

Chapter 1

Public View of Nuclear Energy Today

It is impossible to site or operate a nuclear facility without earning public acceptance from stakeholders including residents. There have been cases where construction plans were cancelled after a local referendum, such as the Maki and Ashihama nuclear power plants in Japan (Juraku, Ohkawa, and Suzuki, 2005). The underlying cause for opposition amongst the residents was a lack of information.

This chapter illustrates how the image of the nuclear energy has (or has not) changed in several countries. While indices of public trust towards nuclear energy drop after accidents, many countries have seen trust improve in the years that follow. The reasons behind this phenomenon are now examined.

1-1. Opinion Research by Japan Atomic Energy Relations Organization, Japan

1) Purpose and method of the opinion research

Since its establishment in 1969, the Japan Atomic Energy Relations Organization (JAERO) has strived to enlighten people on the benefits of the peaceful use of nuclear energy. Based on its belief that the promotion of nuclear-related information relies on a having a good grasp of the perceptions of its recipients, JAERO has conducted regular and repeated public opinion surveys since 2006.

JAERO's method of opinion research is as follows. A survey was conducted with 1,200 respondents aged 15–79 years old, of randomised sex, and from randomly sampled households resident in Japan. Six samples were taken from each of 200 sampling areas chosen in proportion with regional and municipal scale groups. The survey method used was the omnibus investigation personal visit detention method. Surveys were conducted during 4–16 October 2017.

2) Results

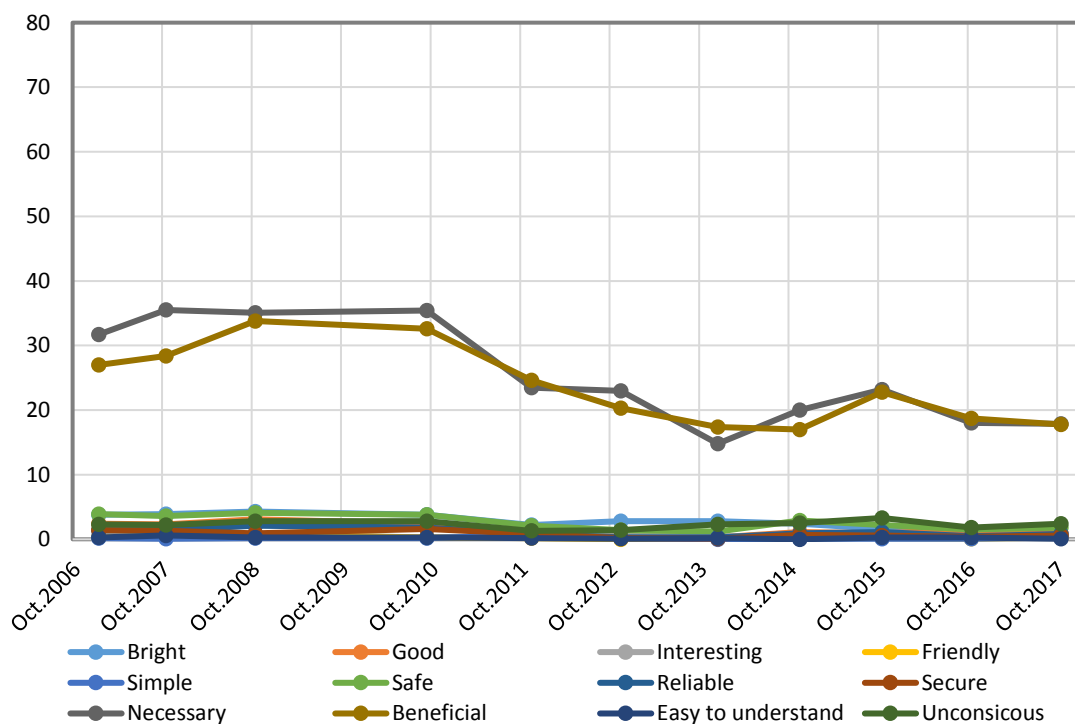
a. Comparison of positive and negative images on nuclear power

Figure 1 shows the trends in the positive image of nuclear power, while Figure 1-2 shows the trends in the negative image. Table 1 compares these results. Overall, the negative images, such as ‘bad’, ‘complex’, ‘dangerous’, ‘unreliable’, ‘insecure/causing anxiety’, and ‘difficult to understand’, score higher than positive images. On the other hand, the positive image of being ‘beneficial’ was higher than the negative image of being ‘useless’. The similar magnitude of the points for ‘necessary’ and ‘unnecessary’ may indicate a divide in opinions.

In addition, the results show that the public image of nuclear power tends to change (for the positive images) or fluctuate (for the negative images) after an accident.

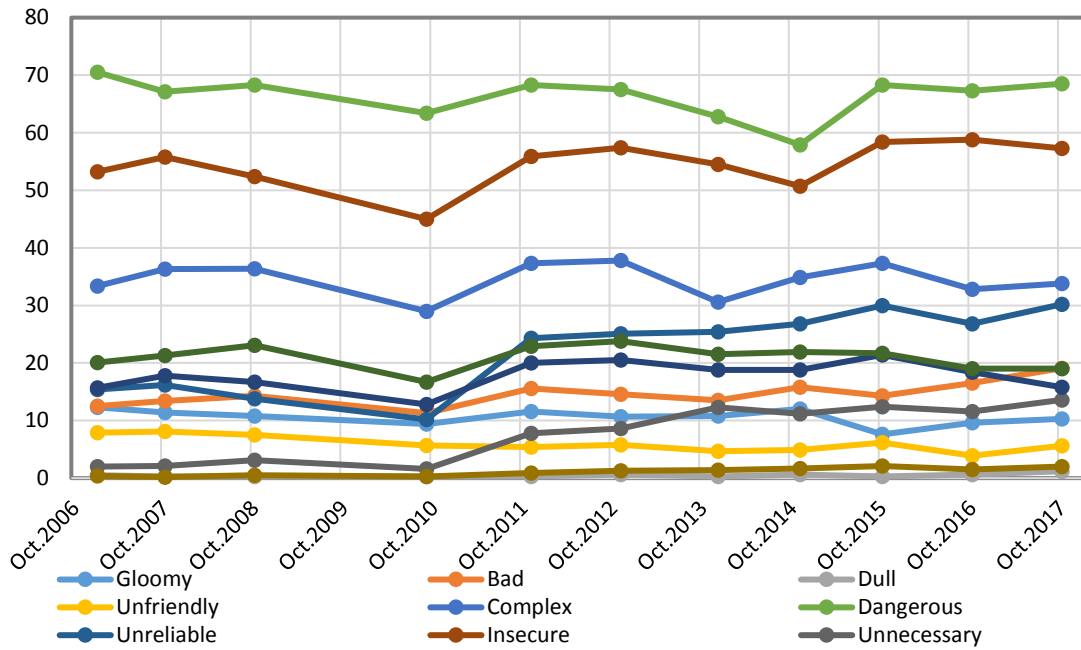
Figure 1-1. Positive Image of Nuclear Power

(% of respondents)



Source: Japan Atomic Energy Relations Organization (2018).

Figure 1-2. Negative Image of Nuclear Power
(% of respondents)



Source: Japan Atomic Energy Relations Organization (2018)

Table 1-1. Comparison of the Positive and Negative Images of Nuclear Power
(% of respondents)

Positive image		Negative image
Good (0.9)	<	Bad (19.1)
Simple (0.3)	<	Complex (33.8)
Safe (1.8)	<	Dangerous (68.5)
Reliable (0.8)	<	Unreliable (30.2)
Secure (1.4)	<	Insecure (57.3)
Beneficial (17.8)	>	Useless (2.0)
Easy to understand (0.1)	<	Difficult to understand (15.8)
Unconscious (2.4)	<	Disturbing (19.0)
Necessary (17.9)	>	Unnecessary (13.6)

Source: Japan Atomic Energy Relations Organization (2018).

b. Public acceptance of nuclear power

An overview of the results of the survey is as follows.

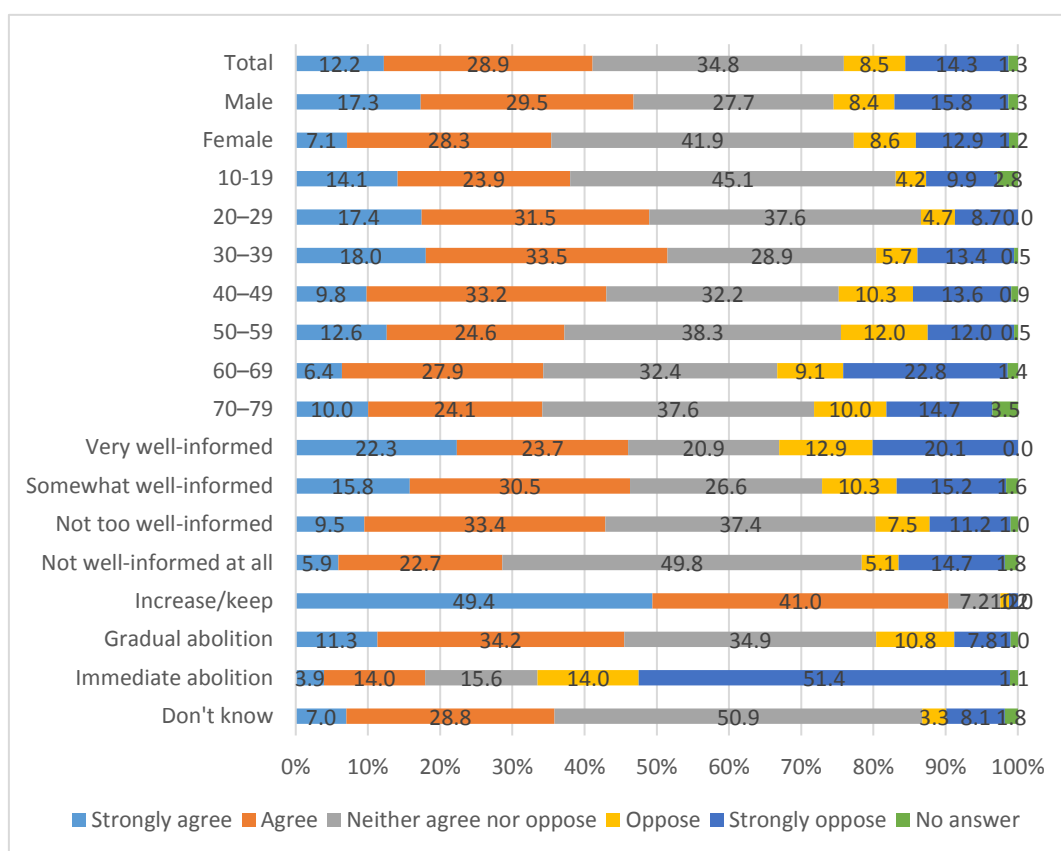
- (i) Under benefit cognition (usefulness, economic efficiency, and contribution to solving global warming), a high percentage of respondents answered 'cannot decide'.
- (ii) Under risk cognition, most respondents acknowledged (to different degrees) that 'nuclear power plants are dangerous in our earthquake-prone country' and did not agree that 'disaster prevention measures of areas surrounding nuclear sites have been established'.
- (iii) Experts, utilities, the national government and local governments concerned with nuclear power are not trusted.
- (iv) Most respondents feel that 'we cannot help using nuclear power for a while but should gradually move towards phaseout'.
- (v) The amount of knowledge concerning nuclear and energy matters has a relatively large influence on the judgement on whether to use nuclear energy; ambiguous answers such as 'cannot decide' decrease with increased knowledge.
- (vi) The main reasons chosen for not restarting reactors are 'unclear prospects for Fukushima Daiichi decommissioning', 'unclear prospects of radioactive waste disposal', 'anxiety concerning disastrous accidents', 'inadequacy of disaster prevention schemes', 'inadequacy of countermeasures against natural disasters', and 'sufficiency of electricity at present'.
- (vii) The most negative responses were towards siting a high-level waste final disposal facility nearby, although there was a level of recognition of the need of efforts for high-level waste disposal.

Cross-tabulation of trends in benefit cognition

Figure shows 41.1% of respondents ‘strongly agree’ or ‘agree’ that nuclear energy is useful. On the other hand, 22.8% of respondents ‘oppose’ or ‘strongly oppose’ this idea. Younger people tend to have positive opinions, while the older generation tends to have negative opinions. The better informed people are about nuclear power, the smaller the percentage of people who answer ‘neither agree or oppose’.

Figure 1-3. Do You Think Nuclear Power Is Useful?

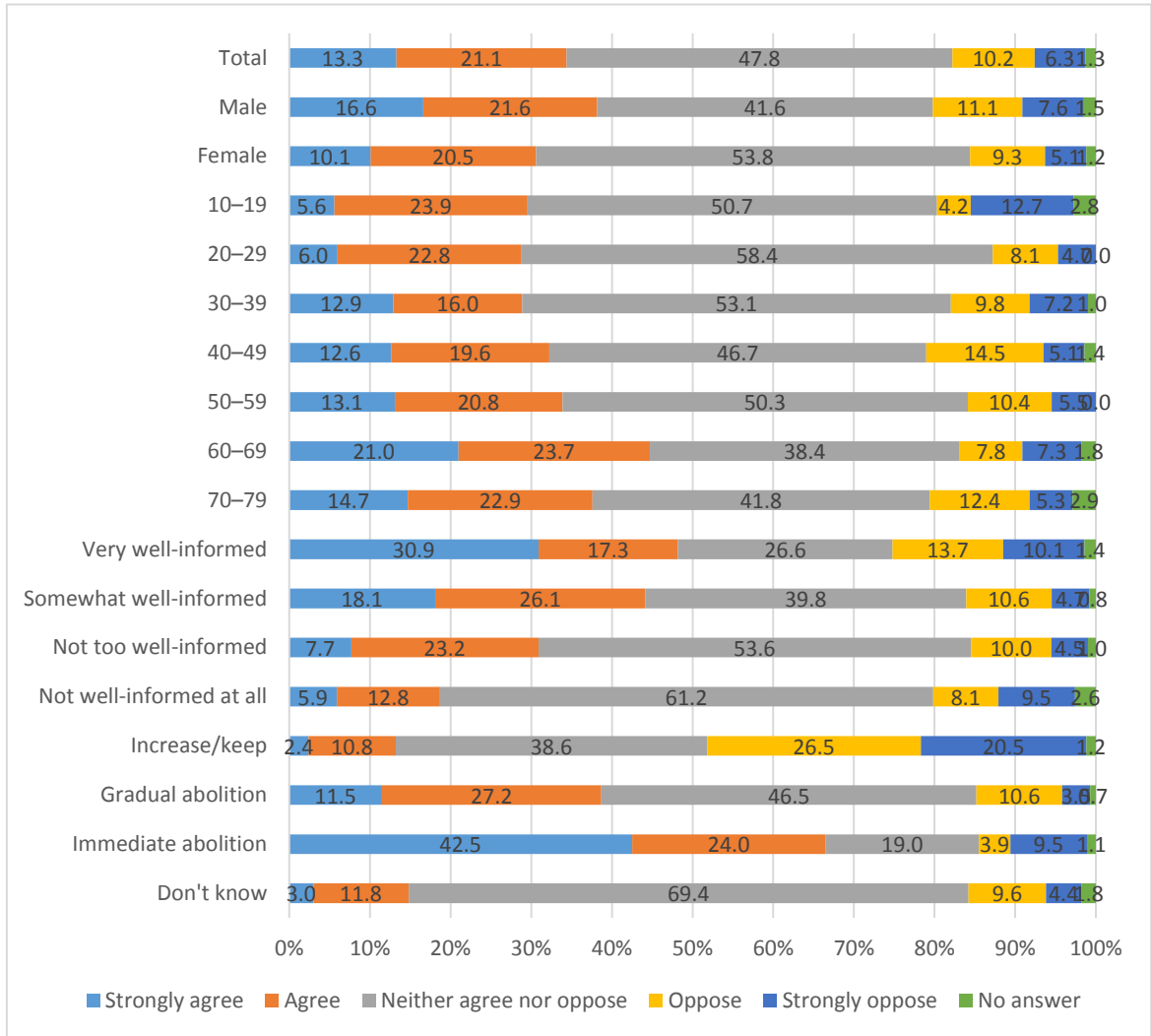
(% of respondents)



Source: Japan Atomic Energy Relations Organization (2018).

Figure 1-4 shows a total of 34.4% of respondents say that they ‘strongly agree’ or ‘agree’ with the idea that Japan’s economic growth is possible without nuclear energy, while 16.5% of respondents ‘oppose’ or ‘strongly oppose’ this idea. It should be noted that ‘agree’ indicates the belief that nuclear power is not necessary, in this case. The more information people have, the larger the proportion of people with positive opinions towards the potential for economic growth without nuclear energy.

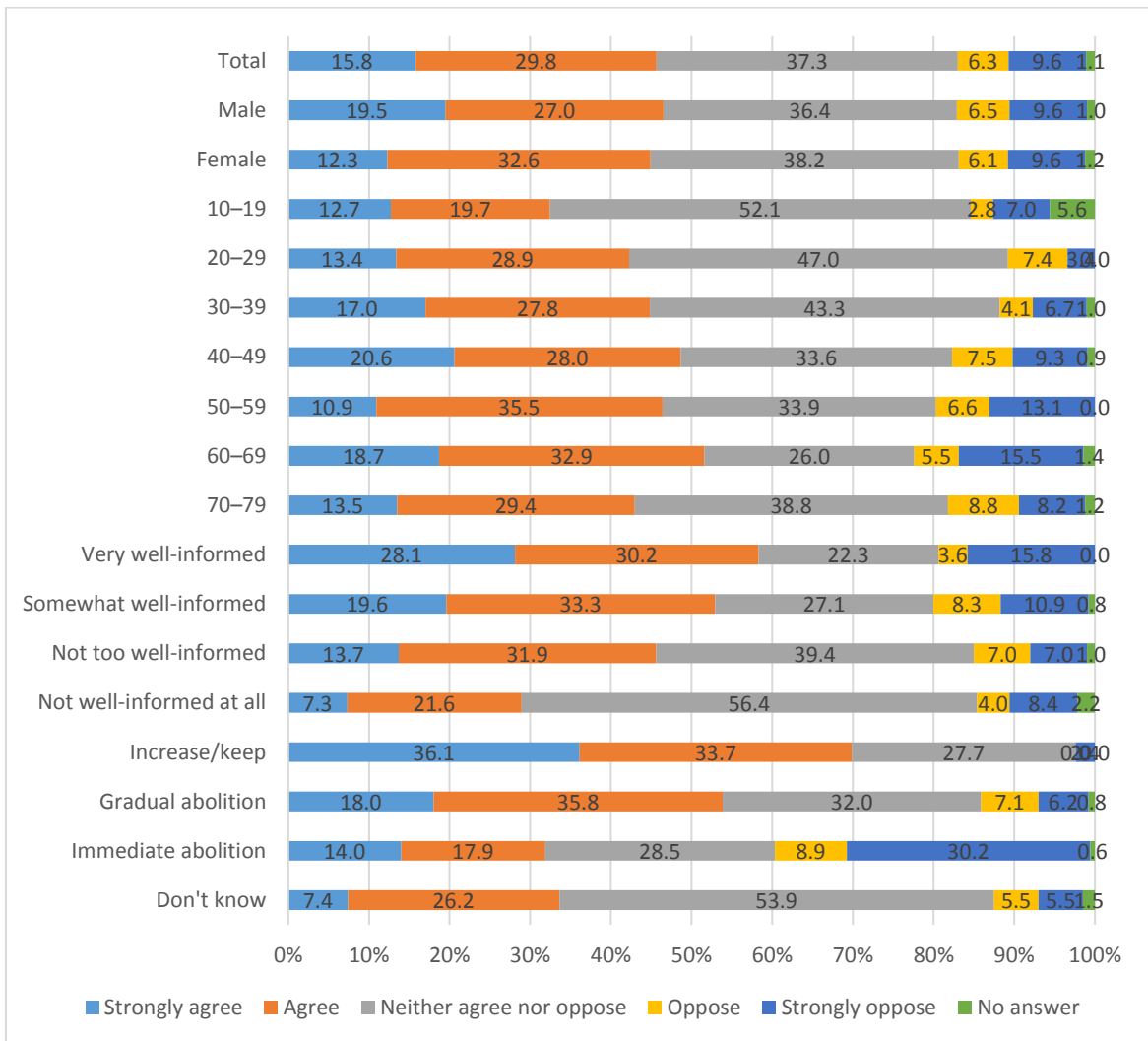
Figure 1-4. Do You Think Japan's Economic Growth Is Possible Without Nuclear Energy?
 (% of respondents)



Source: Japan Atomic Energy Relations Organization (2018).

Figure 1-5 shows total of 45.6% of respondents 'strongly agree' or 'agree' with raising electricity charges to transition away from nuclear energy. On the other hand, a total of 15.9% of respondents 'oppose' or 'strongly oppose' this idea. The older generation tend to have more negative opinions. Again, the more information they have, the larger the proportion of people who hold positive opinions, in this case for paying more to phase out nuclear energy.

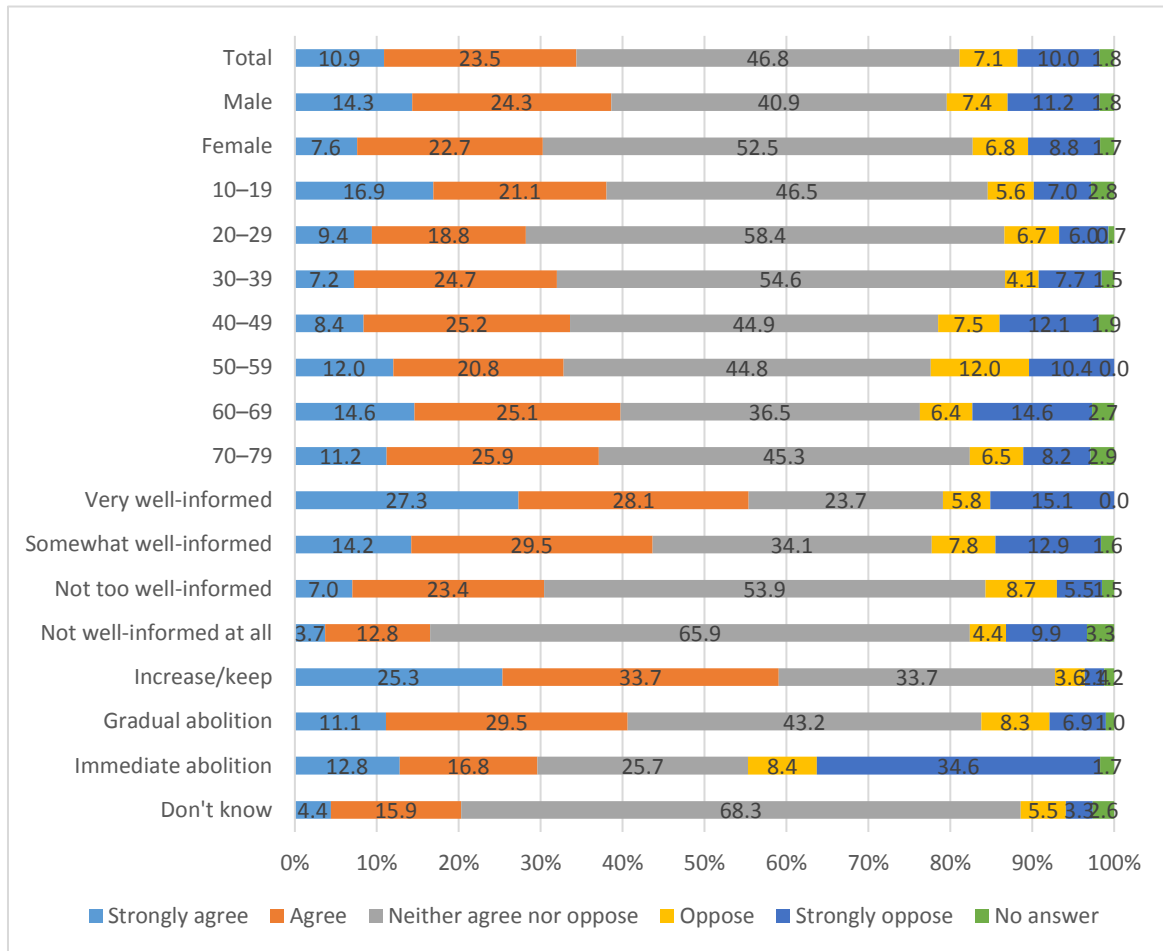
Figure 1-5. Do You Think Electricity Charges Should Be Raised to Transition Away from Nuclear Energy?
 (% of respondents)



Source: Japan Atomic Energy Relations Organization (2018).

Figure 1-6. shows 34.4% of respondents ‘strongly agree’ or ‘agree’ with the idea that nuclear energy contributes to the prevention of global warming, while 17.1% of respondents ‘oppose’ or ‘strongly oppose’ this idea. Teenagers and the over-60 age group tend to have positive opinions. The more information people have, the larger the proportion of people who have positive beliefs about the advantages of nuclear energy in the face of climate issues.

Figure 1-6. Does Nuclear Energy Contribute to the Prevention of Global Warming?
(% of respondents)

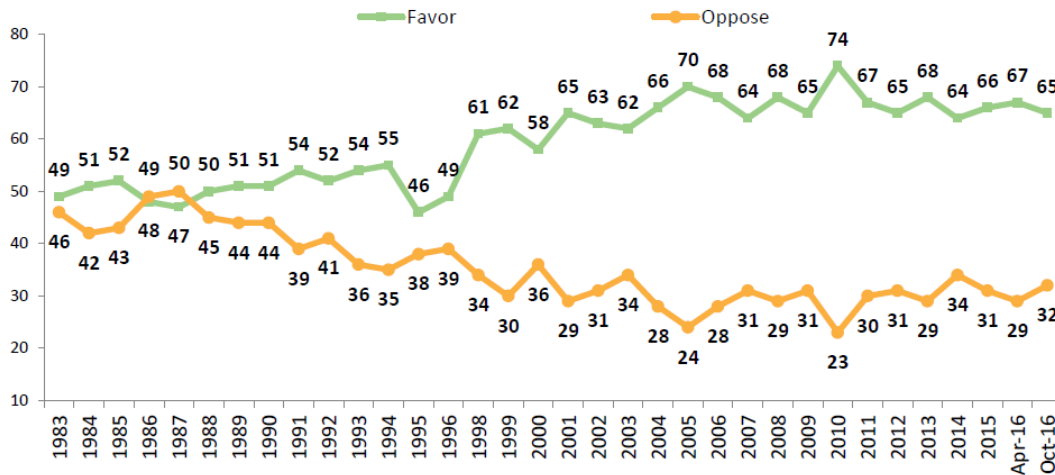


Source: Japan Atomic Energy Relations Organization (2018).

1-2. Status in the United States

Figure and Figure show the results of a public opinion survey with a nationally representative sample of 1,000 adults, conducted in 2016 by Bisconti Research Inc. at the request of the US Nuclear Energy Institute. The study shows that public support for nuclear energy dipped after the Fukushima accident, but subsequently recovered to pre-Fukushima levels (Figure 1-7).

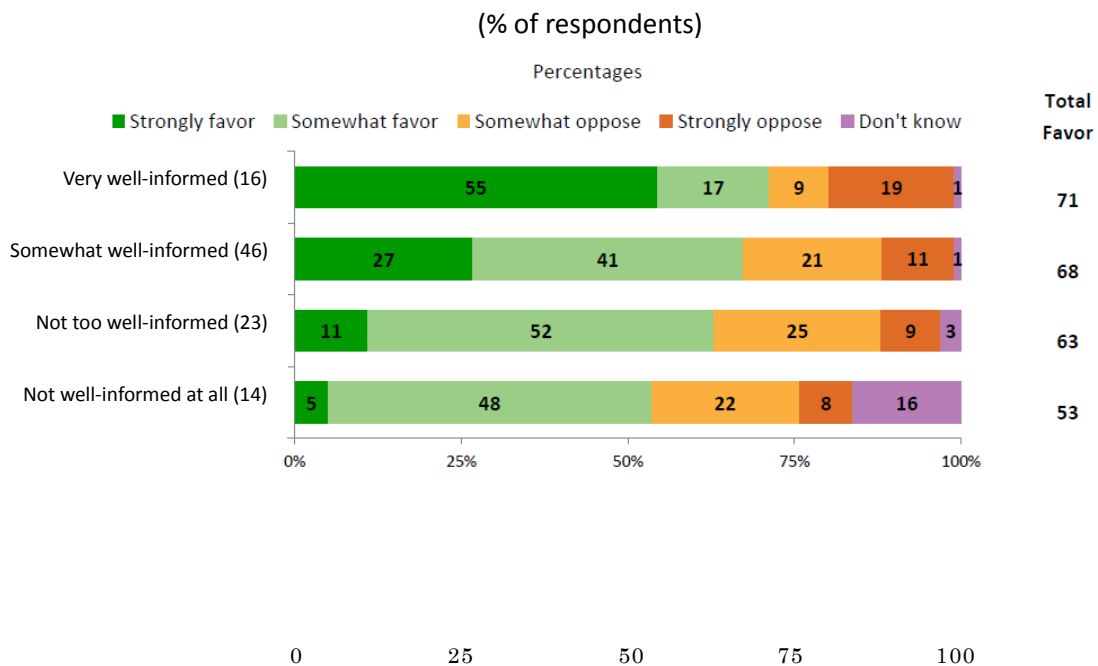
Figure 1-7. Percent Who Favour and Oppose Nuclear Energy, 1983–2016



Source: Nuclear Energy Institute (2016).

Figure 1.8 shows that well-informed respondents are more inclined to favour nuclear energy, whereas those with less information are more likely to oppose it. It is important to note that the percentage of those who strongly oppose nuclear energy is much higher for the ‘very well-informed’ category than it is for the other three categories. If we could clarify why these people feel strongly opposed despite having abundant information, we might be able to improve current information provision.

Figure 1-8. Favourability towards Nuclear Energy, by Degree to which Respondents Feel Informed about It



Source: Nuclear Energy Institute (2016).

A poll taken by Harris Interactive in February 2012 shows that after the Great East Japan Earthquake and Fukushima accident of 2011, the percentage of those who answered that ‘risks outweigh benefits’ exceeded that of ‘benefits outweigh risks’ for the first time (Table). The proportion responding ‘risks outweigh benefits’ increases in the older age groups (Table).

Table 1-2. Benefits versus Risks for Nuclear energy

(% of respondents)

Year	Benefits outweigh risks (net)	Benefits strongly outweigh risks	Benefits somewhat outweigh risks	Risks outweigh benefits (net)	Risks somewhat outweigh benefits	Risks strongly outweigh benefits	Not at all sure
2012	40	15	24	41	19	21	20
2011	42	20	22	37	18	19	21
2009	44	21	23	34	17	17	22

Source: Corso (2012).

Table 1-3. Benefits versus Risks for Nuclear Energy by Age Group

(%)

Age group	18–35	36–47	48–66	67+
Percentage saying benefits outweigh risks	34	34	43	53

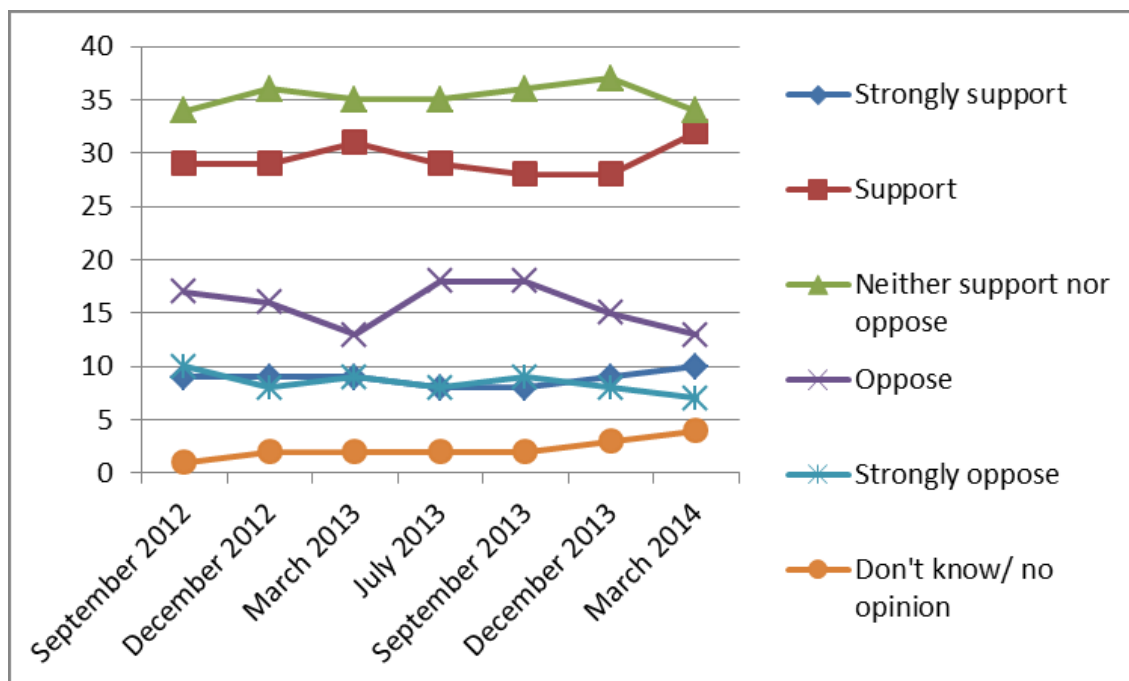
Source: Corso (2012).

Following the Three Mile Island accident, the US conducted extensive accident investigations based on presidential initiatives. Upon receiving the investigation reports, the President issued a statement requiring the implementation of safety enhancements and announcing the organisational restructuring of the nuclear regulatory agency. Both houses of the US Congress carried out independent accident inquiries. The industry founded the Institute of Nuclear Power Operations to voluntarily expand safety campaigns efforts, and established the Nuclear Energy Institute to assume correspondence with congress, various media, and the newly organised Nuclear Regulatory Commission. Thus, the government and nuclear operators have partnered in their struggle to regain public trust.

1-3. Status in the United Kingdom

According to a regular study undertaken by the UK Department of Energy and Climate Change since 2012, public support for nuclear energy following the Fukushima accident has shown a constant positive balance (Figure 1-). There is also a trend for higher levels of support within the male group and the over-65 age group.

Figure 1-9. Change in Level of Support for Using Nuclear Energy in the United Kingdom
(%)



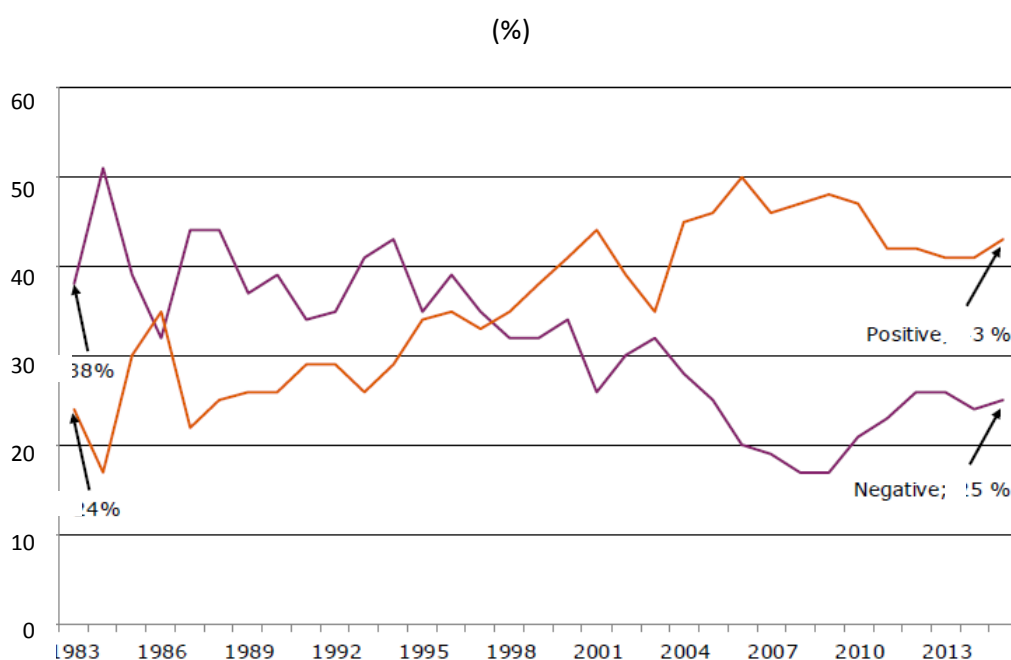
Source: Government of the United Kingdom, Department of Energy and Climate Change (2014).

In the Government of the UK disclosed a document titled 'The UK's Nuclear Future' in 2013, declaring that 'Nuclear power is, and will continue to be, a key part of our low-carbon energy mix' (HM Government, 2013: p.3). This document was co-authored and jointly published with the industry and aims to establish a steady long-term approach for nuclear power, a vital power source for the country.

1-4. Status in Finland

In Finland, a debate on nuclear energy use arose in 2011. A public survey conducted immediately after the Fukushima accident by the US firm Gallup found that positive replies had dropped compared with pre-Fukushima levels, but they still outweighed negative responses. This supports the understanding that Finland remains pro-nuclear (Figure 1-). Reasons behind such attitudes may include the stability of the country's geological foundations; the fact that nuclear plants have continued to operate reliably, which has earned the public's trust; rising energy imports and future demand; ample information disclosure and public consultations on new builds based on a recognition of the need to comply with Kyoto Protocol standards.

Figure 1-10: Public Acceptance of Nuclear Power in Finland

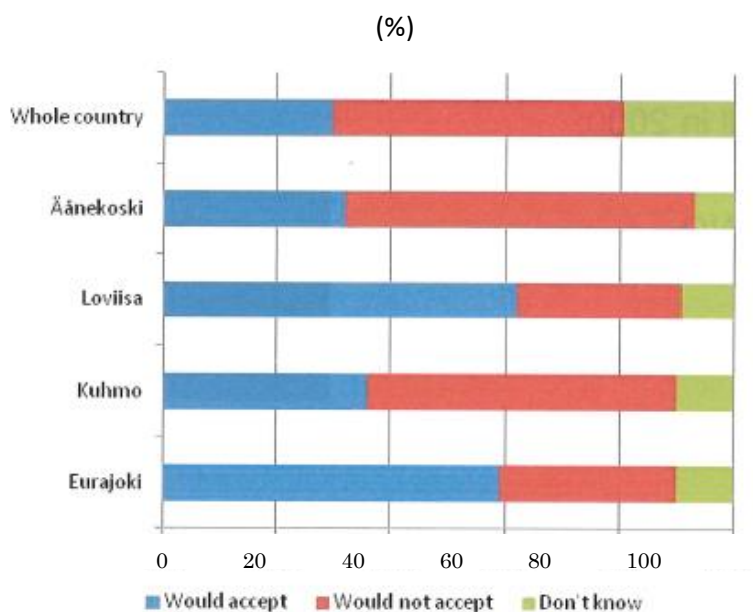


Source: Muranen (2015).

Another public survey, conducted in 1999, shows that the level of acceptance seen in areas hosting nuclear facilities, namely the municipalities of Eurajoki and Loviisa, are significantly higher than the

national average (Figure 1-11Error! Reference source not found.). In these areas, the combination of stable operations and information disclosure has won the residents' trust, and polls taken during the site selection process for a final repository showed a supportive majority.

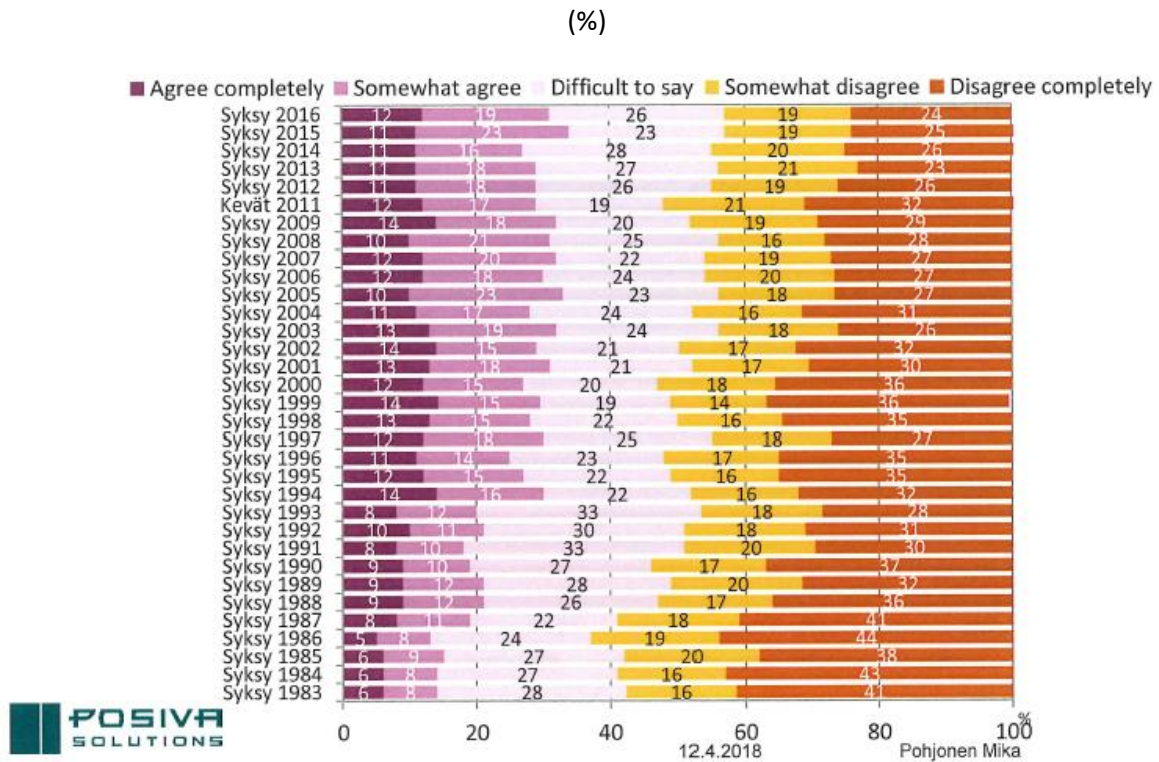
Figure 1-11. Public Acceptance for a Repository in Finland, 1999



Source: Pohjonen (2018).

In addition, the results of an ongoing public opinion study initiated in 1983 show that the percentage of people who 'completely agree' or 'somewhat agree' with the statement 'nuclear waste can be safely stored in a final repository in the bedrock of Finland' rose from a total of 14% in 1983 to 31% in 2016 (Figure 1-12). The operator of Finland's spent fuel repository project, Posiva Solutions, identifies three 'shafts of success' to improve public acceptance: (i) trust and transparency, because it takes years to earn the trust and only minutes to lose it, hence trust and transparency should not be risked under any circumstances; (ii) independent and trusted authorities; (iii) people's own long experience of a reliable, job-creating, tax-paying, and transparent nuclear industry.

Figure 1-12: Annual Poll by the Finnish Energy Association, 1983–2016



Source: Pohjonen (2018).

1-5. Status in the Republic of Korea

By the end of March 2018, 24 nuclear power stations were in operation in the Republic of Korea, and the country has consistently promoted nuclear power, for example through public–private co-operation in promoting the export of nuclear power overseas. However, President Moon made a public commitment during the 2017 election period to establish a policy of moving away from the use of nuclear power. At the ceremony for the permanent shutdown of reactor No. 1 at the Kori Nuclear Power Plant, held in June 2017, he announced efforts towards abandoning nuclear power and expressed his intention to start with suspending the construction of reactors 5 and 6 at the Shin Kori nuclear power plant. It was then decided at a cabinet meeting that the fate of these units should be decided through a public debate in the form of deliberative polling. In July, the government established a public opinion committee comprised of nine members, including lawyers, to conduct the discussion on whether to resume construction of Shin Kori reactors 5 and 6.

Starting in August 2017, the committee contracted a Korean research company to commence telephone interviews with randomly sampled citizens. Of the 20,006 respondents, 500 who offered meaningful

opinions were invited to participate in a citizens' jury. Of this group, 478 accepted the invitation and participated in the debate.

In September, seminars organised by the Public Opinion Committee introduced the citizens' jury to opinions of experts from both sides of the debate – proponents of nuclear power as well as those opposing it. In addition, debate events were held on television and online, broadcast through the state media.

During October 13–15, a 3-day workshop was held in Seoul at which experts who were for and against the use of nuclear power delivered presentations. This was followed by group discussions. Of the 478 members on the citizen's jury, 471 attended this event. On the final day, the 471 members of the jury voted to resume construction of Shin Kori reactors 5 and 6 by a majority of 19 percentage points, with 59.5% in favour and 40.5% against. Concerning the future of nuclear power generation, 53.2% felt that it should be scaled down, 35.5% felt that the current status should be maintained, and 9.7% felt that nuclear power should be expanded (Yonhap News Agency, 2017). In light of these results, the Public Opinion Committee recommended that the government resume the construction of Shin Kori reactors 5 and 6 and scale down nuclear power generation in the future.

Based on these recommendations, the Office of the President announced President Moon's decision to resume preparations for the construction of Shin Kori reactors 5 and 6 on 22 October, and this was endorsed by the Cabinet on 24 October. The President also announced a policy of gradually reducing the country's dependence on nuclear power in the future, based the outcome of the citizens' jury. During the Cabinet meeting where it was decided to resume construction of Shin Kori reactors 5 and 6, proposals were also put forth to withdraw plans for new builds, including Shin Hanul reactors 1 and 2, to prohibit design lifespan extensions for 14 existing nuclear reactors reaching the end of their lifespans in 2038, and to prematurely retire reactor 1 at the Wolsong nuclear power plant (the second-oldest reactor).

Despite having decided not to expand the scale of nuclear power generation in the Republic of Korea, President Moon acknowledges that the strategy of exporting nuclear power technology benefits the Republic of Korea both economically and in terms of international relations, and he has declared a policy of continuing to actively promote the international expansion of nuclear power.

The adoption of a contradictory policy for domestic new builds and nuclear exports may be intended to avert criticism from citizens who are concerned about potential economic losses of phasing out nuclear power, while gradually fulfilling his commitment to his core group of supporters to phase out nuclear power at home.

The President has put particular focus on attracting the interest of the public during elections and has succeeded in winning the support of non-governmental organisations and those with a strong awareness of environmental issues through moves to phase out nuclear power. For this reason, he had no choice but to maintain the stance of abandoning nuclear power. However, the policy of phasing out nuclear power roused strong voices of concern – mainly from industry – that it would result in the loss of the foundation that underpins the domestic nuclear supply chain as well as the stable operation of domestic plants. As a result, the administration was caught in a dilemma. The overseas export policy allowed this deadlock to be broken, as even those who were opposed to the use of nuclear power within the country had indicated support for overseas exports from the perspective of economic benefits and increased employment, particularly for small and medium-sized enterprises.

In addition, the formalising in recent years of preparations to join an international bid to construct two large-scale nuclear reactors in Saudi Arabia is also considered to be one of the reasons why the administration intends to maintain its nuclear exports. Winning the Saudi Arabia deal would be on par with the United Arab Emirates' Barakah Project winning bid led by the conservative past administration. Hence, the current administration hopes to win the support of more conservatives in addition to the existing constituency.

1-6. Summary of public perception of nuclear power

Although the results of the poll vary considerably depending on the research method and the questions, framework, and other factors, it is clear that public opinion has had a significant impact on nuclear power policies in each country. The success stories in the West underline that continuous efforts by the reactor operators to improve safety is a prerequisite for such success, while each government needs to promote energy policies in a responsible manner. Furthermore, co-operation between the government and the private sector in disseminating information helps to gain the understanding of citizens. Data also show that if the government maintains a consistent policy and citizens receive adequate information, public acceptance of nuclear power will improve. Hence, it is important to disseminate information about policies and provide information in a continuous and consistent manner. Moreover, the information disseminated should not only emphasise the technical aspects or the safety of nuclear power, but also explain why nuclear power is necessary.