting of a nuclear power plant; the prefectural assembly accepted that petition. In 1975, unit 1 started operations, and over the next 20 years, units 2 to 4 were built. In 2009, unit 3 started using MOX fuel produced by recycling spent uranium fuel.

In 2011, the accident at Fukushima Daiichi occurred; operations at the Genkai nuclear power plant ceased. However, safety examinations and improvements were implemented, and in 2018, units 3 and 4 restarted, generating electricity again.

2.1.1. Input from Genkai Stakeholders

Chair, Special Committee on Nuclear Energy, Genkai Town Council

The Genkai nuclear power plant was invited and its construction promoted by our parents' generation. Soon, we will be passing the baton on to our children.

The three major factors for the security of a country are food, energy, and defence. Japan's self-sufficiency in food, based on calories, is 38%, and its self-sufficiency in energy is 13%; these figures are very low compared with other countries.

For energy, nuclear power is effective for creating a prosperous country during peace. After the Fukushima Daiichi accident and cessation of the plant's operations, Japan's trade balance fell into the red, causing financial difficulties. From this point of view, we want to progress our economic relationships with other countries. One means for achieving this is by encouraging nuclear power.

Vice-chair, Genkai Chamber of Commerce and Industry

Amidst the confusion of correct information, incorrect information, and speculative information that invites misunderstanding, it is important to produce balanced and more easily understood information regarding the role of nuclear power and its ability to construct a stable energy supply system – the number-one energy issue for Japan. The government is expected to use specialists, advisers, and the media to distribute correct information as well as businesses to distribute live, local information throughout communities.

The economic effect of a nuclear power plant is sufficient; it has an effect for primary industries and services businesses related to the nuclear power plant. Yet the government must understand that environmental changes due to a plant are problematic, including those associated with the economic growth as well as those associated with agriculture and fisheries. Reputational damage from being labelled a radioactive risk is very damaging. Moreover, as the tourist industry has become important over the past 20 years, our natural resources must be honoured and maintained, and those who depend on the tourist industry for their livelihoods must be considered.

Under the premise that nuclear power is safe and secure, a town can indeed take pride in hosting a nuclear power plant – but the town must also offer a stable and fulfilling life to its citizens and be passed on to our children. It is important to secure stable incomes through industrial promotion, raise our children in an enhanced educational environment, and emphasise peace. Mature nuclear power technology is indispensable for safety and security.

Due to the 2011 Tohoku earthquake and the promotion of renewable energy, however, there is speculation that the demand for nuclear engineers will decline; therefore, the number of students specialising in nuclear engineering has decreased. Asserting the necessity of nuclear power technology and the bright future of nuclear engineers and developing the human resources for nuclear power are important tasks for the future. For this purpose, initiatives in energy education are key.

Chair, Genkai Board of Education

There are 369 children studying at Genkai Mirai Gakuen as of 2024. The Board of Education is co-located at the school building, so it is easy for us to obtain an overall perspective of the whole school. After school classes are over, a public 'cram school' opens under contract between Genkai Town and a private-sector 'cram school'. Efforts are also made regarding energy education, including on-site classes through the Kyushu Electric Power Company, study tours during summer vacation, and exchanges with other schools. In addition, training drills are carried out in case of a nuclear power disaster.

A portion of the rice terraces is also rented out for rice planting for the school. 'Our Town Genkai', used to learn about Genkai Town in-depth, has been published. Through these initiatives, the children are raised with a love for their hometown, and human resources are cultivated that can be active globally.

2.1.2. Questions and Answers

Q1: What do you consider the obstacles to townspeople receiving information regarding nuclear power?

A1: As a result of the inconsistency of the media and others reporting on the fear of radioactivity and how wonderful renewable energy is, only fear of nuclear power has been planted in local residents' minds, who are often lacking in knowledge. Understanding the importance of energy is not achieved. Also, the government does not provide comprehensive backup information and does not seem to support the development of nuclear technology.

Q2: What percentage of the children of Genkai want to work as nuclear engineers? Also, what efforts are being made to encourage these children to participate in the nuclear industry?

A2: Almost all ninth-year pupils (third year of junior high school) progress to high school, but to date, many cannot go to preparatory school due to academic ability problems. However, better results are being seen in their third year since the public 'cram school' was introduced. The employees of Kyushu Electric are excellent and highly focussed, so at present, there are not many employees from this locality, but the future looks bright.

Q3: Transparency and communication are extremely important from the point of view of public acceptance of nuclear power. Genkai Town has frequent and enhanced communication via the Energy Park. What suggestions do you have for the countries of East Asia regarding transparency and communication?

A3: The cooperation of the electric power company in activities to promote the locality and other events – and its attitude of active cooperation – is very reassuring. This motivates working with them. Creating relationships apart from business is an important factor. For the future, it is hoped that Kyushu Electric will communicate its needs to local businesspersons.

Q4: Does Genkai Town have any sort of personnel exchange with countries intending to introduce nuclear power as part of their energy mix?

A4-1: Apart from nuclear power, there is an economic exchange, cultural exchange, and overseas study programme with the district where the Kori nuclear power plant is located in South Korea. Also, when plutonium fuel began being utilised, a friendship agreement with Gravelines in France was promulgated. If one seeks cooperation with

any host city, town, or village in Japan, Genkai itself can provide cooperation; there is also a committee of host districts within Japan.

A4-2: The government is working on various documents for Asian countries that are considering nuclear power. For human resources development, there are various necessities, such as system design and qualified engineers. Also, support is provided not only for nuclear power but also for energy transition in Asia, such as renewable energy and energy efficiency.

Q5: When Genkai sought to host a nuclear power plant, what percentage of the town residents agreed with nuclear power?

A5-1: It was said that Genkai Town was like Western Tibet; in other words, it was a desolate area where crops could not be grown, so it was revitalised by the introduction of nuclear power. At present, about 80% support nuclear power. There are many in the local community who want more communication with the electric power company, however.

A5-2: At present, thanks to the subsidies as a host town, enhanced benefits are enjoyed compared with other local government areas, such as free school meals and the low-cost public 'cram school', as well as benefits in fields such as agriculture, education, and child-rearing. There is a negative image due to accidents, but the Kyushu Electric Power Company does have safety and security reporting. Representatives also visit each home, and the local government conducts public relations activities, so the majority of the town residents seem to favour nuclear power.

2.1.3. Input from Opinion Leaders from Developed Countries

Delegate, Consultative Commission on Industrial Change, European Economic and Social Committee and Former Member, European Parliament

After the Chernobyl accident in 1986, I – along with many others – became opposed to nuclear power. However, after becoming a member of the European Parliament, I learned that it was a clean source of electricity that did not emit carbon dioxide (CO_2).

Nuclear power is said to be dangerous, but the number of deaths per unit of electricity generated is much lower than that of other sources of electricity. Environmental groups criticise the level of radiation in Fukushima, but it is sufficiently low compared with Finland. Nuclear power is important for resolving air pollution, which causes various health problems. Balanced information is not being provided.

Radioactive waste is a qualitative problem rather than a quantitative problem, and it is necessary to process it for safe storage. There is a possibility that the generation IV reactors will be the key to resolving this issue. Also, major investment is being made in solar and wind energy, but compared with nuclear power, they produce a larger quantity of waste.

When considering the necessity of nuclear power, it is necessary to understand the energy transition that is about to happen. In the energy transitions to date, they were to a more reliable and higher-density energy. However, the current energy transition from fossil fuel to renewable energy is less reliable and is a transition to distributed energy – as long as the problem of energy storage is not resolved.

In Finland, the factors for success in deciding on the final disposal location for radioactive waste were trust and transparency, a clear process and an independent organisation that can be trusted, reliability of the nuclear industry, and economic effects that the public can understand long term.

Co-founders, Mothers for Nuclear

Mothers for Nuclear was founded in 2016. Our background is that we worked as engineers at a nuclear power plant. At present, we are continuing with grassroots activities supporting the continued operation of the existing reactor and construction of a new reactor.

When we started work as operators at the power station, there were no sources of information about nuclear power, and I was sceptical about nuclear power. However, at the power station, we learned that nuclear power is efficient and effective against climate change and efficient in land use, making a great contribution to the human race.

When we established Mothers for Nuclear, our first objective was to create momentum to support clean energy. In particular, we carried out awareness activities regarding nuclear power for mothers and women. This energy education succeeded, and we feel that young people received accurate information and that they support nuclear power. When talking about nuclear power, it is necessary to talk about issues that are important to people, such as the environment, economic development, and energy security.

Sector Lead, Nuclear and Aerospace, Somerset Council

The benefits provided for hosting a nuclear power facility must meet local needs. As an employer and facility having a major effect on the area, the power plant should always be a 'good neighbour' and foster a sense of community.

With the expectation that Hinckley Point C will provide high revenue and high value, educational facilities have been enhanced. Yet it is normal for people in the area to be engaged in agriculture, so there is no desire amongst the newest generation to become engineers. It is important to share these issues and targets with various stakeholders.

Near the site of construction of Hinckley Point C in Somerset, a university related to nuclear power and a research institute are being constructed; at least 1,000 trainees will be employed. Thus, young people are being encouraged to participate in the nuclear industry across the entire region. Also, initiatives have been established to support

companies interested in providing services for Hinckley Point C, and matching with local companies has been encouraged.

For the tourist industry, Hinkley Tourism Action Partnership has been established. As a result of supporting businesses and a survey of visitors, the local tourist industry has cultivated new tourist resources, and publicity regarding the area has been raised throughout the country.

Senior Lecturer, Nuclear Futures Institute, Bangor University

When a Trawsfynydd nuclear power plant was first discussed, local residents were sceptical, but they gradually understood the advantages. Both agriculture and tourism are seasonal, and young people were leaving the area to seek work. Nuclear power played a role in bringing back the young people to the area.

As part of decommissioning measures, a dialogue was held with the community, and their understanding was obtained. This was also a good example for learning about measures to decommission a graphite reactor.

In Anglesey, the aluminium industry was developed due to the low-cost electricity and abundant copper mining, which contributed to employment and the local economy.

At Wylfa, a new nuclear power project has failed, so science and technology students and trainers are at a loss what to do. There is talk about a new project, but many issues have arisen, such as scepticism regarding the enormous amount of investment. M-SParc promotes not only nuclear power but also the establishment of new innovative companies through business support, providing low-cost space, and matching university research with companies. Also, it enables diversification of the economy and plays a role in promoting highly valued jobs.

2.1.4. Questions and Answers

Q1: What percentage of the people in Finland is opposed to nuclear power?

A1: At present, a majority supports nuclear power. In 2002, a vote was taken throughout the country on whether to construct a fifth reactor, and the result reflected the high level of support by the public. Support for nuclear power increased as they became aware that renewable energy alone is not sufficient. For example, Germany invested heavily in solar and wind power and completed the phase-out of nuclear power; as a result, they have become dependent on Russian energy.

Q2: Finland is the first country in the world to decide on a final disposal site for radioactive waste. As part of this, what processes were taken to obtain the acceptance of the public and local residents for the disposal site?

A2: The priority was not to leave this problem for future generations. Factors for success were ensuring thorough transparency and communication. Also, from the 1990s onwards, securing a disposal site was a precondition for new nuclear power facilities. Nearly 17 years of survey work were undertaken for selection of the disposal site, and the site was selected from amongst multiple candidate sites. Local municipalities were given a veto so that independent decision-making could be carried out. Then, in 2000, the government decided on the disposal site and secured the bedrock to isolate the waste from human activities. The bedrock in Finland is amongst the oldest in the world. Fuel recycling has been postponed due to problems of technical requirements and cost but remains as a future option. After closure of the disposal site, it can be reopened after 100 years.

Q3: Various publicity activities cost money. Where does Mothers for Nuclear get its financial support?

A3-1: We carry out our activities separately from our work as operators. Volunteer activities are established based on small donations from individuals. In addition, we receive support from groups concerned with climate change and air pollution.

C3-1: In Japan, cases of such donations being openly made are unheard of.

C3-2: I was thinking about why in the about 50 years since inviting nuclear power that no local companies have been cultivated. Nuclear power-related work is almost exclusively done by large companies, which come from outside of Genkai. In contrast, areas that host nuclear power plants are run-down, with low birthrates and ageing populations. There is financial support available but no knowledge or know-how on revitalising the area, so we have been struggling. No specialists or advisers have been dispatched to look into this problem. There is a limit to what the local residents can do by themselves. I think it is necessary to construct a system of cooperation so that the area as a whole can rise up and link with the central government and not just businesses.

A3-2: In the [United Kingdom] UK, fortunately, it was possible to spend a lot of time formulating a plan. During this time, the participants examined what kind of measures could be provided for the area. By performing various interventions in a planned manner, the people can be given the necessary support. Requirements were produced by the local government that the supply chain within the UK and the area was to be utilised to a prescribed extent. It is important that such policy decisions are led by the central government.

A3-3: In the UK, the process of reactor decommissioning is supervised by the Nuclear Decommissioning Authority (NDA). Business opportunities in the decommissioning project for companies within the hosting area have been investigated, and activities that are advantageous for organisations and schools within the area have also been investigated. The NDA has also induced new small-scale businesses to become established. Taking an example from renewable energy,

by agreeing to host a wind farm, benefits such as cheaper electricity are provided. It is necessary that an environment is created so that there are benefits from being close to a power generation facility. Local governments investing in and becoming part-owners of solar and wind power stations is an effective policy.

2.1.5. Press Conference after the Workshop

Q1: What is the significance of the 12 persons from the various Asian countries participating in this meeting?

A1: ERIA is based in Jakarta and conducts research into energy safety, security, and sustainability. It is necessary that Asian countries achieve the targets of the Paris Agreement through energy transition and develop economically. Safety and economy are important viewpoints for promoting clean energy, and many Asian countries are investigating the realisation of a low-carbon society by using nuclear power. This has been an opportunity to learn many things directly from those that have co-existed with nuclear power in Genkai since the 1970s and how hosting the nuclear power plant has contributed to the economy and energy safety and security.

Q2: Recently, Genkai accepted undertaking a literature survey [for a disposal site], but in Finland, they have already progressed as far as selection. What was the most important factor for selection of candidate sites in Finland? Also, in Genkai, the process will continue to progress, but do you have any advice regarding where Genkai should put its efforts?

A3: Communication and transparent decision-making are key. For construction of the fifth nuclear reactor, it was a condition that there is a decision on the final disposal site, so from the start, there was transparent exchange with the public. Also, it was a precondition that the problem of waste would not be passed onto the next generation. Selection of the site took about 17 years, and there were many candidate sites. However, the residents monitored the policymakers and compared them. Also, granting the residents a veto was important. Genkai should construct trust and give the residents a right to express their opinions. Also, it is necessary to educate residents regarding safety and the significance of final disposal through much communication and provision of information. In Finland, the residents were able to tour the facility and to ask questions.

Q4: What impressions have you obtained regarding Genkai?

A4: Before this meeting, I visited Genkai Mirai Gakuen. It is very rare to find that an elementary and junior high school are housed in the same building, and that the Board of Education is also in the same building. I think that it is wonderful to bring these together. Education of the next generation is one task for Genkai, and in addition to a school, a 'cram school' has been provided. I am very impressed at the great effort that has been put into educating the next generation.

2.2. Symposium in Osaka

Due to its economic activity and population density, Osaka is one of the major areas of electricity consumption in Japan. Many factories, office buildings, and commercial facilities have accumulated within Osaka Prefecture, and supplying stable electricity to these facilities is a necessity. In addition, Osaka is a key point for domestic transport, so there is significant demand for electric power for the rail and road networks. The Kansai region, which includes Osaka, is supplied with electricity generated by several nuclear power plants in the Reinan region. As a stable baseload power source, these nuclear power plants also contribute to the industrial activities and living infrastructure of the Kansai region.

The aim of this symposium was to exchange opinions regarding how to face the use of nuclear power in an electricity-consuming area and to share the thoughts of host municipalities of nuclear facilities.

Five speakers in Japan were invited to the symposium:

1. director, Office for Regional Relations for Nuclear Facilities, Government of Japan;
2. chief researcher, Research Institute of Innovative Technology for the Earth (RITE);
3. vice-chair, Kansai Economic Federation;
4. chair, Tsuruga Branch, Fukui Council for Peaceful Nuclear Power Use; and
5. vice-chair, Osaka Chamber of Commerce and Industry.

2.2.1. Keynote Speech, Director, Office for Regional Relations for Nuclear Facilities, Government of Japan

Often heard from those living in areas hosting a nuclear power plant is that they want everyone in the electricity-consuming area to understand the energy situation in Japan as well as the importance of nuclear power. This is also a major theme for the Ministry of Economy, Trade and Industry. Within Japan, the contribution of nuclear power can be seen in the fact that the electricity reserve margin is higher in the parts of Western Japan where nuclear power plants are operating; thus, the electricity cost there is lower.

For local promotion of nuclear power, the Ministry of Economy, Trade and Industry provides support through the branding of special local products and use of renewable energy. Also, a co-creation conference has been established with Fukui Prefecture to undertake promotion of the area with the host municipalities, central government, and various businesses.

Japanese opinion surveys have shown that there is particular concern regarding global warming and electricity prices, and that concern is especially high regarding the Japanese energy situation and electrical power shortages, nuclear power safety

and risk, and disposal of high-level radioactive waste. Communication is achieved using various media sources, describing concerns regarding the situation of the 3Es of energy, while varying the focus of the information.

2.2.2. Input, Chief Researcher, RITE

Developed countries transfer high-unit CO_2 emissions intensity to developing countries, so the coupling between CO_2 emissions and the economy continues in the world as a whole. It is necessary to reduce CO_2 globally with low-cost energy. It is also necessary to achieve carbon neutrality by energy-efficiency means and to supply the remaining energy needs with renewable energy or nuclear power. If fossil fuel is used, it is necessary to have carbon capture and storage or CO_2 removal. However, in Japan, there are strong constraints regarding each of these.

It has become obvious, as I travel around the country, that renewable energy is more known than nuclear power. Yet although renewable energy costs have lessened worldwide, there is still a great difference in cost depending on the country. The cost in Japan is still high, so it is economically most feasible to produce hydrogen or synthetic methane with overseas renewable energy. Introducing renewable energy under land restrictions also leads to disasters and destruction of the landscape.

For the large-scale introduction of renewable energy – which is unevenly distributed – it is necessary to invest in strengthening the power grid. However, the investment must be performed appropriately so that the capacity factor does not decline, preventing the wheeling charge – and therefore the electricity charge – from increasing too much. Expansion of renewable energy is essential, but it is necessary to proceed in a balanced manner.

Some claim that nuclear power is more expensive than renewable energy, but, in fact, in areas where nuclear power has been restarted, the electricity charges have come down. However, there are some aspects of nuclear power and the economy that are difficult to grasp, so activities to promote understanding are necessary. In model analyses for Japan, where there are limited options for carbon neutrality, the results show that it is economically rational to utilise nuclear power to the maximum extent for cleaner energy.

The demands for early realisation of carbon neutrality are becoming stronger. To realise this, the primary energy must be renewable energy, nuclear energy, and fossil fuel plus carbon capture and storage. Indeed, actions aiming for carbon neutrality are essential, but the major principles remain 'S+3E', emphasising energy security, economic efficiency, and environmental protection. It is important to achieve an energy mix that reduces the various risks in total by utilising the advantages of each type of energy, including the stability of supply, safety and security, and economic efficiency, reducing their disadvantages and compensating for disadvantages by other technologies. The role to be played by nuclear power is large.

2.2.3. Questions and Answers

Q1: What are the criticisms of renewable energy coming from the provinces?

A1: There are many cases where there is resistance to the harm being done to the traditional landscape caused by solar panels and wind turbines, in particular from the elderly.

Q2: How many units of nuclear power plants are needed in Japan?

A2: It is difficult to give a single answer, but assuming carbon neutrality is achieved by 2050, if the share of nuclear power is about 50%, then that would be economical. However, this is not a practical number, and it will be decided based on deep discussions with the host municipalities in the short period of time until 2050.

Q3: In the models, why does the integration cost increase when the solar energy percentage exceeds 40%?

A3: The capacity factor declines due to output curtailment, and costs are incurred due to the introduction of hydrogen, storage batteries, and transmission lines.

Q4: In the [International Energy Agency] IEA model, to achieve carbon neutrality globally, it is necessary to double nuclear power. What do you think Japan's role in this is?

A4: In the RITE model, the estimated amount of nuclear power is slightly more than that of the IEA. In Japan, the amount of nuclear power needs to be 20% or 30%. Under the situation where the electric power companies' management is weak and the risk of investment in nuclear power is high, it is necessary to secure financing with the risks properly allocated.

Q5: What do you think about [small modular reactors] SMRs?

A5: The US is leading their development, and it is important that there are also business developments. Also, [light water reactors] LWRs have the lowest unit cost, but the scale of investment is large, so in countries that have liberalised electricity markets, SMRs are financially easier.

2.2.4. Input, Vice-chair, Kansai Economic Federation

The Global Environment and Energy Committee takes every opportunity to maximise the utilisation of nuclear power generation, and since 2010, it has submitted more than 20 proposals to the government. In 2022, concerns regarding the degradation of the nuclear power supply chain and requests regarding ensuring the predictability and sustainability of the nuclear power policy were conveyed to Prime Minister Fumio Kishida.

Exchange-of-opinion meetings are periodically held with those involved with nuclear power plant hosting matters in Fukui Prefecture regarding Japan's energy policy, in

particular nuclear power. Also, observation meetings and lecture meetings are held for member companies. We intend to continue to express our opinions to the government, provide information to our member companies, and promote understanding in Kansai, based on the thoughts of residents from host municipalities.

As the Osaka and Kansai Expo Future Society Showcase shows, we aim to realise a future society incorporating advanced technology and systems. For example, Kawasaki Heavy Industries is undertaking projects such as the world's first liquid hydrogen transport ship and hydrogen engine buggy. This expo also demonstrates the importance of hydrogen as an effective solution to realising carbon neutrality.

At the expo, it is planned to showcase renewable energy, hydrogen mixed thermal power, and nuclear power. These initiatives are expected to improve the understanding of the importance of the best mix of a variety of power sources, including nuclear power.

2.2.5. Input, Chair, Tsuruga Branch, Fukui Council for Peaceful Nuclear Power Use

The Fukui Council for Peaceful Nuclear Power Use was established in 1971 to increase cooperation with private sector groups to deepen understanding of nuclear power. This was a time when the opponents of nuclear power became more active with the newly established Ohi nuclear power plant by Kansai Electric Power Company, and confusion was also caused by the local government. Activities include holding energy fora, lobbying the relevant government ministries and agencies, and publishing *Energy Kawaraban*. Also, the Tsuruga Branch created the EneCafe in the Kansai area. Here, through the concept of thinking and talking about energy in a relaxed atmosphere, opinions have been exchanged with about 650 persons.

People must understand that reputational damage lasts, and calm discussions based on facts are key. For this, it is important to foster the knowledge, without basis, of nuclear power amongst residents of Fukui Prefecture. Also, society must reduce the use of negative words regarding nuclear power such as '*genpatsu*' and '*kaku no gomi*'.

We certainly do not want the people of the Kansai area to ignore waste, but we want to raise their awareness of the clearance system and problems of intermediate storage. Also, we want them to have respect and gratitude for the support that the nuclear power plants of Fukui Prefecture have provided to the Kansai area and to consider what should be done for the future.

2.2.6. Questions and Answers

Q1: When nuclear power was being introduced to Japan, what did the government do to obtain the understanding of the host municipalities?

A1: At the time that nuclear power was introduced, I was a child, so I do not know. I recall that at the time of the Fukushima Daiichi accident, nuclear power was strongly

supported for reducing CO_2, and even in the Basic Energy Plan, the target was a nuclear power percentage of 50%. At that time, I think the electric power companies were a bit slack. After the accident, they changed their minds and continued their activities to gain the understanding of the Japanese people. When activities were carried out in the Kansai area, most of the people believe that nuclear power is necessary, but I felt there was an environment where it was difficult to speak out of fear. It is important to persistently persuade highly motivated people to gather members.

Q2: Besides activities such as EneCafe, were there more effective means for obtaining the support of the general public for nuclear power?

A2: By talking in a relaxed manner while drinking coffee, the person's true feelings come to the fore. It is necessary to create a place where it is possible to think about energy problems while respecting other people, regardless of whether they are supporters or opponents.

2.2.7. Input, co-founders, Mothers for Nuclear

When I started work as an operator at the power station, I was sceptical about nuclear power and I felt scared. However, while working at the power station and asking many questions, I learned that nuclear power could produce reliable clean energy at low cost and use only a small amount of land. I also noted that mothers and women have few opportunities to work at a nuclear power plant. We hope that businesses and governments support groups like ours, and with their cooperation, we can share the advantages of nuclear power with more people.

Governments should have a policy of support for nuclear power, and companies should disclose transparent information, so that non-corporate communicators can effectively explain the value of nuclear power. Public opinion depends on areas with a large population, so it is necessary to reach a variety of listeners. Therefore, it is necessary to talk about issues that are important to people, such as environment, economic development, and energy safety. In California, in 2016, it was decided to shut down nuclear power due to the effect of the low level of public support. However, recently the support has increased, and the state government has finally reversed its policy; nuclear power will continue.

2.2.8. Input, Sector Lead, Nuclear and Aerospace, Somerset Council

Near the construction site of Hinckley Point C in Somerset, a university related to nuclear power and a research institute are being constructed. At least 1,000 trainees will be employed. Thus, young people are being encouraged to participate in the nuclear industry across the entire region. Also, initiatives have been established to support companies interested in providing services for Hinckley Point C, and matching construction companies with local companies has been encouraged. At present, about

64% of the Hinckley Point C construction plans has been awarded to British companies, mainly local companies to Somerset.

To gain support for the nuclear power plant as well as for nuclear power generation to produce positive economic benefits, it is necessary that the developer, electric power company, and local community – as well as all the main actors such as education providers, technology providers, and business support organisations – cooperate as an ecosystem.

2.2.9. Input, Senior Lecturer, Nuclear Futures Institute, Bangor University

When the Trawsfynydd nuclear power plant was being planned, there was scepticism locally that it would make the town lose its unique Welsh culture. However, the creation of long-term high-income employment and prevention of young people from leaving the locality to find employment elsewhere have contributed to maintaining the culture. At the time of the start of operations at Wylfa, the excessively conservative attitude of the regulator at that time energised the opposition. It is necessary to take care regarding how the actions and method of communication of the regulator can affect the perceptions of nuclear power. When emphasising safety, it can cause people to have doubts about nuclear power.

When the new Wylfa power station project failed, science and technology students and trainers were at a loss what to do. When a nuclear power station project has been started, it should be carried out to completion.

M-SParc, a science park in Anglesey, promotes not only nuclear power but also the establishment of innovative new companies, as well as matching university research with companies through business support and providing low-cost land. Also, it enables diversification of the economy and plays a role in promoting highly valued employment. By supplying low-cost and stable electricity, nuclear power prevents aluminium manufacturing and data centres, for example, from moving overseas, and this results in employment being maintained and the supply chain being secured.

2.2.10. Input, Delegate, Consultative Commission on Industrial Change, European Economic and Social Committee and Former Member, European Parliament

Risks must be recognised, quantified, understood, and managed without emotions. Also, risks must be fairly compared with various other energy forms. In other words, it is necessary to consider issues including health, effect on the environment, potential for use, economics, and plant lifetime.

In the 1990s, when public discussion started regarding the construction of a fifth nuclear reactor in Finland, making a decision on the waste disposal problem was set as

a precondition for permitting a new nuclear reactor. Also, it was decided that the waste problem should not be passed down to the next generation. Involving the local city council in the decision and granting them a veto were important factors in the success of selecting the disposal site. The factors for success in deciding on the final disposal location for radioactive waste are trust and transparency, a clear process, independent and trusted authorities, reliability of the nuclear industry, and communication of economic effects that the public can understand long term.

2.2.11. Panel Discussion

Q1: Who carried out the opinion survey in California in 2022?

A1: This survey was carried out by an independent private sector organisation.

Q2: In the UK, will new nuclear reactors be constructed on the same site as decommissioned plants?

A2: The nuclear reactors in the UK are graphite reactors, and the method of decommissioning is different from that of LWRs. The current plan is that the nuclear reactors will be mothballed, and after they are in a stable state, they will be left. On the other hand, the turbine hall and other peripheral buildings can all be removed, and perhaps an SMR can be installed there. Reuse makes more sense.

Q3: Mothers for Nuclear aims to create a global community and is also focussing on education. Do you have any activities to support other countries, including in ASEAN?

A3: At present, we have branches in Germany, the UK, Canada, and Australia, and we would certainly like to meet with people from ASEAN countries and share our experience.

Q4: The use of nuclear power for the manufacture of aluminium in the UK is very interesting. In Indonesia, there are potential mineral resources, and moves are being made towards refining. There is great potential for hydroelectric power on Kalimantan Island. Which do you think would be more economical to use, nuclear power or hydroelectric power?

A4: The advantage of a nuclear-powered smelter is that it can be installed close to the place where the aluminium is needed. By installing it close to a large city, the aluminium can be directly supplied to the consumer, and the supply chain can be shortened. On the other hand, the problem with a hydro-powered smelter is that it must be constructed in a very distant location where a dam can be constructed. Also, the cost of introduction is very high, and there is also the problem that it is subject to the effects of climate change.

Q5: 'Stakeholder involvement', 'industrial development', and 'human resources development' as described in the [International Atomic Energy Agency] IAEA Milestones Approach were introduced, but which should we be paying most attention to?

A5: They are all important, and a balanced approach must be taken to all three. To ensure the participation of stakeholders, it is necessary to obtain the agreement of stakeholders, and the benefits must be important for the community.

Q6: What are the potential long-term benefits for the UK and European countries of replacing fossil-fired power stations with nuclear power stations?

A6: Nuclear power is a known technology, unlike carbon capture. In developed countries, experience is already being lost, but costs can be reduced by repeating the construction. Also, unlike renewable energy, the same transmission facilities used to date can be re-used.

Q7: It is marvellous that thanks to the activities of Mothers for Nuclear, the percentage of support for nuclear power in California has increased. Are there plans for construction of new nuclear reactors in the US including California?

A7-1: Public opinion in California has definitely improved, but it is not an overwhelming majority, and there are many people that do not sufficiently understand the benefits that nuclear power brings to society. In California, it has been decided to extend operation of the existing reactors, but to deal with climate change, electrification of other sectors must occur, and advanced reactors should be investigated. Policymakers have started discussing SMRs, and this is progress.

A7-2: It is important to get people to understand that energy cannot be taken for granted and how much our lives have been enriched by energy compared with the past. Also, it is necessary to use facts and numbers for comparisons of efficiency with other forms of energy.

2.2.12. Input, Vice-chair, Osaka Chamber of Commerce and Industry

Nuclear power has a certain advantage for issues confronting companies, including small and medium-sized enterprises, such as the increasing interest in carbon neutrality and pressure on management due to energy prices remaining high. That advantage is that it has an important position as a baseload power source. On the other hand, considering the burden on the nuclear power plant host area, it is essential to support the technical development of companies to ensure diverse electrical power sources in the future, such as safety technology for nuclear power generation and technical development of new electrical power sources.

The Osaka Chamber of Commerce and Industry held a forum that provided the latest information and business matching to promote innovation in next-generation technology and industry, looking to 2030. We work on the technical development of, and provide support for the commercialisation of, carbon-neutral and next-generation energy, such as use of hydrogen and ammonia and offshore wind farms. This year, we are also working on the issue of power generation by nuclear fusion. We want to deepen the understanding of both the nuclear power plant host areas and the electricity-consuming areas, so that both areas can develop together.

2.2.13. Press Conference after the Symposium

Q1: When talking to teenagers regarding nuclear power, what kind of topics catch their interest?

A1: They are interested in nuclear power and are concerned about climate change. Nuclear power is an excellent solution to the problem of climate change, and discussions on matters that are useful for the next generation resound in their hearts.

Q2: In Japan, the reprocessing plant has not yet been completed, and the location of a disposal site has still not been selected. What initiatives by the government are necessary to obtain the agreement of localities and the understanding of the public?

A2: During the discussion regarding the construction of a fifth nuclear reactor in Finland, the condition was set that there would be no new reactor unless the prospect of final disposal was established. This was so the problem would not remain so for the next generation. For selection of the disposal site, transparent communication was thoroughly promoted. The attitudes of the residents were carefully analysed, and a mechanism was provided to enable local governments to participate in the decision-making. It was important to ensure that local governments had a veto.

Q3: At present, Russia is responsible for the majority of nuclear power exports in the world. What kind of initiatives do you think Japan, the US, and Europe should be taking?

A3-1: Russia is providing comprehensive services such as nuclear finance, training, and waste collection, so they are selling this technological expertise to many countries. For Europe and the US, funding for such education is important. Without the cooperation of everyone, including regulatory organisations, it will not be possible to be competitive.

A3-2: The [Électricité de France] EDF is involved in a scheme in India. Nationalisation is probably one means.

A3-3: The initial investment for SMRs is low, so presumably procurement of finance is easy?

A3-4: Amazon has purchased a data centre that is receiving electricity from the Susquehanna nuclear power plant. I anticipate that the needs of industry for clean energy will increase in the future, such as in this case.

A3-5: It is necessary that safety standards be satisfied in accordance with IAEA guidelines for civilian use. Also, there are parts that lack transparency, such as military use, and mechanisms for insurance and safety are insufficient. For this purpose, cooperation and coordination between countries is necessary, including Japan.

Q4: How is the acceptance of nuclear power personnel from overseas in your countries?

A4-1: Universities are open forums, and their doors are open to foreigners. There are no problems provided that they are from a country that has ratified the Nuclear Non-

Proliferation Treaty. Otherwise, it is a bit difficult.

A4-2: In the National College for Nuclear in the UK, education is provided focussing on reactor decommissioning. The programmes are designed to provide formal academic qualifications, even leading to a PhD. Training is in a format where content can be selected, and short-term student visas are provided for those participating in a course.

A4-3: In countries in Asia, considering the use of nuclear power, many educational programmes have been established for basic theory, but practical learning is insufficient. At this stage, about five engineers are dispatched for learning. From the point of view of how nuclear power should be positioned in policy, human resources are being developed as a part of a cooperative programme between ERIA and IEEJ.

Q5: There are concerns that if a disposal site is constructed in a nuclear power plant host area (as in Genkai), the burden and risks will become concentrated. In Finland, the disposal site and the nuclear power plant are close to each other. What is your view regarding this point?

A5: We consider these to be assets. Also, risks are reduced, particularly from the transport point of view. In these areas, many people take pride in being responsible for a power station or a disposal site. It also has an economic development effect.

Q6: Regarding the economic effect on the nuclear power host area, it has been said that industrial diversification is necessary, but who undertakes support of the other industries – the central government or plant operator?

A6-1: All those involved, such as the electric power company, local government, developer, and chamber of commerce, discuss how employment in the area should be maintained. It is important that the people in the locality are employed.

A6-2: As was shown in the lecture document of the government today, there is a mechanism for dispatching specialists to support the start-up of new businesses in nuclear power plant host areas. However, it seems that the people of Genkai Town did not know about this mechanism, so how to share such information amongst those involved is an issue.

Q7: Many people are opposed to nuclear power, and I think discussions with them often fail to arrive at agreement. Overseas, how is awareness raised and information communicated?

A7-1: It is important to have a campaign with a clear target. During the discussions in Finland regarding whether to construct a fifth nuclear reactor, the targets were young people and women. At that time, the image of energy amongst most people was that it is natural to have energy. To understand the necessity of energy, there were discussions regarding how difficult life was in our parents' generation and our grandparents' generation when there was no energy. It is important to visualise energy by making comparisons of different forms of energy using specific facts and numbers.

It is also effective to make the scale easy to understand, for example, the number of wind turbines required to obtain the same energy as one nuclear reactor.

A7-2: Amongst the countries of ERIA, public opinion has long been divided between nuclear power and fossil-fuel power. In India, the resistance to nuclear power has been particularly strong, but trust was constructed by explanations from the President and the academic world. After the Fukushima Daiichi accident, efforts were made to maintain regulations and standards, and this led to trust being maintained.

Q8: I visited Anglesey 10 years ago. When I spoke to a person from the Chamber of Commerce, they said that it was important that their children remained in Wales and that their culture and heritage are passed down to them. Is this insufficient at present?

A8-1: Wales has its own unique language and culture, and there was a feeling that it was being eroded and in decline. To protect this culture, the local people must have good employment locally. Even if university students go to other countries or regions, it is important that they return. Anglesey is scheduled to be designated as a free port, and when this happens, there will be tax breaks. It is expected that many companies will be attracted to the area by sufficient electricity from nuclear energy and the tax breaks.

A8-2: There are problems that can be solved by understanding technical information. Greenpeace asserted that the radiation from Fukushima is at an emergency level. However, if their assertions are heeded, it would be necessary to evacuate the whole of Finland because the level of natural radiation is so high there. It is important to share a balanced overall picture.

3. Policy Proposals

To cultivate correct understanding, it is necessary that the government, businesses, and third-party communicators provide appropriate information in accordance with their respective standpoints. For this purpose, it is effective to share the value of nuclear power within the context of important issues for the public, such as rate of energy self-sufficiency and environmental problems.

As a prerequisite for communication, it is important for each to continue to gain the confidence of the public through the disclosure of information.

Achieving economic effects for local communities is an important factor for success in siting. This includes not only participation in the nuclear power supply chain by local businesses and the creation of employment opportunities but also industrial and economic diversification through support for other sectors.

It is necessary that businesspersons become sensitive to local needs by maintaining close communication with the local community and to constantly be good neighbours.

Providing academic institutions at the siting location and encouraging the participation of young people in the nuclear power industry have advantages for the siting location in the form of creation of employment from a micro viewpoint. From the macro viewpoint, it maintains and develops nuclear power technology within Japan and leads to confronting future energy problems.

For local governments and local residents to accept nuclear power facilities, it is necessary that the government consistently maintains its nuclear power policies and continues to showcase a bright future for nuclear power.

Responsibility for cultivating understanding should not rest with the siting location, but all society – including government, businesses, and the area where the nuclear power is consumed – should play their role in constructing a society where calm discussion based on facts is possible.

Appendix: Itinerary for the Stakeholder Involvement Week for Nuclear Energy

Workshop on Living in the Host Municipality of Nuclear Facilities with Leaders from Europe, the United States, and Japan

Date: 21 May 2024

Venue: Room 'Event Hall', 2nd floor, Genkai Town Hall

Language: Japanese/English (with simultaneous interpretation)

Programme	
13:00	Doors open and Registration
13:30–13:40	Opening Remarks: Mr. Tatsuya Terazawa, Chair and CEO, The Institute of Energy Economics, Japan (IEEJ)
13:40–13:50	Welcoming Remarks : Mayor of Genkai
Session 1: Relationship with Nuclear Power Plants in Genkai – Efforts and on the Future (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
13:50–14:50	Chair, Special Committee on Nuclear Energy, Genkai Town Council
	Vice-chair, Karatsu Uwaba Chamber of Commerce and Industry President, Makihara Shouten
	Chair, Genkai Board of Education
	Q&A
14:50–15:00	Break
Session 2: Efforts of Respective Countries in Hosting Nuclear Facilities: Life, Employment, Industry, and Residents' Thoughts (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
15:00–15:40	Dr. Eija-Riitta Anneli Korhola (Finland)
	Ms. Kristin Zaitz (US) and Ms. Heather Hoff (US)
	Ms. Corinne Matthews (UK)
	Dr. Michael Rushton (UK)
	Q&A

Programme	
Session 3: Policy Proposals (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
15:40–15:50	Wrap-up of Proposals
15:50–16:00	Closing Remarks: Dr. Anbumozhi Venkatachalam, Senior Research Fellow for Innovation, Economic Research Institute for ASEAN and East Asia (ERIA)

Symposium on Thinking about Power from an Electricity-consuming Area

Date: 23 May 2024

Venue: Room 'NANIWA East', 4th floor, Sheraton Miyako Hotel Osaka

Language: Japanese/English (with simultaneous interpretation)

Programme	
12:30	Doors open and Registration
13:00–13:10	Opening Remarks: Mr. Tatsuya Terazawa, Chair and CEO, IEEJ
13:10–13:35	Welcoming Remarks and Keynote Speech: Director, Office for Regional Relations for Nuclear Facilities, Electricity and Gas Industry Department, Agency for Natural Resources and Energy, Japan
Session 1: Why Is Nuclear Power Important? The Significance and Utilisation of Nuclear Power and How to Face the Host Municipality of Nuclear Facilities (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
13:35–13:40	Introduction of Speakers by Moderator
13:40–14:15	The Role of Nuclear Power in the Global Energy Situation and in Achieving Carbon Neutrality: Chief Researcher, Research Institute of Innovative Technology for the Earth (RITE)
14:15–14:35	Major Initiatives of the Global Environment and Energy Committee in the Kansai Economic Federation: Vice-chair, Kansai Economic Federation
14:35–14:50	Coffee Break
Session 2: Acceptance of Nuclear Power and Residents' Thoughts, Stakeholder Involvement, and Dialogue with Stakeholders (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
14:50–14:55	Introduction of Speakers by Moderator
14:55–15:20	Residents' Thoughts from the Host Municipality of Nuclear Facilities: Chair, Tsuruga Branch, Council for the Peaceful Use of Nuclear Power in Fukui Prefecture
15:20–16:20	Recent Developments in Nuclear Power and How to Foster Understanding Nationwide (including Major Electricity-consuming Areas): Ms. Kristin Zaitz (US), Ms. Heather Hoff (US), Ms. Corinne Matthews (UK), Dr. Michael Rushton (UK), and Dr. Eija-Riitta Korhola (Finland)

Programme	
Session 3: Panel Discussion: How to Frame Nuclear Power in Power-consuming Areas (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
16:20–16:40	Panel Discussion
Session 4: Policy Proposals (Moderator: Mr. Junichi Ogasawara, Senior Research Director and Manager, IEEJ)	
16:40–16:50	Wrap-up of Proposals
16:50–16:55	Comments on the Discussion: Vice-chair, Osaka Chamber of Commerce and Industry
16:50–17:00	Closing Remarks: Dr. Anbumozhi Venkatachalam, Senior Research Fellow for Innovation, ERIA

In May 2024, The Institute of Energy Economics, Japan (IEEJ) organised a symposium in Osaka, one of Japan's largest cities, to foster understanding of nuclear power by focusing on the relationship between nuclear-hosting municipalities and electricity-consuming areas. The symposium attracted opinion leaders from nuclear-hosting communities in Europe and the US, Japanese guest speakers, representatives from Asian countries, and a large public audience. Discussions covered a range of topics, including the role of nuclear energy, perspectives of residents in hosting municipalities, economic organisations' attitudes, and practices in the US and Europe. Key recommendations emerged from the symposium, highlighting the importance of improved communication on nuclear issues, economic development for nuclear-hosting municipalities, and human resource development.

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