Chapter 2

Public Perception and Acceptance of Nuclear Power

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Chapter 2

Public Perception and Acceptance of Nuclear Power

In this study, IEEJ reviewed each country's perception of nuclear power, and the experiences and measures for building a consensus to contribute to the improvement of social acceptance of nuclear power, how society could accept nuclear power, and to propose policies. In this chapter, each country's public perception and the meaning of PA are described. Each country's experiences and measures for building a consensus are described in chapter 3. An analysis of chapters 2 and 3 and the compiled policy proposals are discussed in chapter 4.

Countries surveyed are selected by the reasons below:

United States (US)	The largest nuclear energy consumer in the world
Finland	A repository for the final disposal of spent nuclear fuel was accepted for the first time in the world
United Kingdom (UK)	The government supports and promotes nuclear power
Japan	The government promotes nuclear power even after the Fukushima Daiichi accident

Each country's history of nuclear power, and an overview of public perception before and after the Fukushima Daiichi accident are described in the following section.

1. Public perception of nuclear power

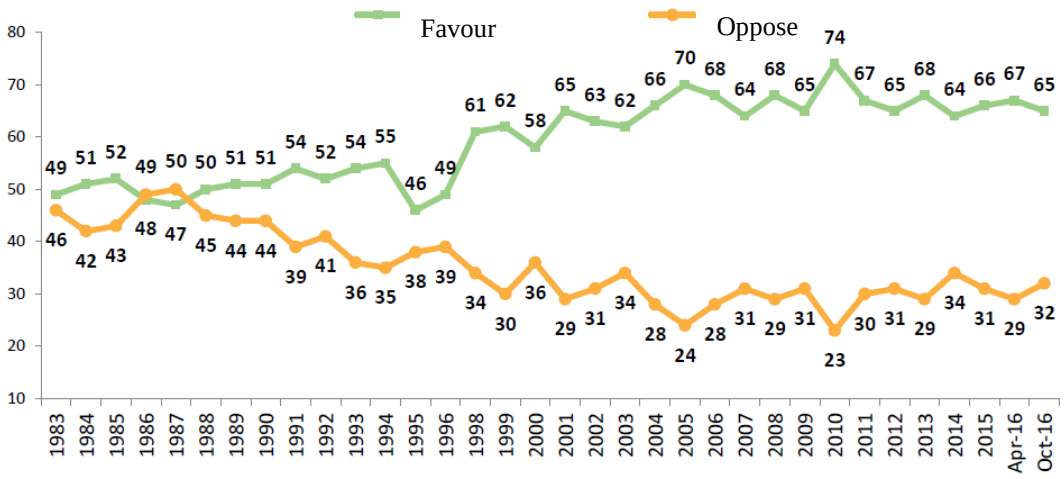
1) Status in the United States

In the US, the construction of nuclear power plants (NPP) rapidly expanded after 1957 when the Shippingport Atomic Power Station started operation and continued up to the end of the 1970s. However, an accident occurred at the Three Mile Island Nuclear Generating Station Unit 2 in

1979, which caused some distrust of nuclear power. After that, with the decrease of the cost of thermal power generation and the downwards adjustment of electricity demand estimates, the construction of new NPPs stopped. Nevertheless, with the California electricity crisis in 2001 triggering the need for a stable electricity supply and concerns of higher natural gas prices, the movement towards the construction of new NPPs began in full scale. As of 2019, nuclear power accounted for about 20% of electricity generated in the US. At present, 95 NPPs are in operation and two NPPs are under construction.

Figure 2.1 shows the percent of people in the US who favour and oppose nuclear energy from 1983 to 2016. The 2016 data are from surveys conducted by Bisconti Research Inc., at the request of the US Nuclear Energy Institute.

Figure 2.1: Percent Who Favour and Oppose Nuclear Energy, 1983–2016 (%)



Source: Nuclear Energy Institute (2016). 'Fall 2016 National Public Opinion Tracking Survey Memo'. https://www.nei.org/CorporateSite/media/filefolder/resources/reports-and-briefs/national-public-opinion-survey-nuclear-energy-201610.pdf (accessed 26 November 2019).

Figure 2.1 shows the number of people who opposed nuclear energy increased following the accident at Chernobyl Unit 4 in the Soviet Union in 1986. Following that, more people supported nuclear energy than opposed it. These results also show that public support for nuclear energy dipped after the Fukushima accident, but the foreign accidents have hardly affected public perception.

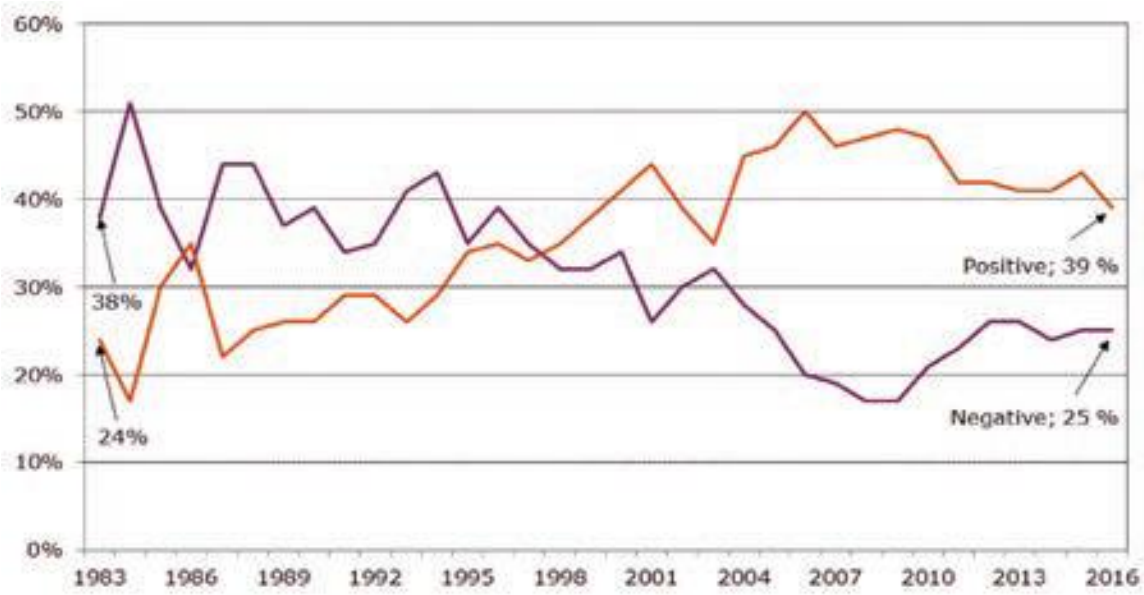
2) Status in Finland

Since the oil crisis in the 1970s, Finland has promoted nuclear power development in order to solve the excessive dependence on fossil fuels and Russia. During the Cold War, the Loviisa Units 1 and 2, which started operation in 1977 and 1981, respectively, were built using Eastern Bloc technology. The Olkiluoto Units 1 and 2, which started operation in 1979 and 1982, respectively, were constructed using Western Bloc technology. The consequent new construction plans were temporarily ceased following the Chernobyl accident in 1986 but have resurfaced to tackle issues including the chronic import of electricity and compliance with the target for reducing greenhouse gas emissions. As of 2019, nuclear power generation accounted for about 35% of electricity generated in Finland. At present, four NPPs are in operation and a new plant is under construction in Olkiluoto.

Finland is the only country in the world where a final disposal facility of high-level radioactive waste is under construction. Since the total amendment of Finland's atomic energy act in 1987, its people, the municipality hosting the radioactive waste facility, neighbouring municipalities, and regulatory organisations expressed their opinions on the project for introducing nuclear power facilities, including the final disposal facility, even before the application for construction was filed. For this reason, the planned construction site of the high-level radioactive waste final disposal facility was decided much earlier than the application for construction permission.

Figure 2.2 shows public opinion polls in Finland. According to World Nuclear News, in the 2010 survey, the opinion poll was carried out over 1 week in January, and 1,000 Finns aged 15 and over were interviewed on their general opinions of nuclear power in a Finnish context.

Figure 2.2: Evolution of Public Acceptance of Nuclear Power in Finland



Source: 'What People Really Think About Nuclear Energy' (2017), *ATW–International Journal for Nuclear Power*, 62(3), 157–163. https://www.kernenergie.de/kernenergie-wAssets/docs/fachzeitschrift-atw/2017/atw2017_03_157_What_People_Really_Think.pdf (accessed 26 November 2019).

The number of people who opposed the commercial use of nuclear power increased following the accident at Chernobyl in 1986. The ratio of supporters of nuclear power exceeded that of opponents in the second half of the 1990s and the results shows that even though public support for nuclear energy dipped after the Fukushima accident, as of 2016, the majority support nuclear power generation in Finland.

3) Status in the United Kingdom

In the UK, Calder Hall Unit 1 started nuclear power generation for commercial use in 1956, and it has since been a pioneering NPP. Whilst the UK's development of nuclear reactors progressed through trial and error, light-water reactors were introduced in the 1980s. The promotion of nuclear power resurfaced in the late 2000s due to the exhaustion of the North Sea gas fields, the need for a stable energy supply, and the ambitious target for reducing global warming gas emissions. As of 2019, about 18% of the country's electricity is generated by nuclear power. At present, 15 NPPs are being operated and one station is being constructed at Hinkley Point C.

The results of surveys by the UK Energy Research Centre (UKERC) are shown in Table 2.1. The 2013 survey was conducted with 961 respondents between 8 and 26 March 2013.

Table 2.1: Overall Support for and Opposition to Nuclear Power (%)

	2005	2013
Overall, I support nuclear power	26	32
Overall, I oppose nuclear power	37	29
I am not sure whether I support or oppose nuclear power	32	27
I don't care what happens with nuclear power	3	3
Other/None of these/ Don't know	1	9

Source: UKERC (2013), 'Public Attitudes to Nuclear Power and Climate Change in Britain Two Years after the Fukushima Accident,, 19 Sep. http://www.ukerc.ac.uk/publications/public-attitudes-to-nuclear-power-and-climate-change-in-britain-two-years-after-the-fukushima-accident-summary-findings-of-a-survey-conducted-in-march-2013-working-paper.html (accessed 26 November 2019).

Overall, the support for nuclear power has increased by about 6 percentage points since 2005, whilst opposition has decreased by about 8 percentage points since 2005. A similar number of people generally supported (32%) or opposed (29%) nuclear power in 2013. The number of people ambivalent about nuclear power (that is, being unsure whether to express support or opposition) dropped from 32% in 2005 to 27% in 2013.

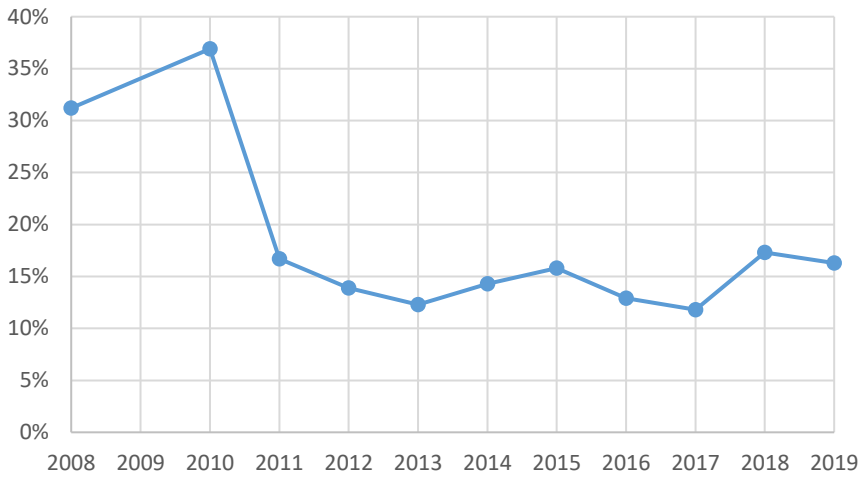
4) Status in Japan

Japan started commercial nuclear power generation in 1966 when the Tokai nuclear power plant opened using technology introduced from the UK. After that, Japan introduced a light-water reactor from the US in 1970. The construction of light-water reactors expanded to compensate for Japan's low energy self-sufficiency and the increase in domestic manufacturing in the 1980s. During the 1990s, several Japanese-type light-water reactors were constructed. In 2011, 54 NPPs were in operation and about 30% of electricity generated was from nuclear energy until the accident occurred at the Fukushima Daiichi NPP in 2011. However, the percentage of electricity generated by nuclear power remained at around 8% in 2019. At present, only nine NPPs are in operation.

The Japan Atomic Energy Relations Organization (JAERO) has conducted regular and repeated public opinion surveys since 2006. JAERO's survey was conducted with 1,200 respondents from 3 to 15 October in 2019.

Figure 2.3 shows the trends in the percentage of respondents who would like to use nuclear energy in the future.

Figure 2.3: Percentage of Respondents Who Would Like to Use Nuclear Energy in the Future

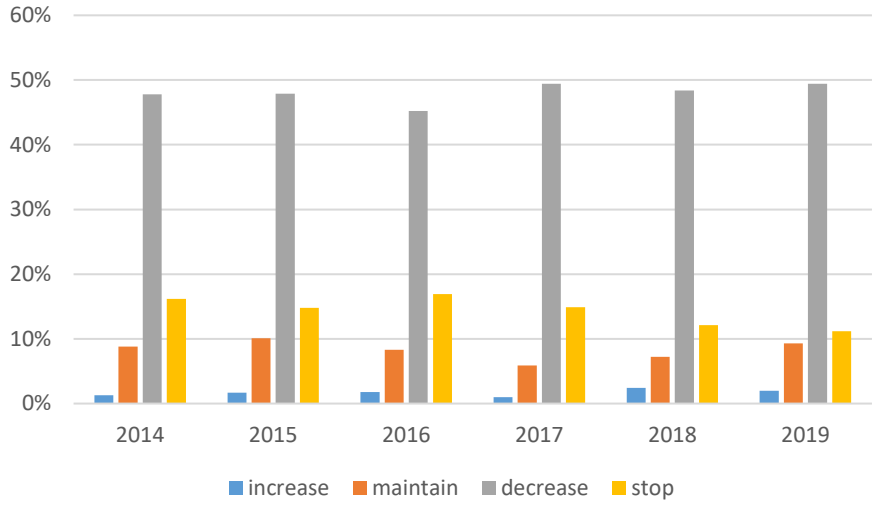


Source: Japan Atomic Energy Relations Organization (2020), 'Opinion Research on Nuclear 2019'. https://www.jaero.or.jp/data/01jigyou/tyousakenkyu2019.html (accessed 18 March 2020) (in Japanese).

The result shows that the public image of nuclear power has tended to decline after an accident.

Figure 2.4 shows 11.3% of respondents who answered 'increase' or 'maintain' think that nuclear energy is useful. On the other hand, 60.6% of respondents who answered 'decrease' or 'stop' think that nuclear energy is not useful in the future in Japan.

Figure 2.4: How Do You Think Nuclear Power Generation Should be Used in the Future?

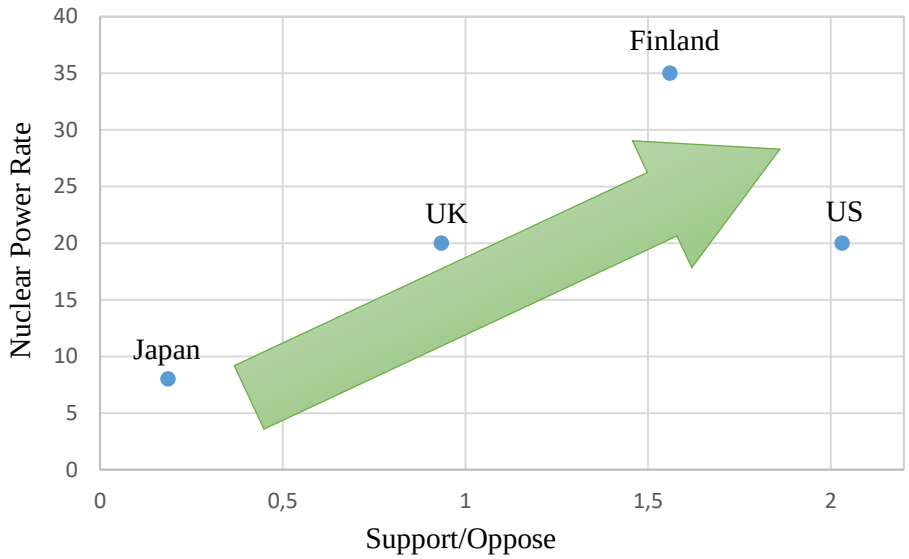


Source: Japan Atomic Energy Relations Organization (2020), 'Opinion Research on Nuclear 2019'. https://www.jaero.or.jp/data/01jigyou/tyousakenkyu2019.html (accessed 18 March 2020) (in Japanese).

5) Summary of public perception of nuclear power

Nuclear power has been generally accepted in the US, Finland, and the UK, although acceptance levels differ from country to country. Figure 2.5 shows the proportion between those who support nuclear power and those who do not, along with the share of nuclear power in each nation's electricity supply.

Figure 2.5: Is There a Correlation Between Public Perception and Nuclear Power Use?



UK = United Kingdom, US = United States.
Source: Prepared by IEEJ based on the results of surveys shown in Chapter 1.

These comparisons are not necessarily correct as they were made in different years, with questionnaires being inconsistent amongst the survey bodies. However, they indicate a rough correlation between the PA of nuclear power and its share in a nation's electricity supply. The higher the share in a nation's electricity supply, the greater the acceptance of nuclear power.

In this rough correlation, the US is in a somewhat specific situation. Whilst the share of support is much larger than the opposition, the share of nuclear power in electricity supply is not as large. The reason is assumed that the US has more energy resources, such as gas and coal, than other countries, but more detailed analysis is required.

Public acceptance of nuclear power

The International Atomic Energy Agency (2007, p.5) defines PA as follows:

> Public acceptance implies that a certain policy or a certain concrete measure is clearly or tacitly supported by members of the public who may be affected, positively or negatively, by its implementation.

Considering the four countries listed in section 2.1, if the proportion between those who support nuclear power and those who do not is almost the same or more, it is thought that nuclear power is clearly or tacitly supported by the public. In other words, it can be said that PA of nuclear power is achieved. Countries considering the introduction of nuclear power need to work for PA to create such a situation.