

GET1024 / GEC1036 Lecture 21

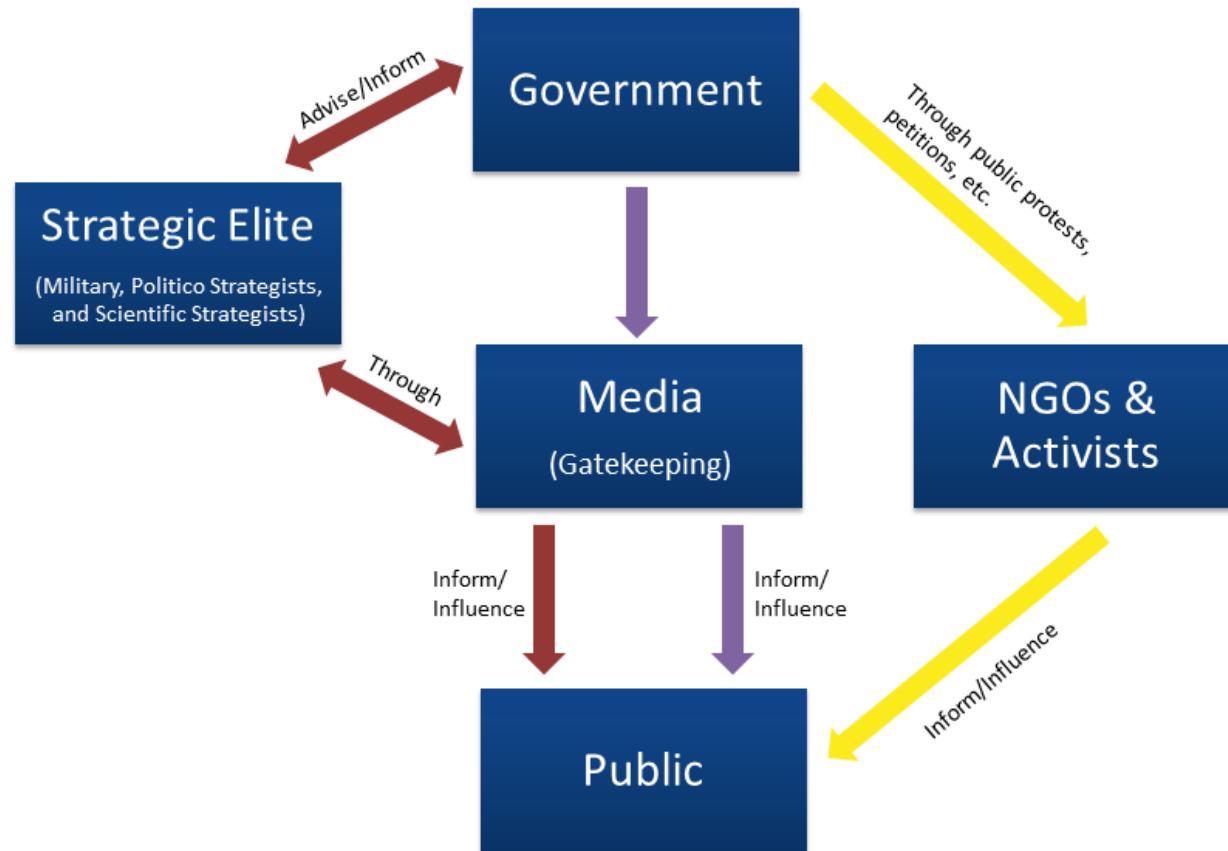
Public Perception on Radiation II

Influences & factors affecting
results of survey

Surveys to understand Public
Perception

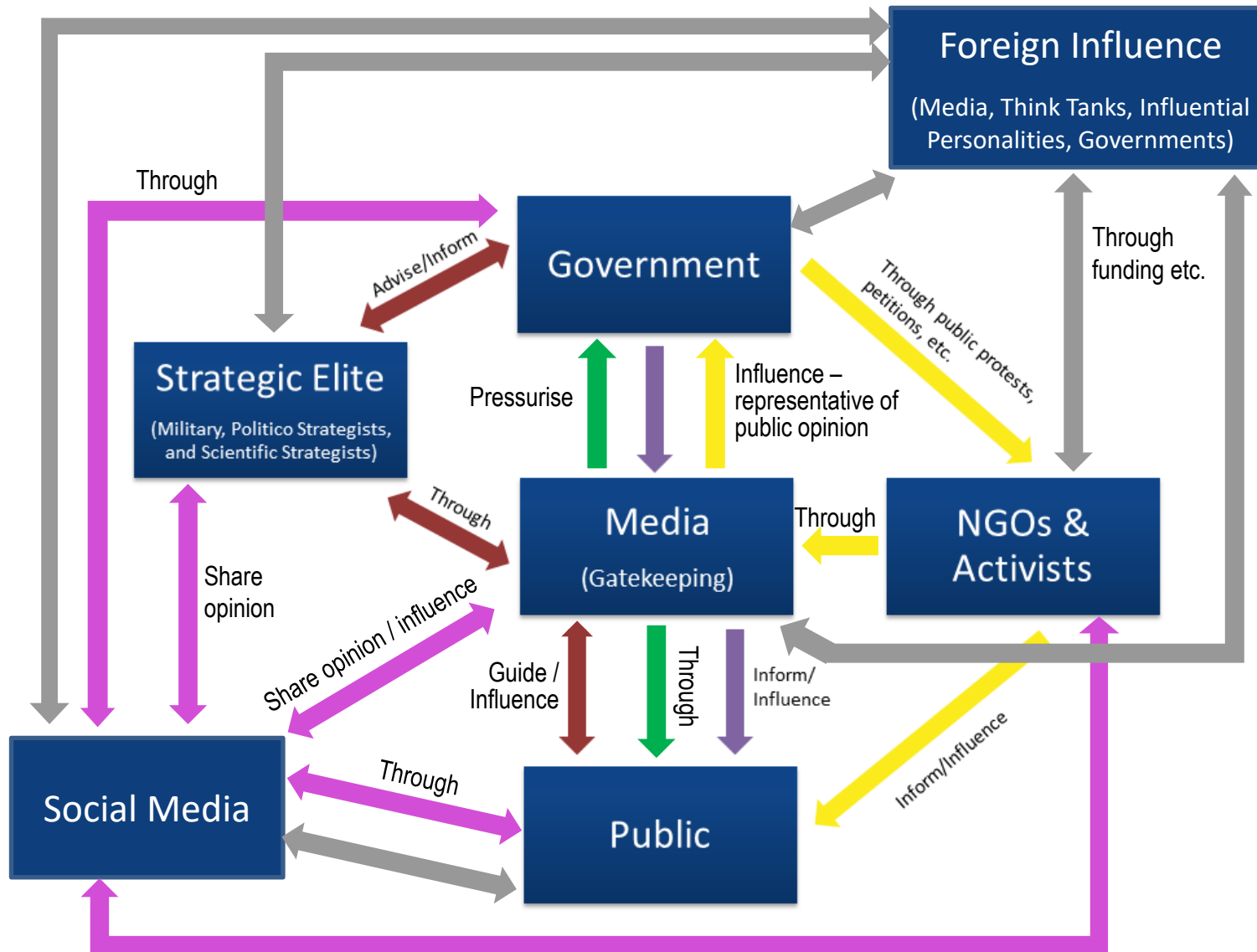
- FNCA Survey for 7 countries in Asia vs your response (in Survey 1)
- Survey in UK vs your response (in Survey 2)
- Survey in China

Past Influences of Public Attitudes



- Figure adapted from paper “Assessing Indian Nuclear Attitudes”¹
- Relevant to the experience of many other countries. May still represent the current situation in some (though decreasing rapidly in number) countries.

Current Influences of Public Attitudes



- More two-way influences than before even for those influences present in the past.
- Additional influences of social media and foreign influences
- Public opinions have greater influence than before

Factors Affecting Survey Results

➤ Participants of Survey

- Age, Gender, Nationality, Education level, Income, Urban vs Rural, have some or little understanding of radiation and operation of nuclear power
- Misconceptions that participants may have
- Trust of government / government transparency and past record (may be related to countries)

➤ The Phrasing of Questions

- Use of some adjective, e.g., safe vs safer
- Conditions – if situated near your residence vs far away (NIMBY), if country economy is affected badly, if it is only option, if it improves climate change, etc.

➤ Organizations conducting surveys

- May be tied with choice of questions / phrasing of questions and possibly survey targets or methods of survey.

FNCA Survey:

Japan, China + 5 SE Asian countries
(compared with Survey 1 you took)

FNCA Survey

- Survey conducted by Forum for Nuclear Cooperation in Asia (FNCA)¹ in 2010 (before Fukushima)
- FNCA is based in Tokyo with the participating countries: Australia, Bangladesh, China, **Indonesia**, Japan, Kazakhstan, Korea, **Malaysia**, Mongolia, **The Philippines**, **Thailand** and **Vietnam**.
- The survey focuses on the awareness and interest in energy in general, and in nuclear energy in particular. It also captures the way information on nuclear energy is obtained and how the students feel about the reliability of these sources.

Country	High Sch	University	Total	Male	Female
China	488	336	824	58.7%	40.7%
Indonesia	219	96	315	46.3%	53.7%
Japan	302	568	870	58.9%	41.0%
Malaysia	322	306	628	37.6%	62.4%
Philippines	322	434	756	47.8%	51.9%
Thailand	210	359	569	64.9%	35.0%
Vietnam	472	401	873	69.2%	30.8%

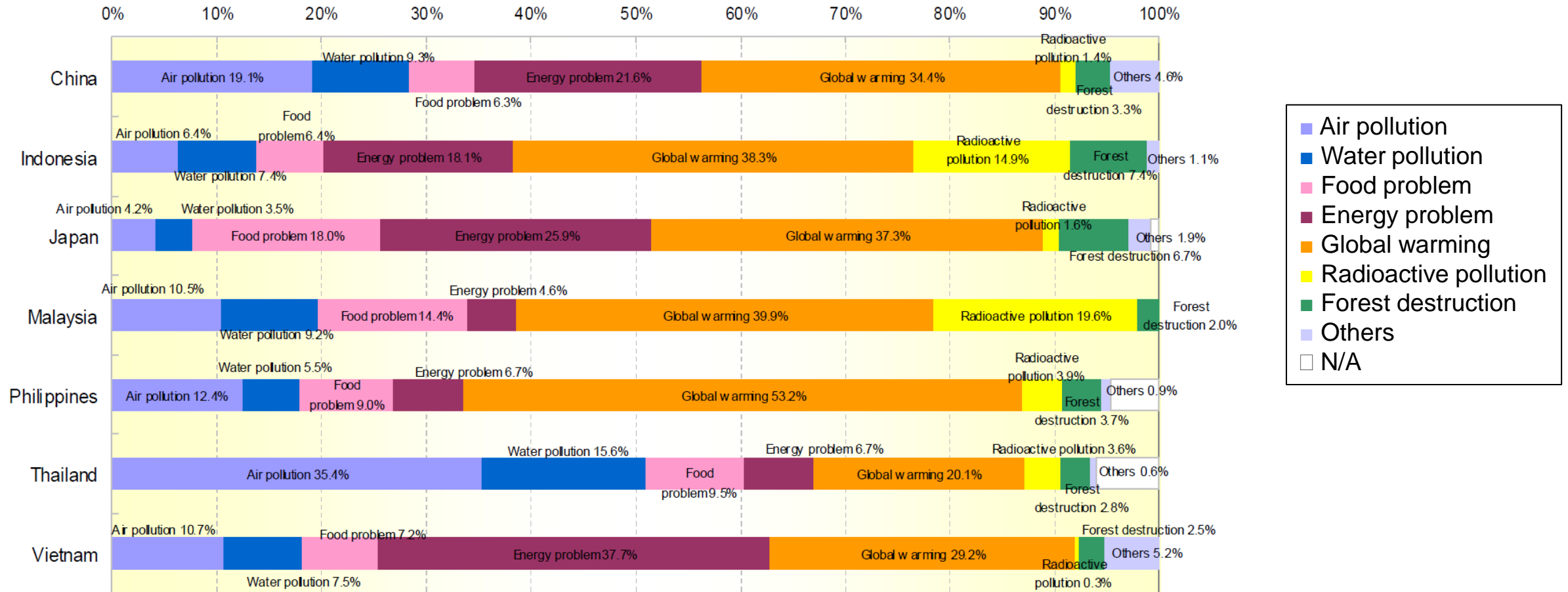
Table shows some statistics of participants of this survey (http://www.fnca.mext.go.jp/english/pi/public_opinion_survey.pdf).

Comparison of your response were made with the response of the university students in these seven countries are presented in the next few slides.

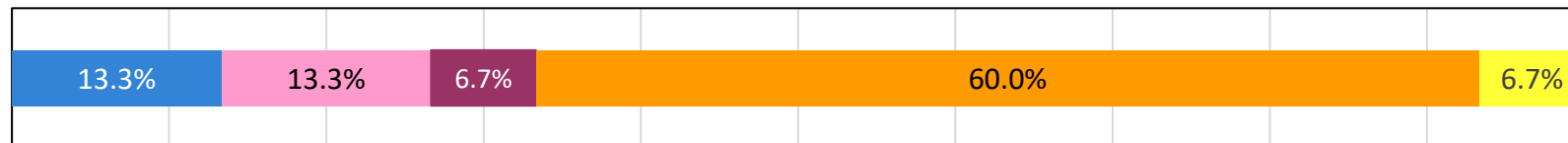
¹ <http://www.nnc.kz/en/cooperation/about-fnca.html>₆

Most Concerned Issue

1. Which of the following issues are you most concerned with?

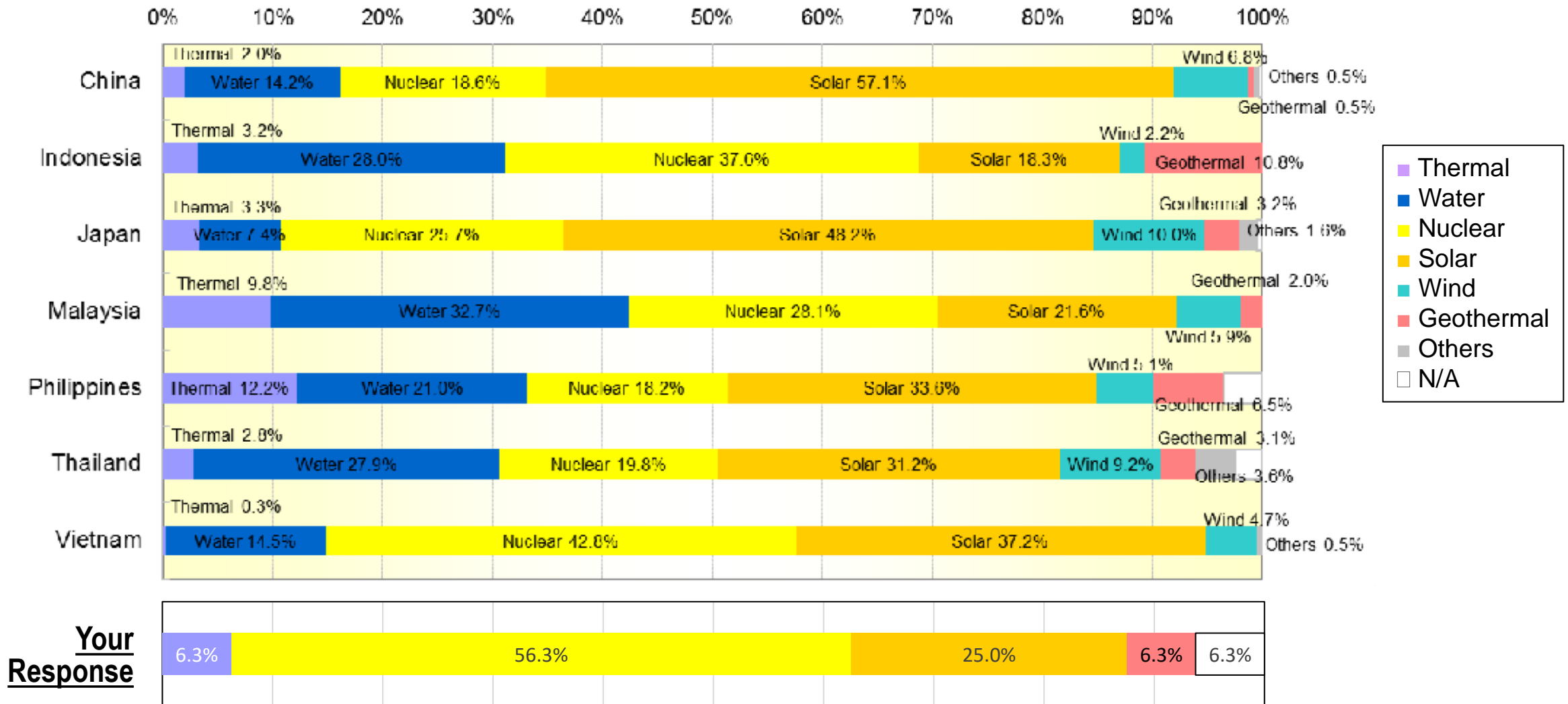


Your Response



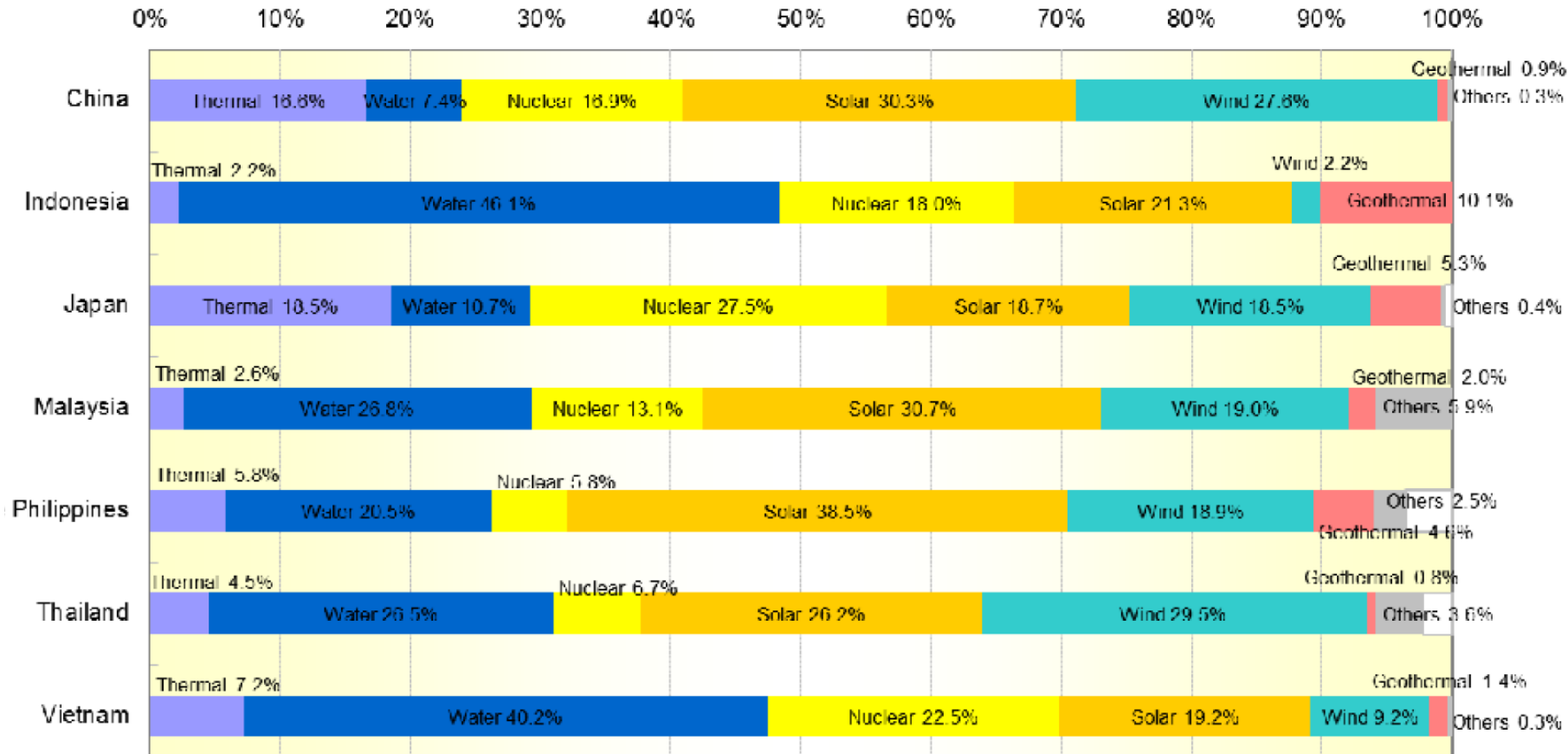
Best Method of Power Generation

2. Which method of power generation do you think is the best?

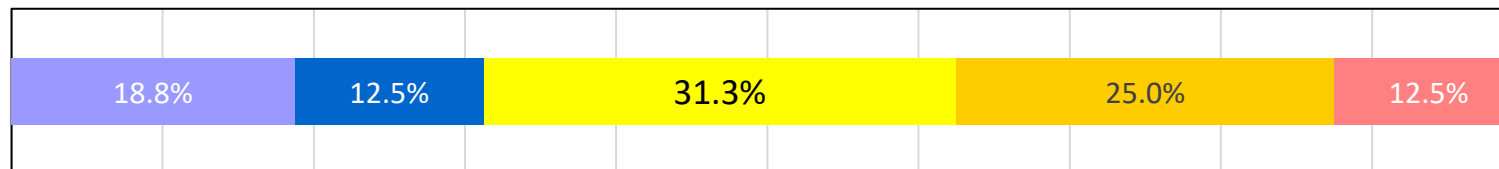


Lowest Electricity Cost

3. Which method of power generation do you think has the lowest electricity cost?

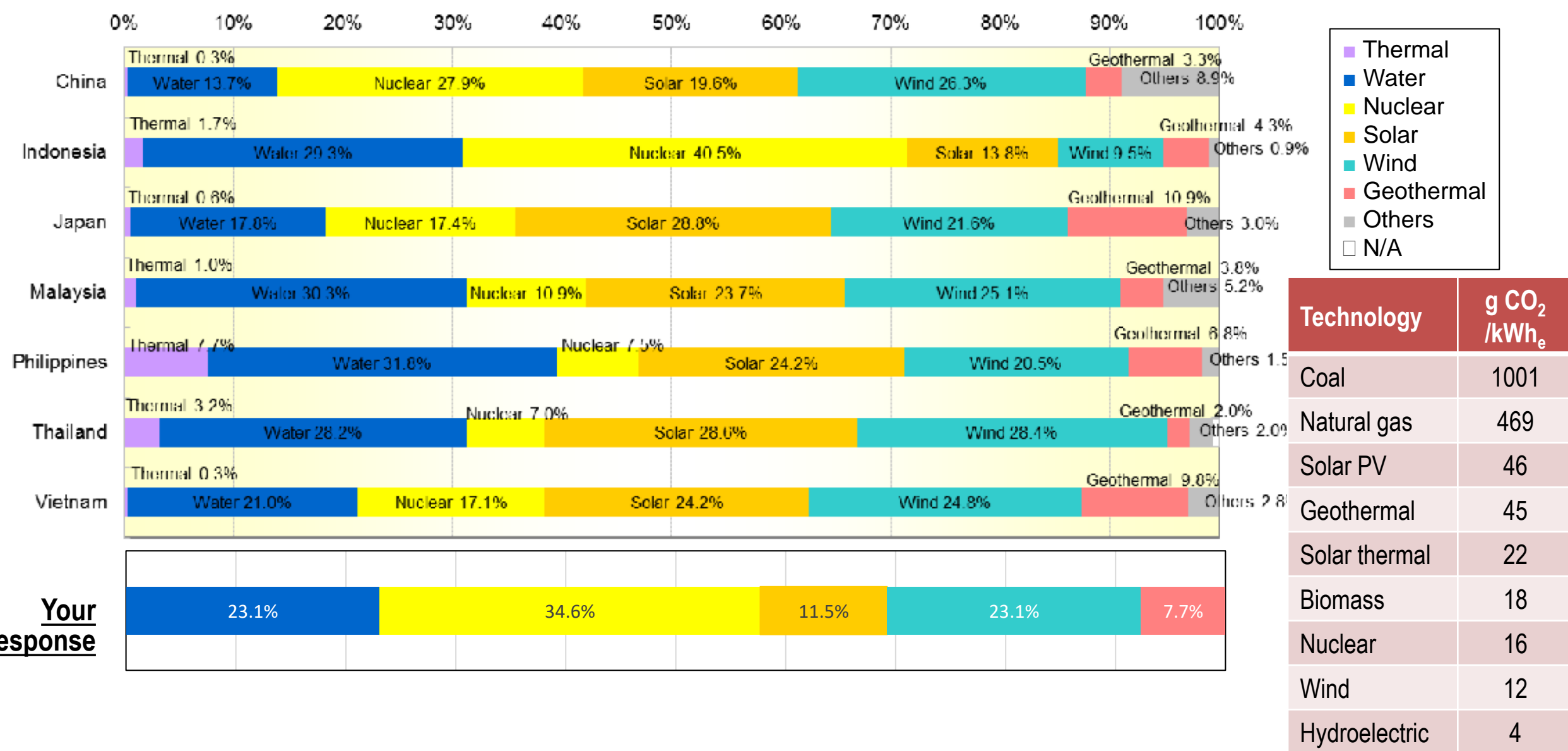


Your
Response



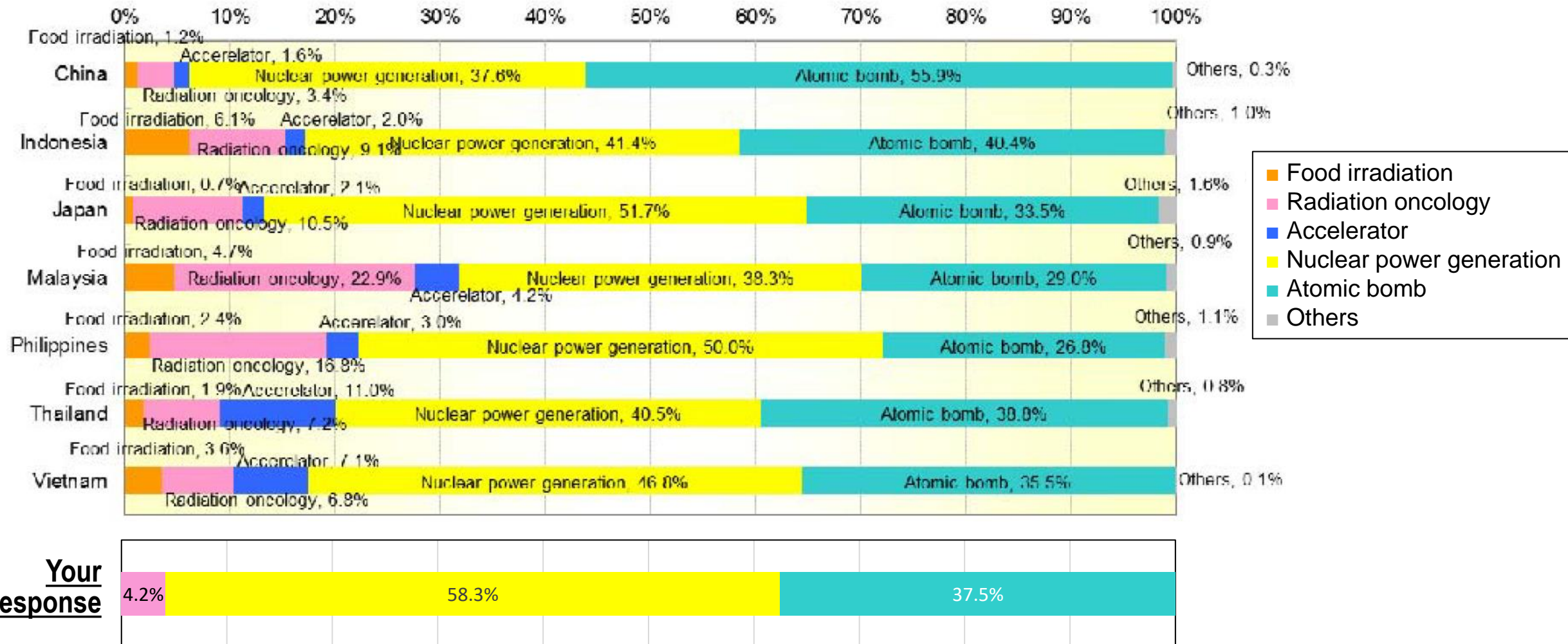
Least CO₂ Production

4. Which method of power generation do you think emits less carbon dioxide (CO₂) when generating electricity?



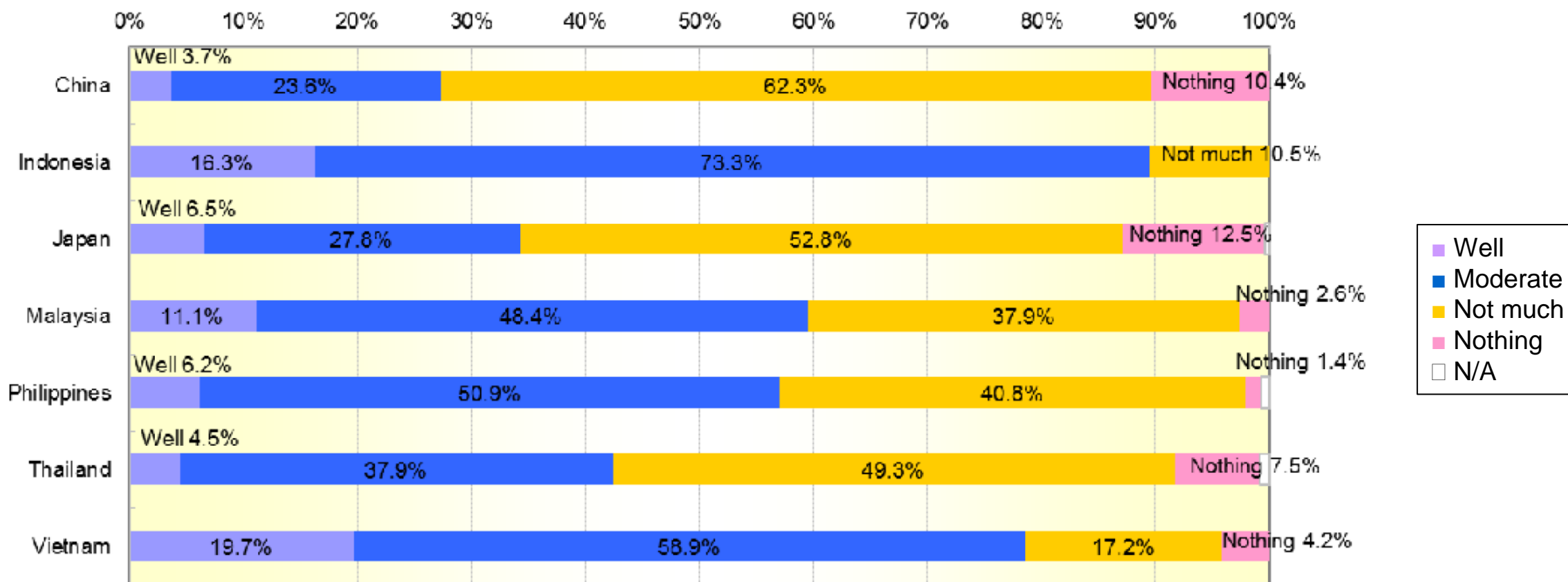
Word Most Associated with “Nuclear Energy”

5. What comes into your mind when you hear or read the word “nuclear energy”?

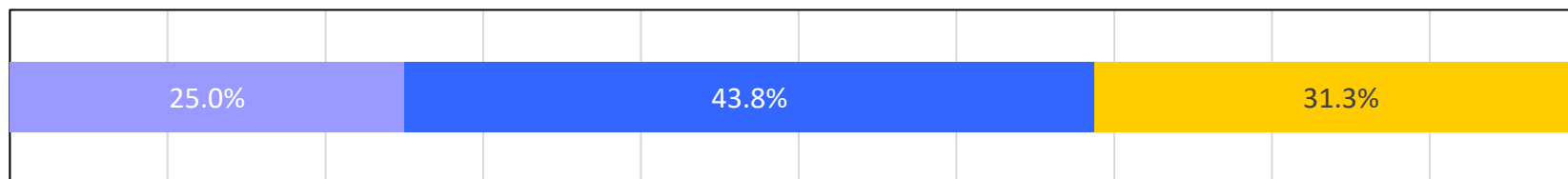


Knowledge about Nuclear Power

6. What is the extent of your knowledge about nuclear power?

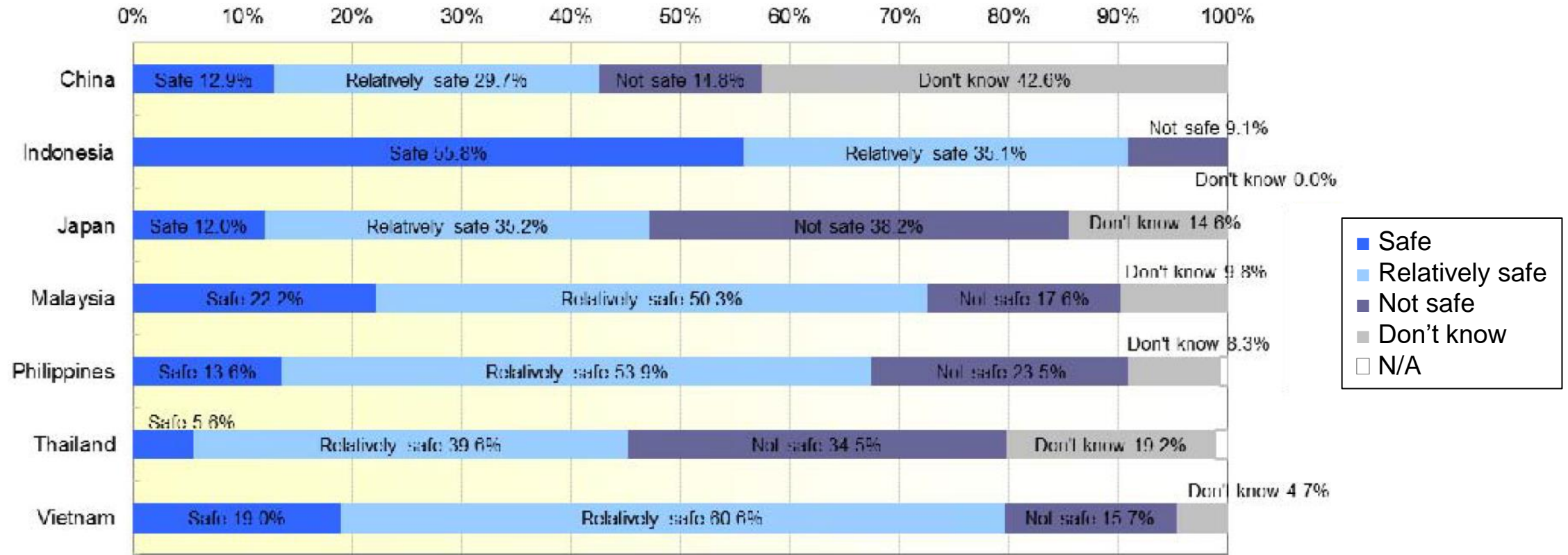


Your
Response

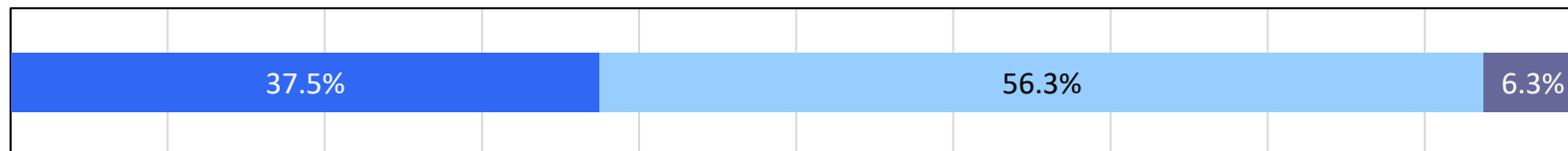


Safety of Nuclear Power

7. Do you think nuclear power is safe or not?

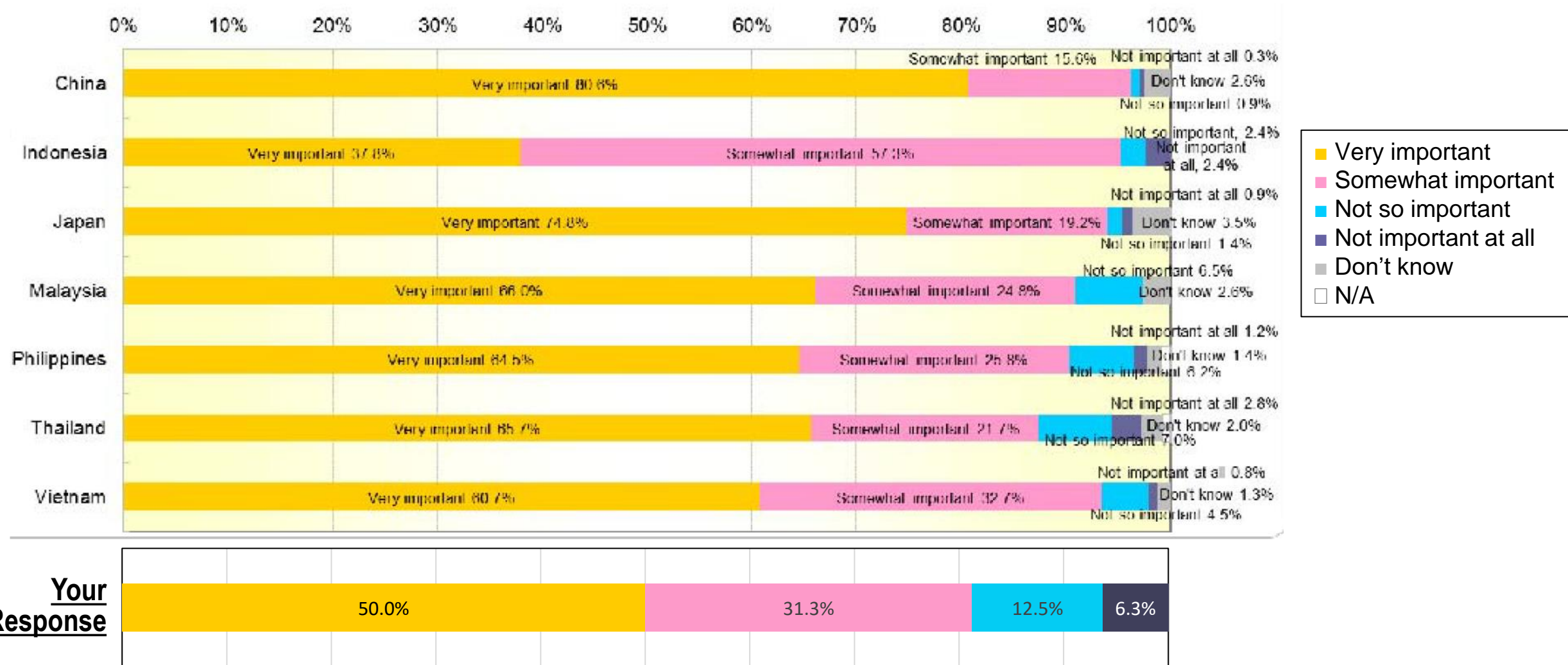


Your Response



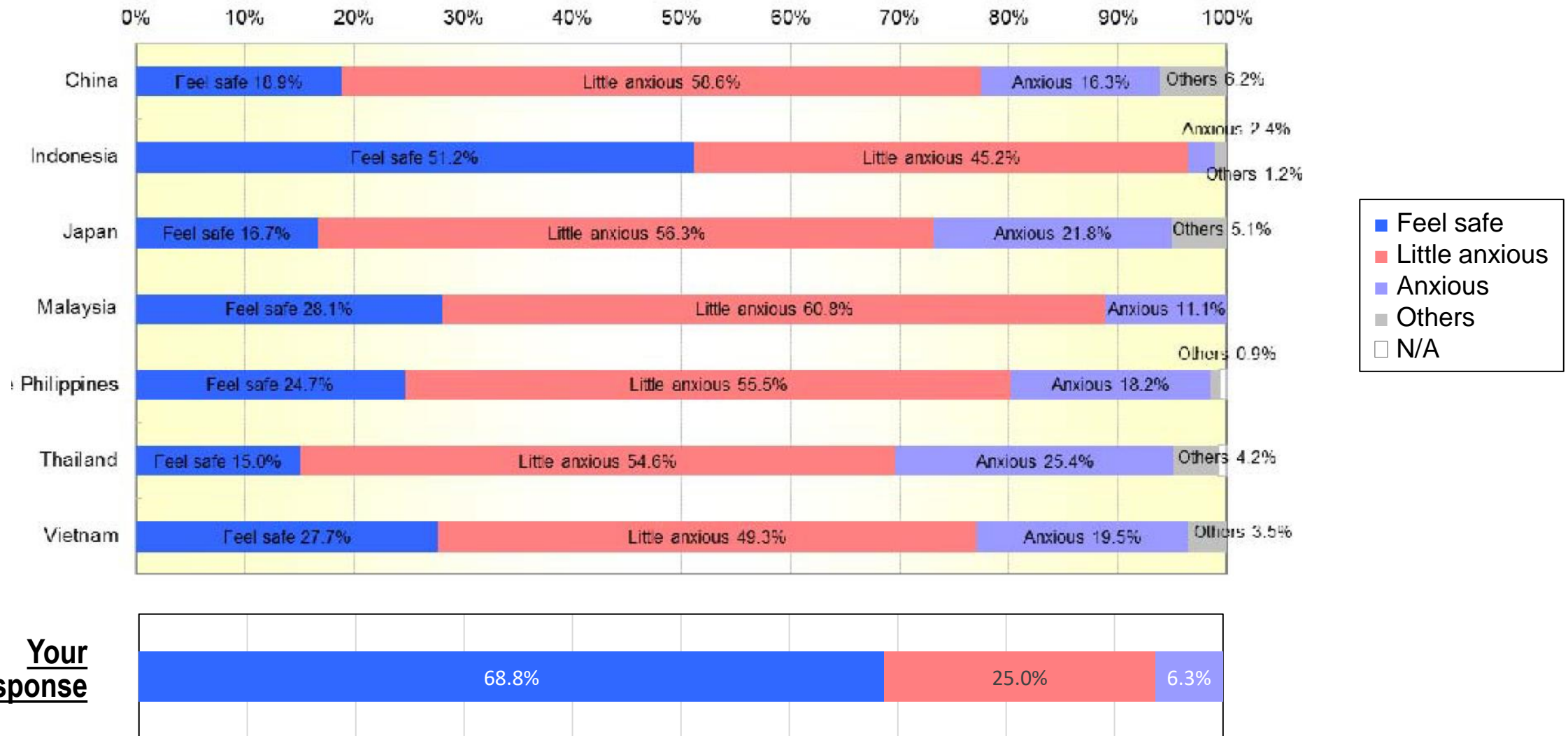
Public Acceptance Important for Construction

8. In your opinion, is public acceptance important for construction of nuclear power plant?



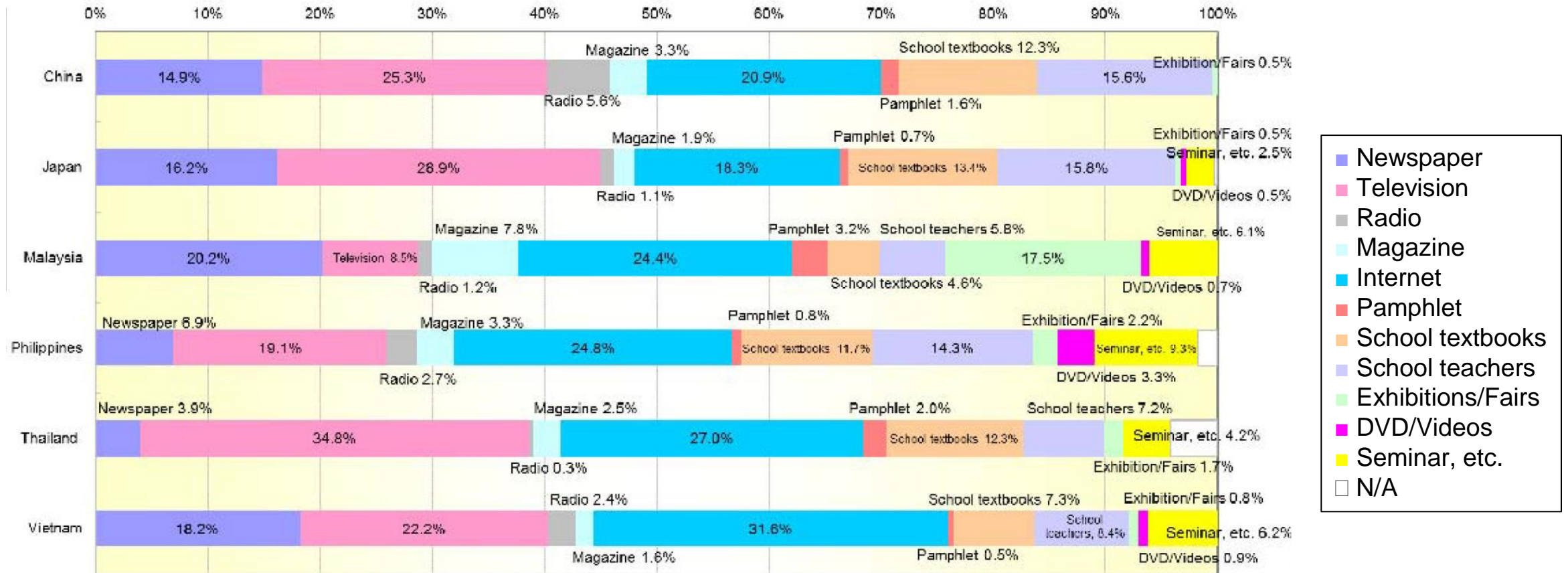
Opinion on Food Irradiation

9. Radiation is used in various fields. What is your opinion on “food irradiation” which sterilizes foods using radiation?

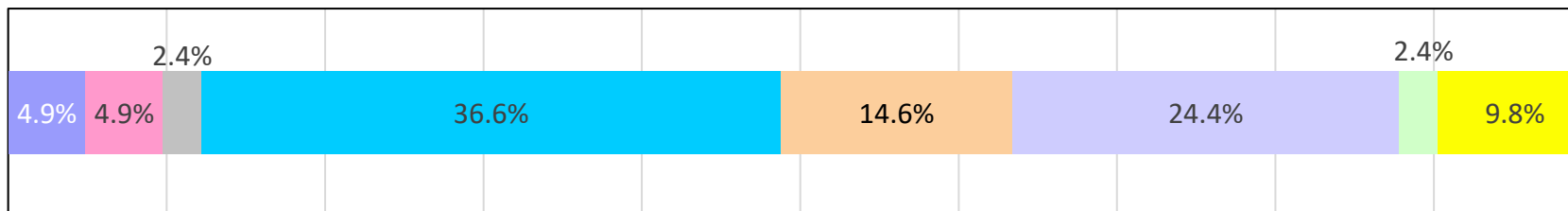


Sources of Information on Nuclear Power

10. From which sources of information do you usually get your information on nuclear power?

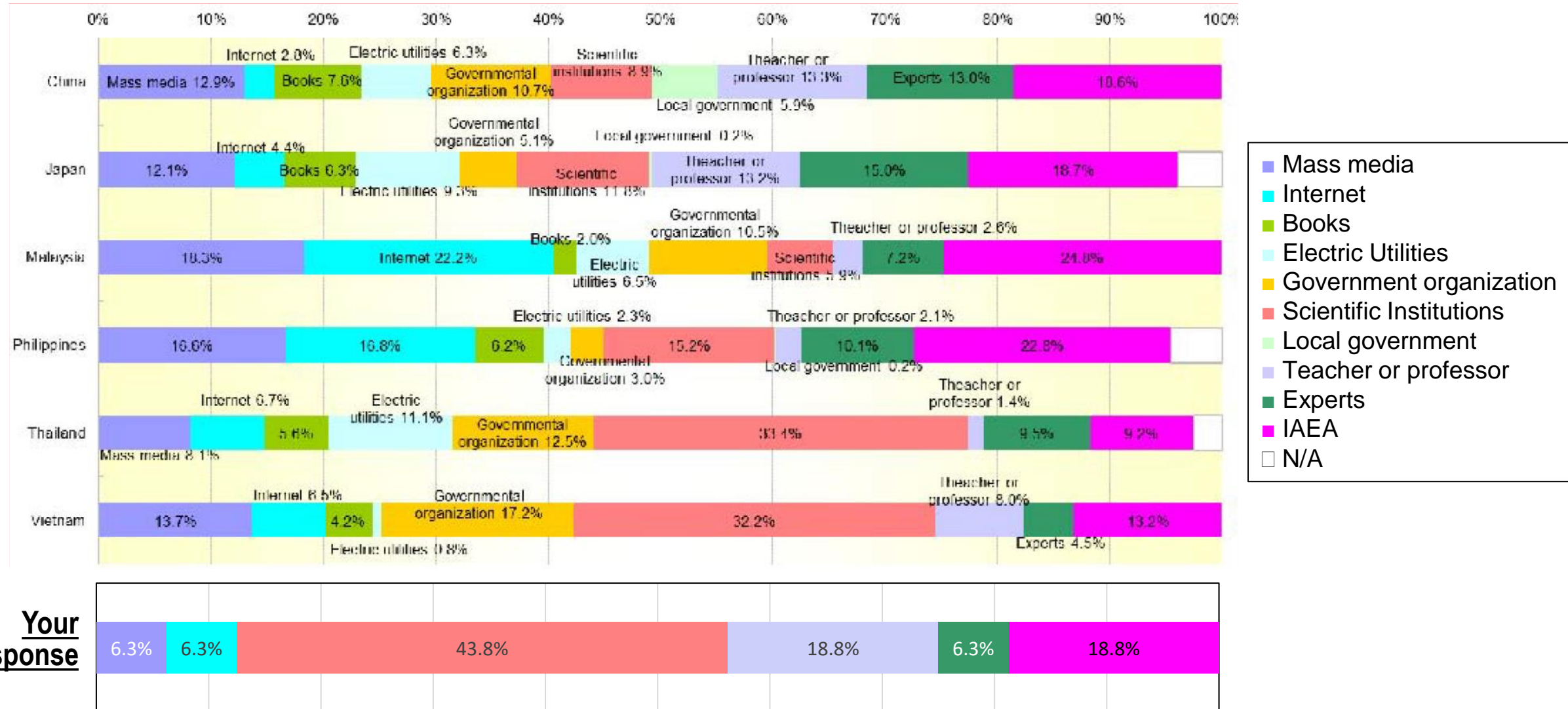


**Your
Response**



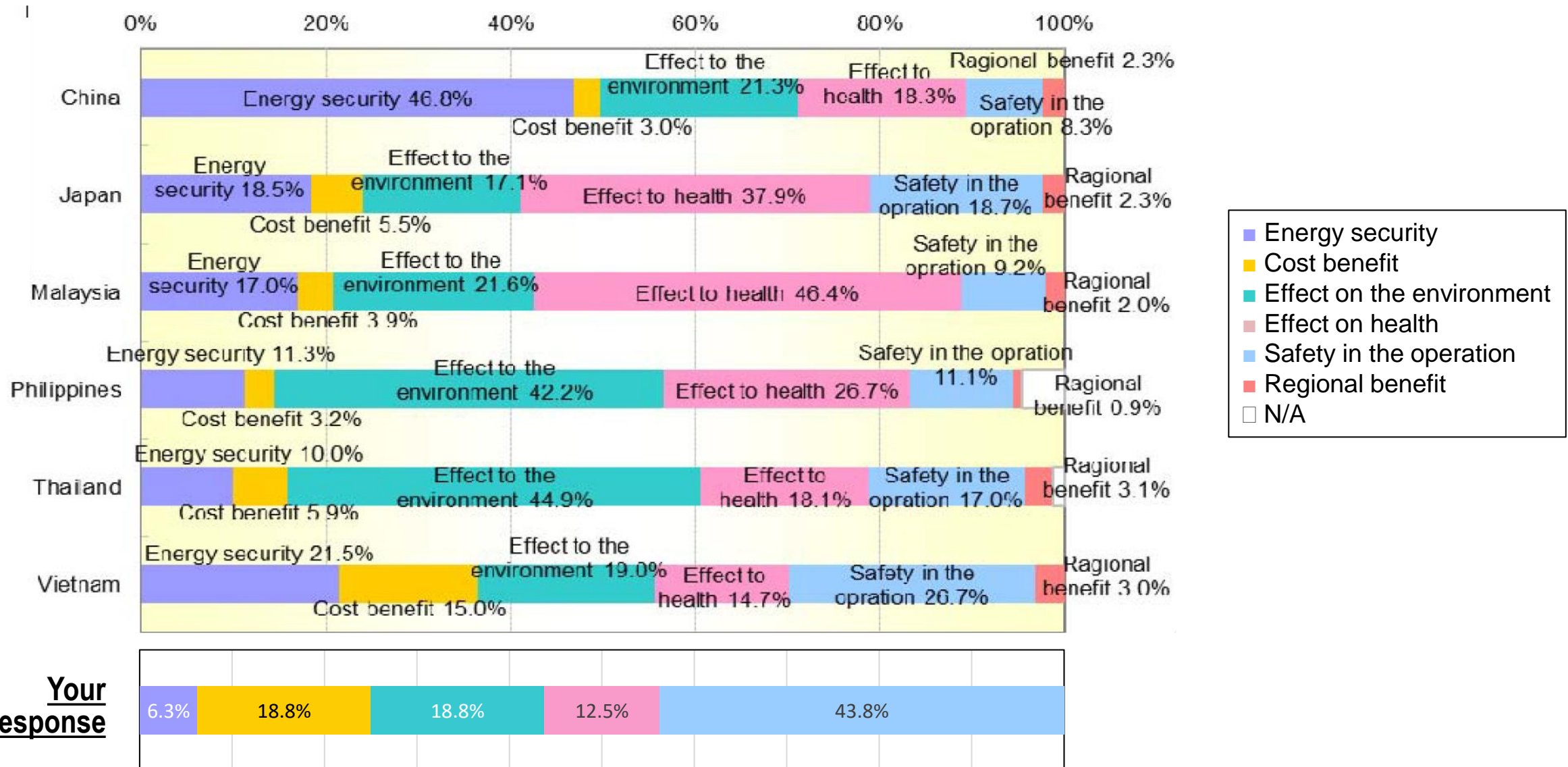
Most Reliable Sources of Information on NP

11. Which source do you think is the most reliable for obtaining information on nuclear power?



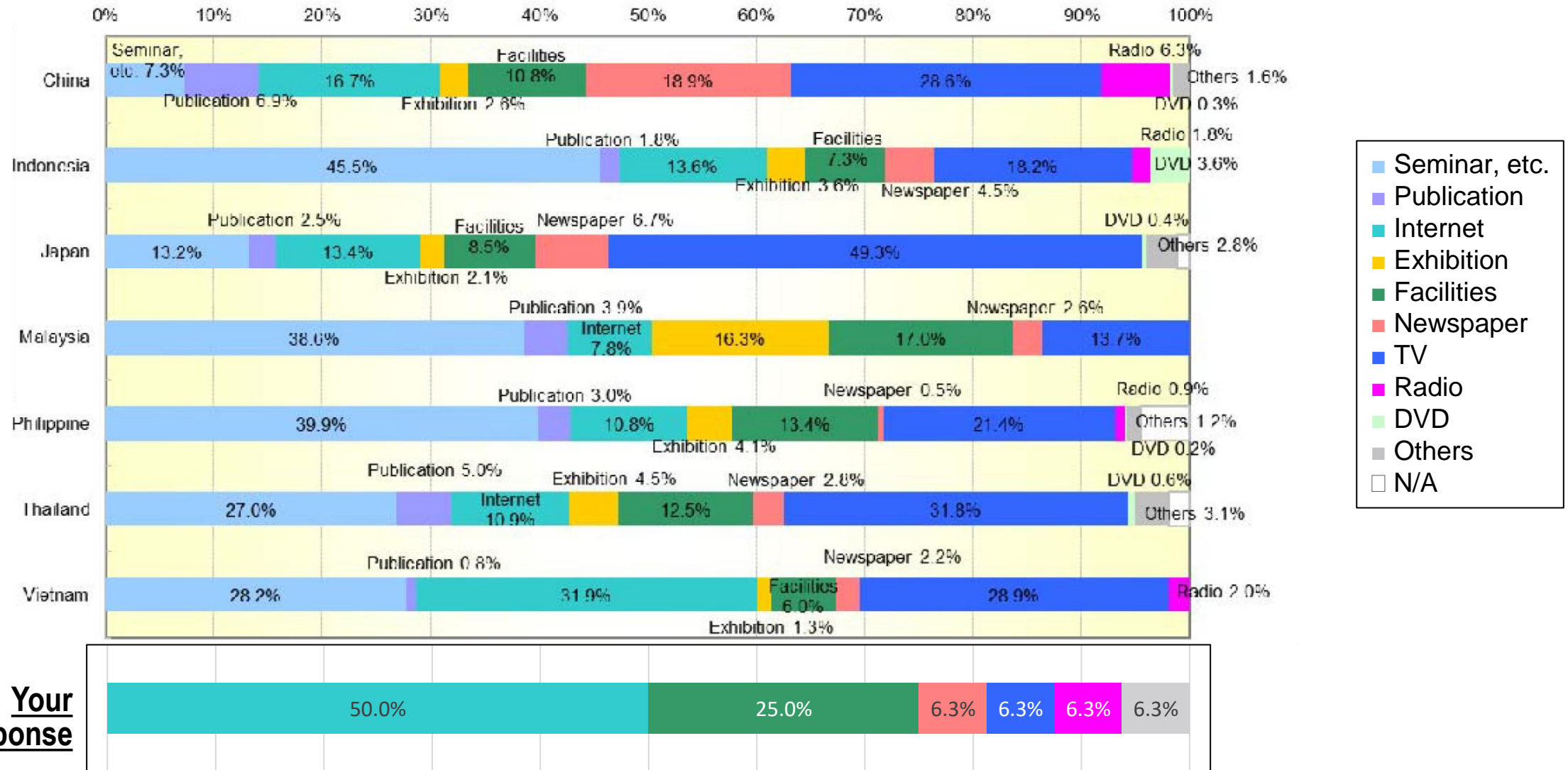
First Information on NP Respondents Want

12. Which is the first information on nuclear power do you want to know?



Most Effective Communication Tool

13. Which communication tool do you think is the most effective?



Some Observations on FNCA Survey

- Global warming (climate change) was considered to be most concerned issue for many participants in various countries. Related to and quite close behind in terms of level of concern are energy problem and air pollution.
- Overall, solar energy is favourite for most countries while nuclear energy does not fair too badly.
- In terms of cost of production and amount of CO₂ produced, there are quite varied views. (Good data for these are available – though pro- and anti-nuclear groups may present them very differently.)
- In terms of knowledge about NPP, it is rather surprising that participants in the two countries with NPPs indicated least knowledge while participants in Indonesia felt that they are knowledgeable.
- For most participants, there is still a very strong association between “nuclear energy” and “atomic bomb”.
- Public acceptance is considered by all to be very important before construction.
- On sources of information for nuclear energy, internet ranks very high both as sources as well as most effective means of communication even though few participants put it as the most reliable source, which for many participants are scientific institutions, experts or international organizations such as IAEA. [⇒ Experts should use Internet to provide information!]

Surveys in UK:

(compared with Survey 2 you took)

Survey on Public Perception in UK (Survey 2)

- Following slides are based on a survey on public perception on nuclear power in 2013 in UK by Anna Marie Mack¹ and the Survey 2 you did during the last lecture.
- Again, the survey focuses on public opinion on various energy sources in general and then specifically on nuclear energy.
- The survey was conducted online with 72 voluntary participants.
- This may not be representative of the general population as it is more likely to bring in younger audience with strong interest in nuclear energy – either for or against.
- The profile of the participants was given on right.

Gender			Age		
Characteristic		%	Characteristic		%
Gender	Male	41.67%	18 or under		4.17%
	Female	56.94%	19 - 29		58.33%
	Rather not say	1.39%	30 - 39		11.11%
Highest level of education			40 - 49		12.50%
			50 - 59		5.56%
			60+		6.94%
			Rather not say		1.39%
	No formal qualifications	0.00%	Employment Status	Full time working	38.89%
	GCSE/ O-Level	9.72%		Part time working	5.56%
	Vocational qualification	5.56%		Unemployed	0.00%
	A-Level or equivalent	43.06%		Retired	4.17%
	Bachelor's degree	20.83%		Student	48.61%
	Masters/PhD	1.39%		Looking after home/children	0.00%
	Still in full time education	11.11%		Other	1.39%
	Other	6.94%		Rather not say	1.39%
	Rather not say	1.39%			

¹Download at <http://clock.uclan.ac.uk/9014/6/Anna%20Mack%20-%20nuclear%20perception.pdf>

Opinions on Various Energy Sources

In general how favorable or unfavorable are your opinions on the following energy sources when used to produce electricity?

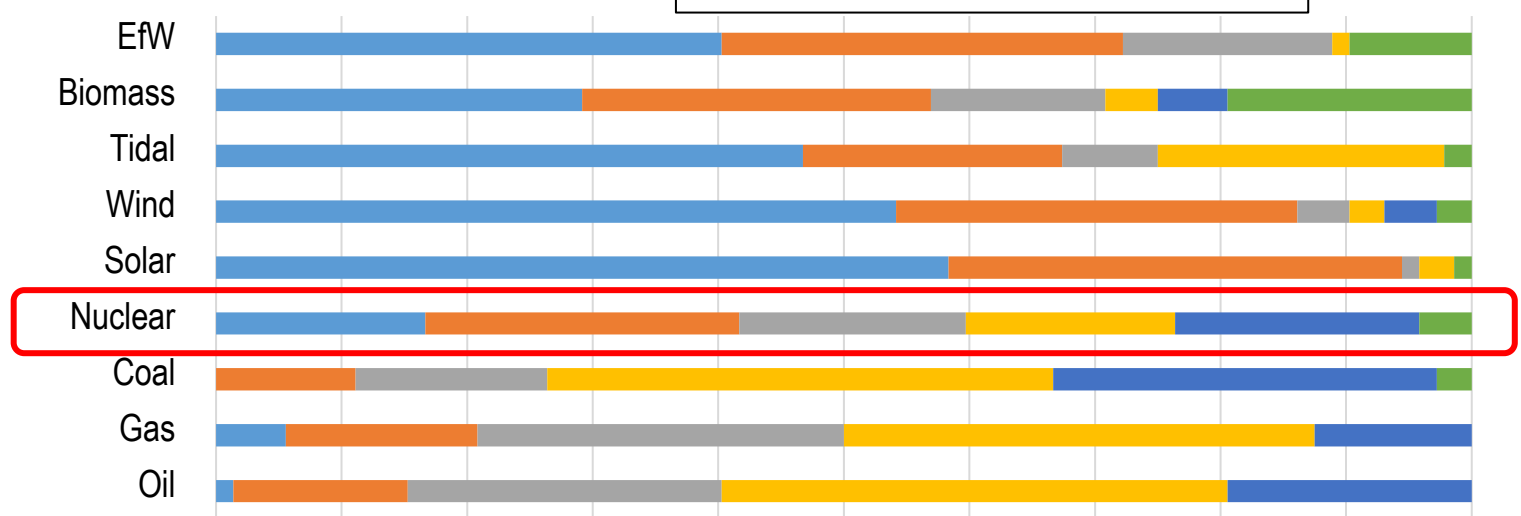
Very similar trends:

1. Renewables more highly favored
2. Fossil fuels – not favored.
3. Order for fossil fuels: gas, oil, coal.

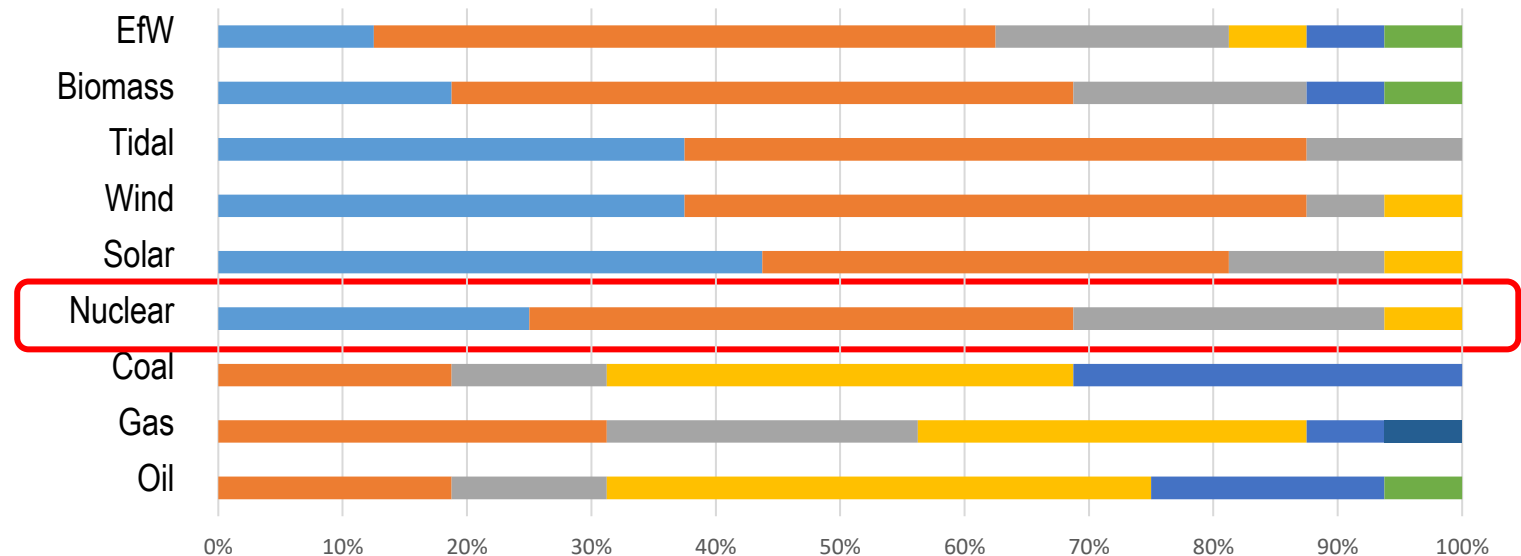
Differences: your response showed

1. More favorable towards nuclear

Response in UK



Your Response



Opinions on Various Energy Sources

In your opinion which statement is most relevant to each energy source?

Very similar opinions:

1. Non-renewables contributes to air pollution and climate change
2. Renewables are safe to use and has no harmful emission
3. Nuclear creates hazardous waste
4. Renewables are inefficient

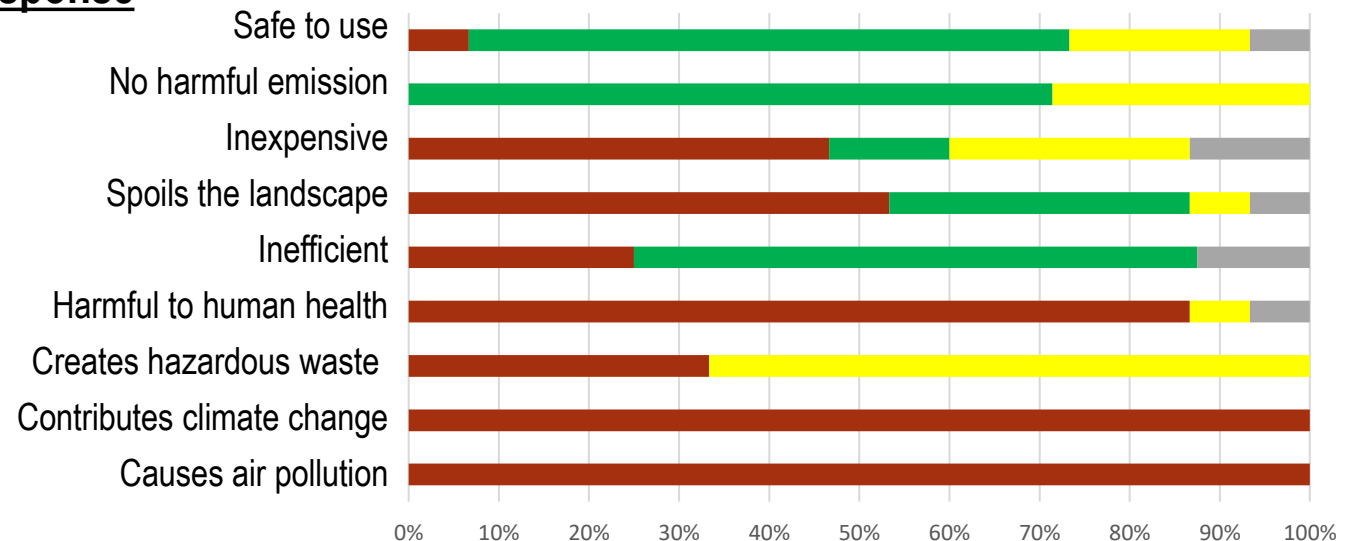
Differences: your response showed

1. More of you (but still < 30%) considered nuclear to be safe to use and has no harmful emission.
2. More of you considered non-renewables instead of nuclear to be harmful to health cf. those from UK.

Response in UK



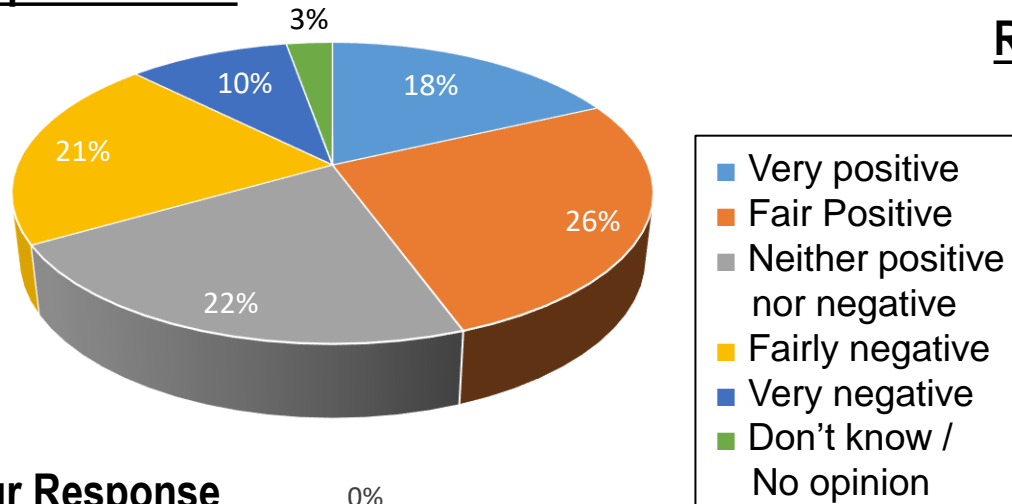
Your Response



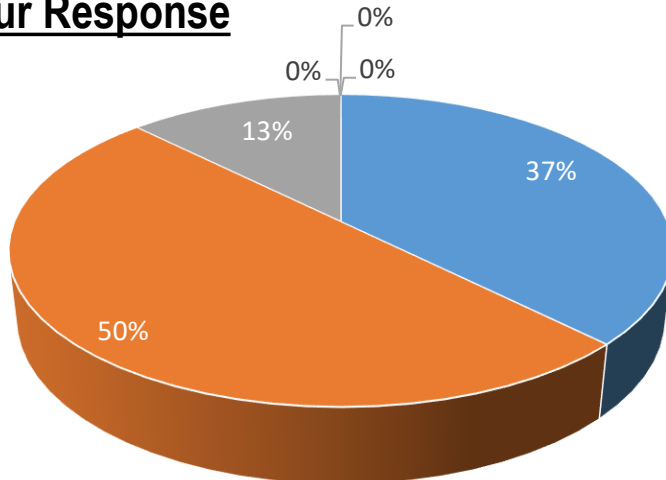
Opinions on Nuclear Power

What is your opinion of using nuclear power to produce electricity?

Response in UK

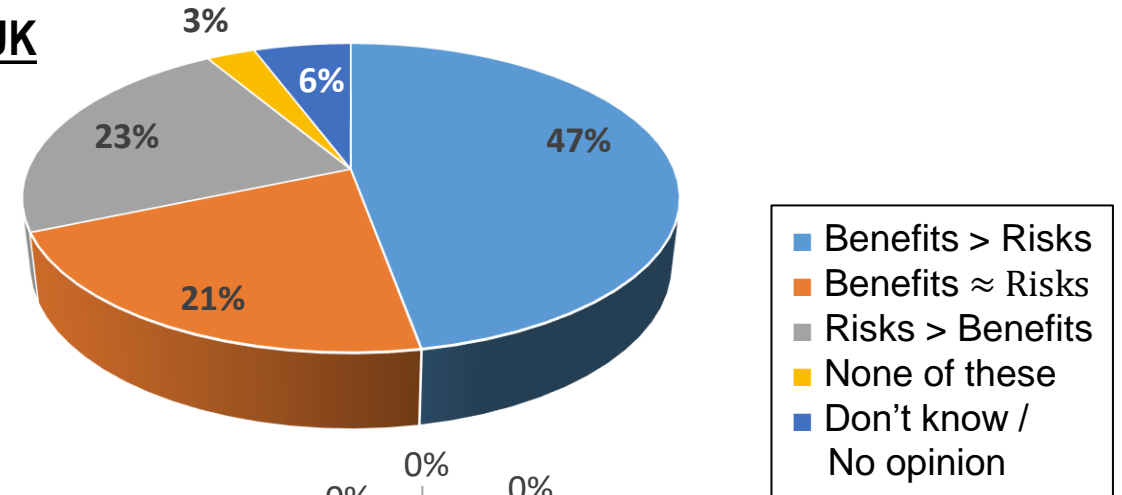


Your Response

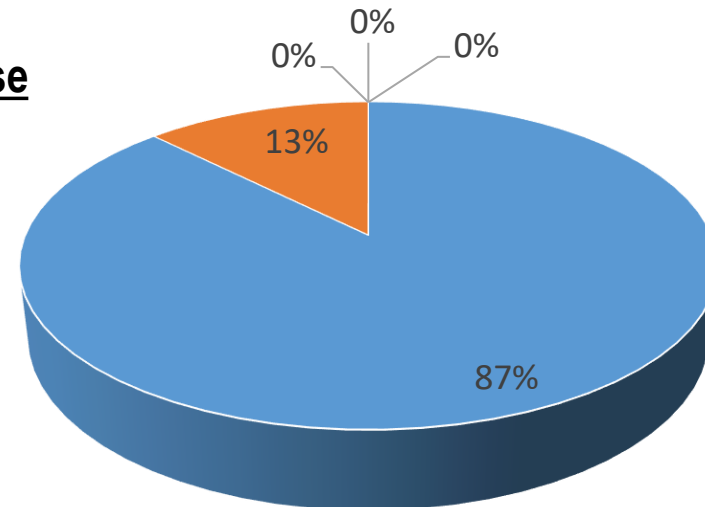


From what you know or what you have heard which of the following statements most closely represents your opinion on nuclear power?

Response in UK

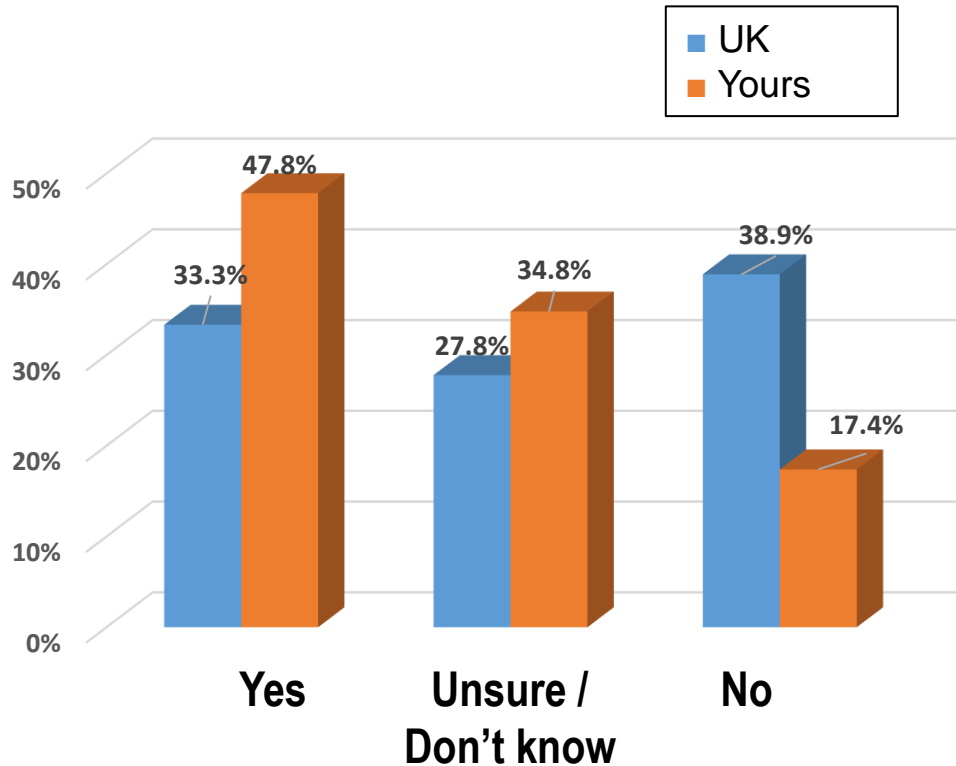


Your Response



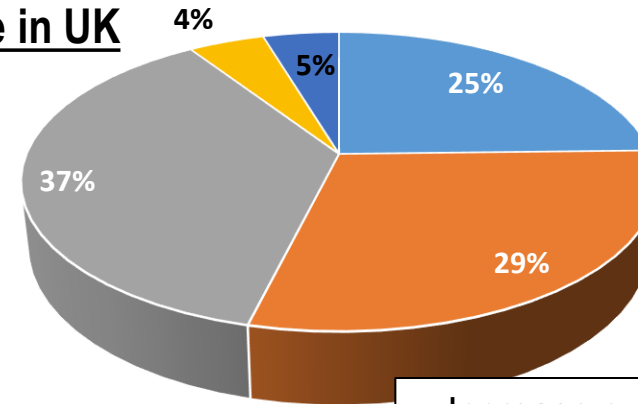
Opinions on Nuclear Power

In your opinion should Singapore / UK start to build nuclear power stations?

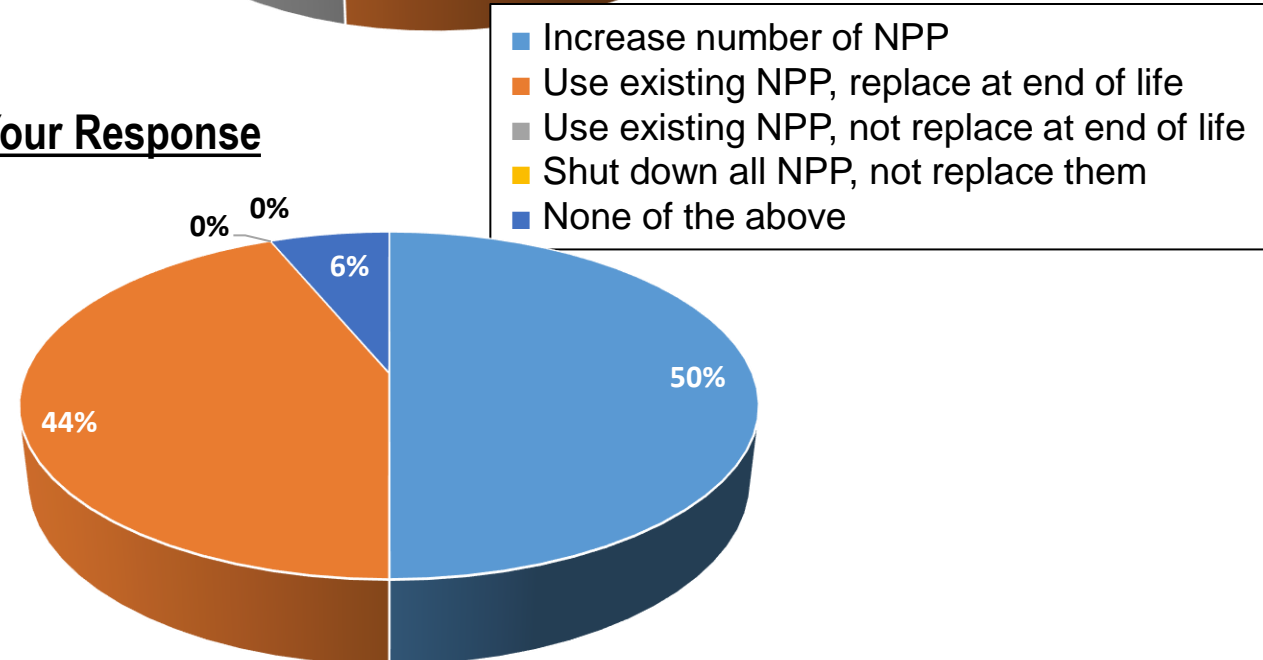


Which of the following statements about nuclear power best describes your own opinion?

Response in UK



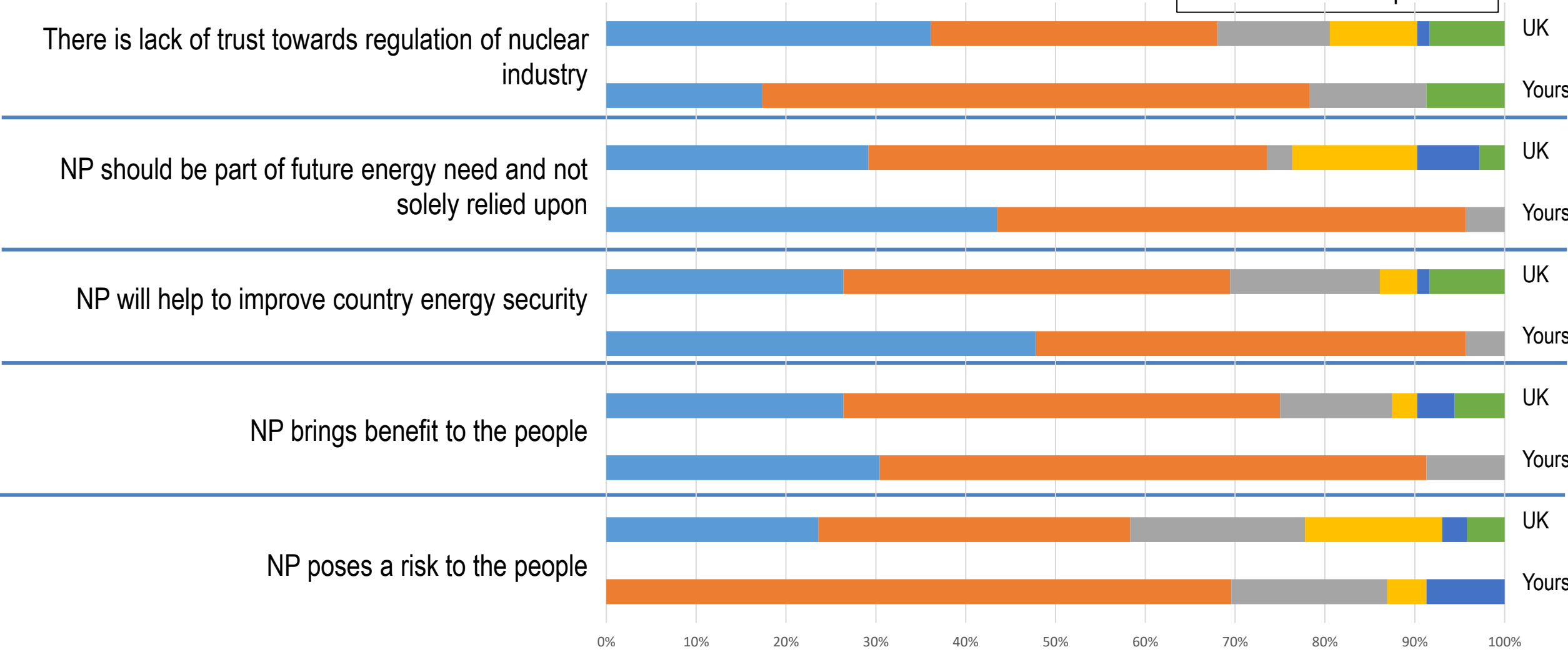
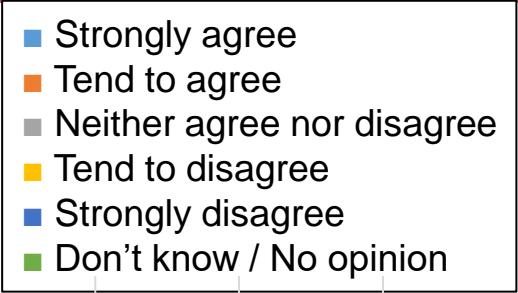
Your Response



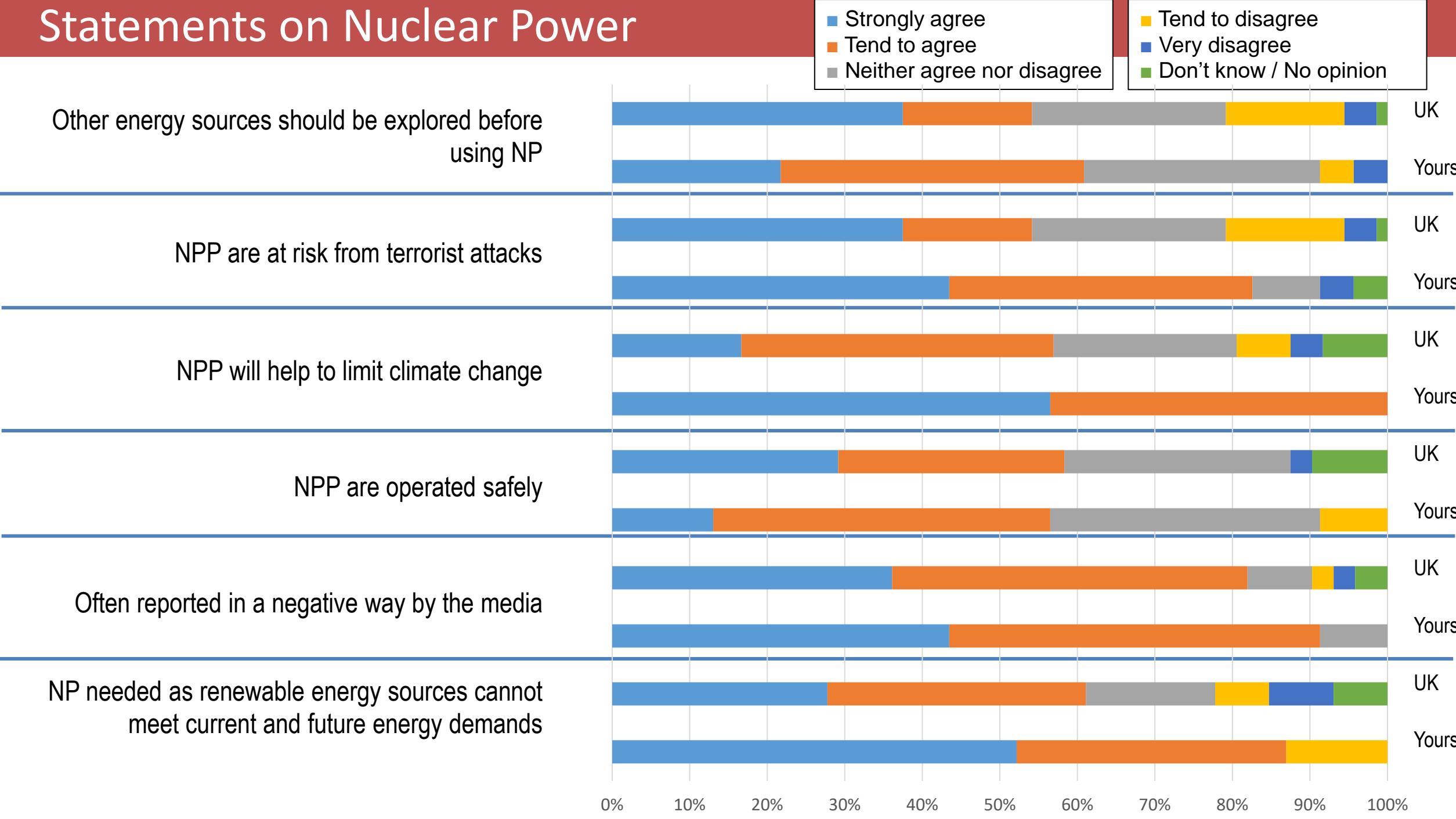
Statements on Nuclear Power

To each of the following statements about nuclear power in the country, please state to what extent you agree or disagree with each.

Q7 A-E

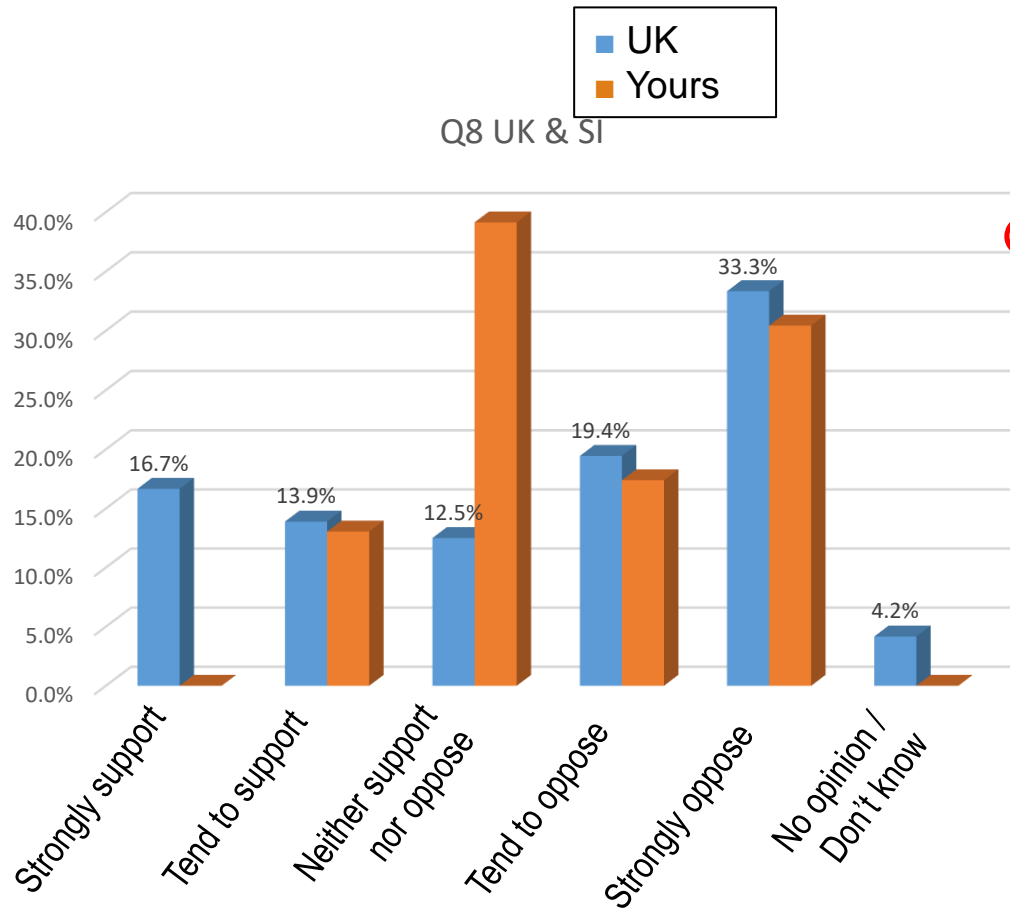


Statements on Nuclear Power



New NPP near One's Home

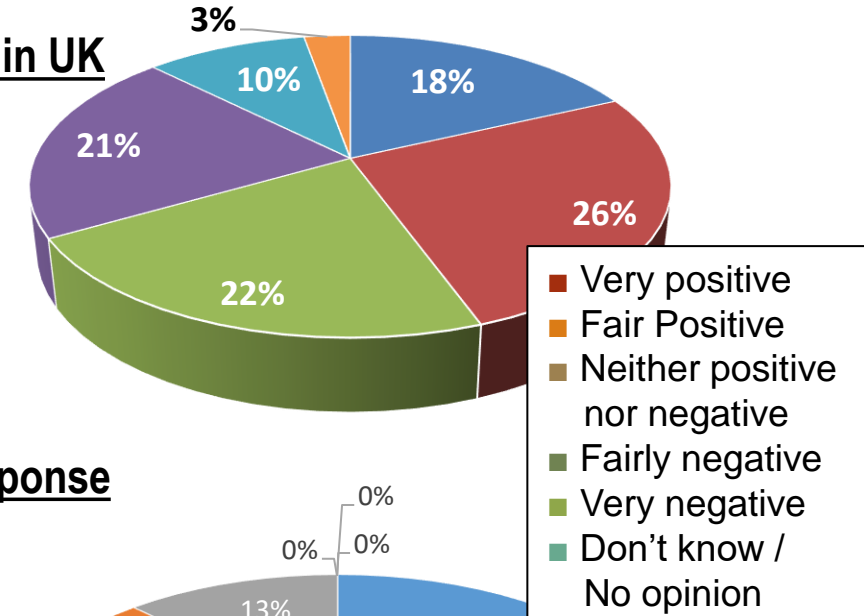
To what extent would you support or oppose the building of a new NPP near your home / in your area?



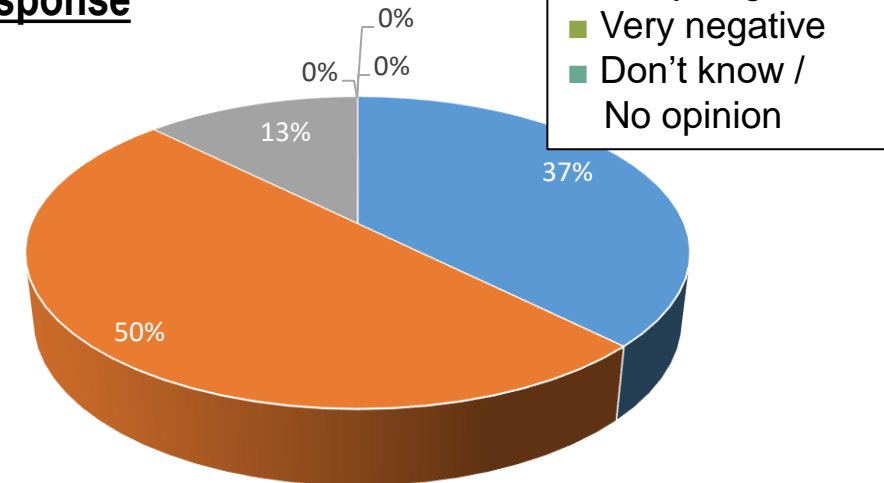
compare
to

What is your opinion of using nuclear power to produce electricity?

Response in UK



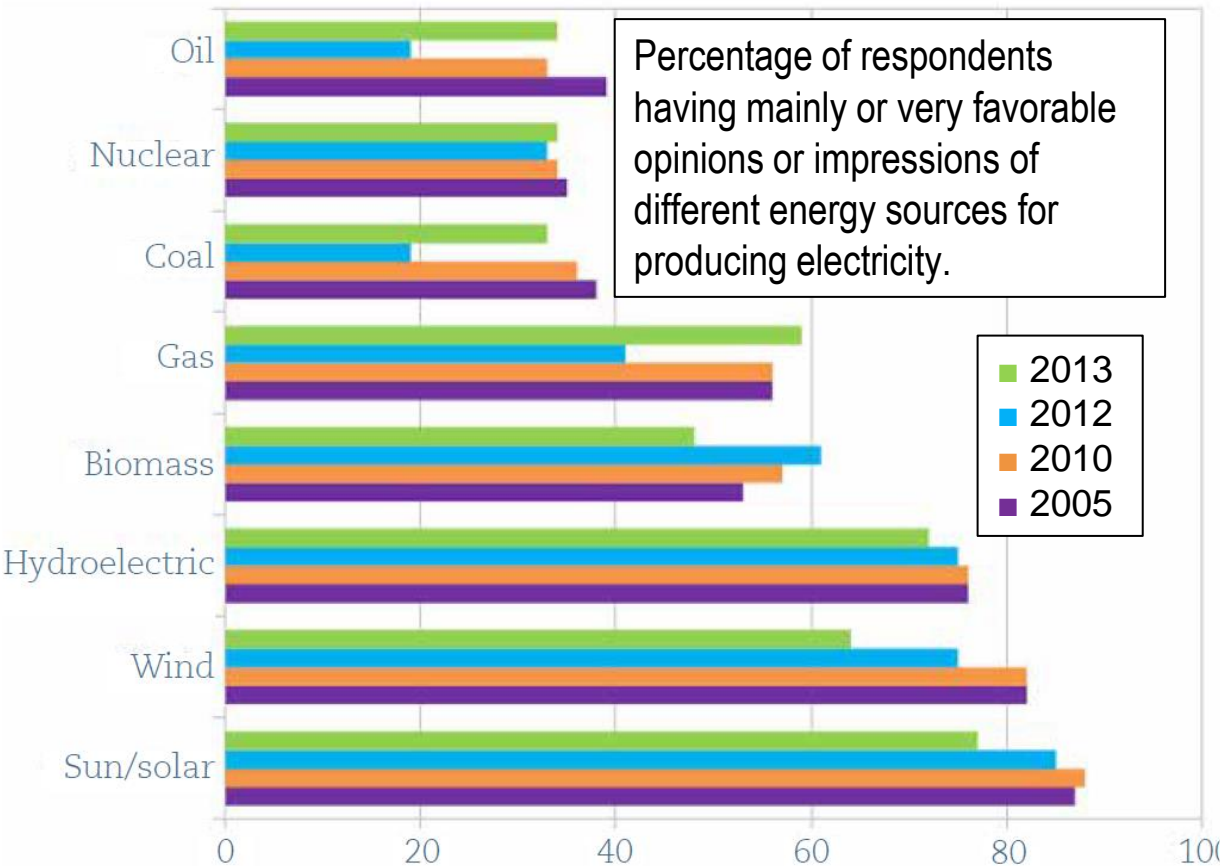
Your Response



Is difference due to the “Not in my backyard (NIMBY)” mentality or was it due to the phrasing of the question with extra condition given?

Survey done by UK Energy Research Centre

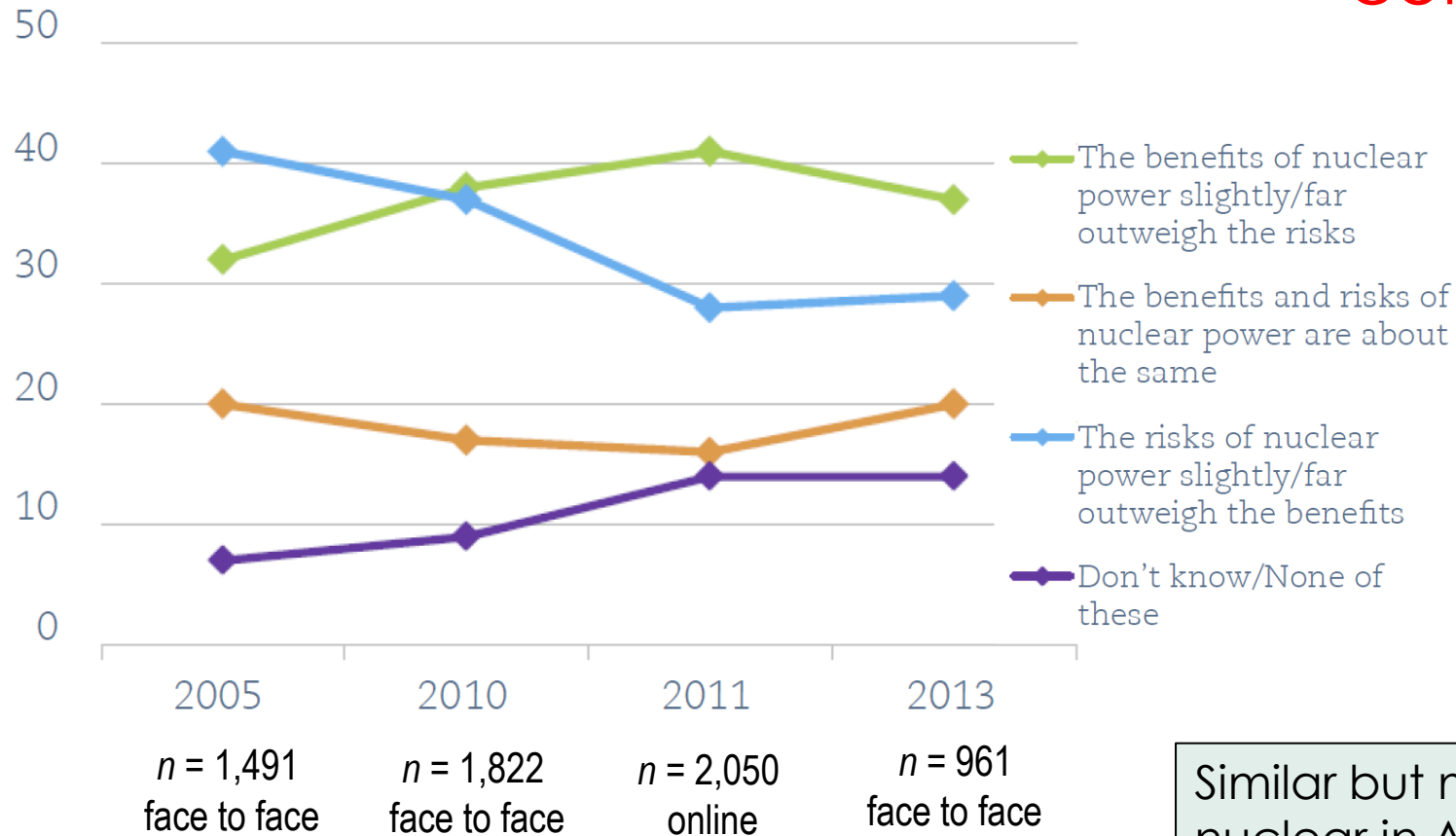
- Some of the questions used in previous survey were similar to questions used by UK Energy Research Centre¹ tracking public attitudes on nuclear power and climate change over the years.
- For example, on the various energy sources:



- Again, renewables are still favorites though there is a tendency for their popularity to decrease over the years.
- The order of preference is similar to what the previous survey though nuclear here ranks around the same position as non-renewables and lower than natural gas.
- Interesting that Fukushima accident did not seem to affect the opinion on nuclear energy.

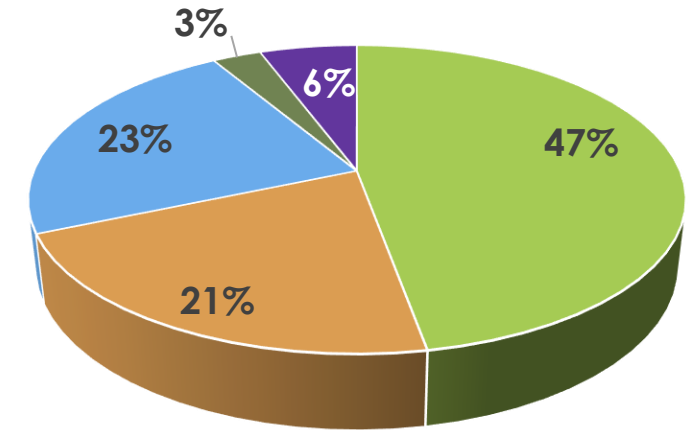
Comparing with Other Surveys

➤ On the benefits vs risk of nuclear power:



by UK ERC

compare
to



by Anna Marie Mack

Similar but more pro-nuclear in AMM Survey



On Future of UK NPPs

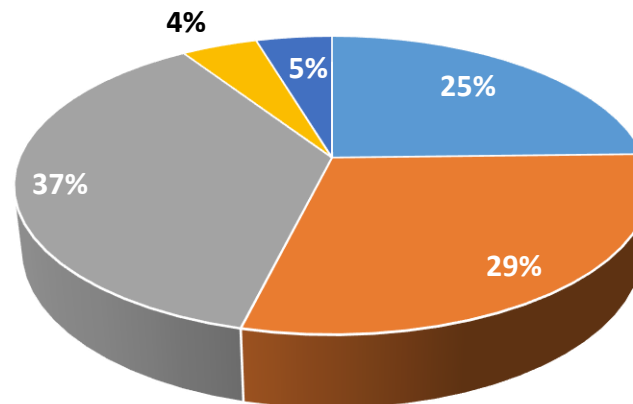
- Similarly on the question of building new NPPs and continuing existing plants and replacement of these plants, UK ERC tracked the changes which fluctuates over the years.

Table 3. Views on the future of nuclear power in Britain (in %)

	2005	2010	2011	2012	2013
We should increase the number of nuclear power stations	9	17	23	21	15
We should continue using the existing nuclear power stations and replace them with new ones when they reach the end of their life	34	29	31	26	30
We should continue using the existing nuclear power stations but not replace them with new ones when they reach the end of their life	34	33	21	32	27
We should shut down all existing nuclear power stations now and not replace them with new ones	15	13	11	9	13
Don't know/none of these	7	7	15	12	16

by UK ERC

by Anna Marie Mack



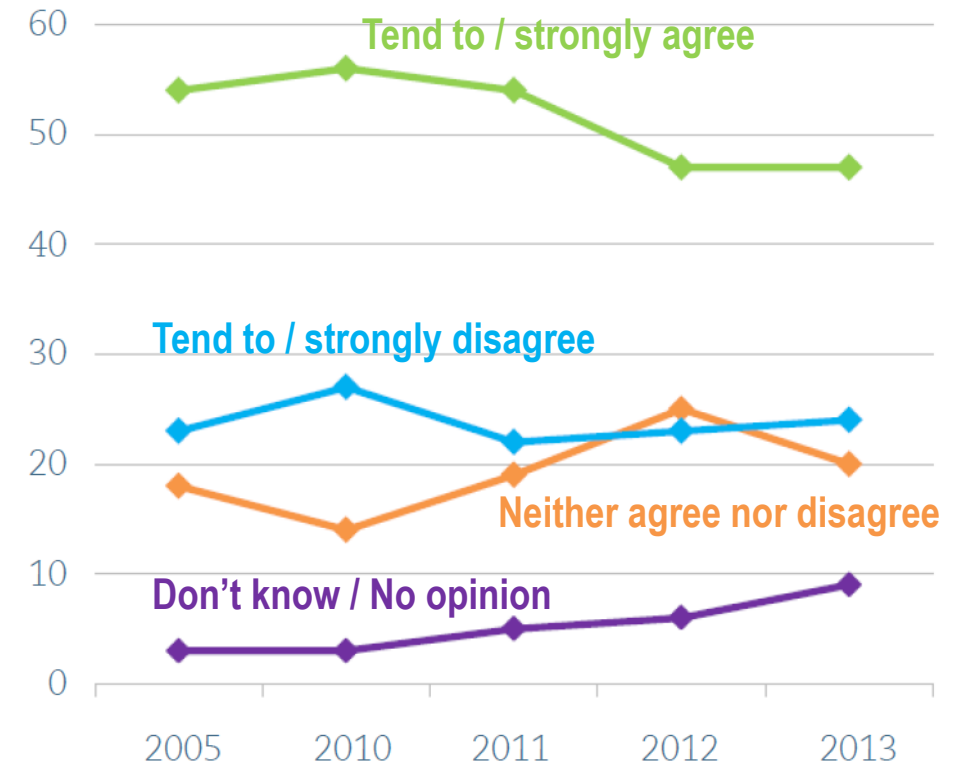
- Increase number of NPP
- Use existing NPP, replace at end of life
- Use existing NPP, not replace at end of life
- Shut down all NPP, not replace them
- None of the above

Adding Climate Change or Energy Security

- The UK ERC survey also tracked the difference in response if additional condition (climate change or energy security) is added.
- Overall, there is a higher level of support of building new NPP if it helps to tackle climate change or improve energy security.
- This “conditional support” may drop when any severe accident happens.

Table 2. Overall support and opposition to nuclear power (in %)

	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



% willingness to accept the building of new nuclear power stations if it would help to tackle climate change.

Chinese Survey:

(on Knowledge on & Attitudes
towards Nuclear Power)

Survey on Chinese after Fukushima

- China presented a very interesting case – political and socially different from the West – but could have some similarities with Singapore and SE Asia.
- Rapid build-up of NPPs in recent years – currently operating 54 reactors with 15 more under construction and many more planned. Mainly using Pressurized Water Reactors but actively pursuing other more advanced technologies.
- Partially to tackle their air pollution.
- Some recent cases of protest caused concerns and public attitudes has become an important issue.
- Face to face survey¹ on knowledge and attitudes of Chinese residents (some living very close to NPPs).

Table 1. Socioeconomic and demographic information of the interviewees ($n=435$).

Variable	Category	Percent(%)	Variable	Category	Percent(%)
Gender	Male	56.1	Income (10,000 yuan/year)	Under 2.0	20
	Female	43.9		2.1–5	49.6
Village Cadre	Yes	5.5		5.1–10	18.2
Education	No	94.5	Party member	Over 10	12.2
	Below/elementary	23.5		Yes	11.5
	Middle school	37.7	Age (year)	No	88.5
	High middle-school	32.2		Under 18	3.0
Distance to NP	College	7.6		19–40	36.5
	<0.5 km (SJ village)	18.4		40–60	46.9
	5 km (DX village)	16.8		Over 60	13.6
	10 km (DJ village)	17.0			
	400 km (QX, QZ, QD, YJ villages in Dezhou)	47.8			

¹See <https://www.researchgate.net/publication/235987636>

Level of Knowledge in Chinese Survey

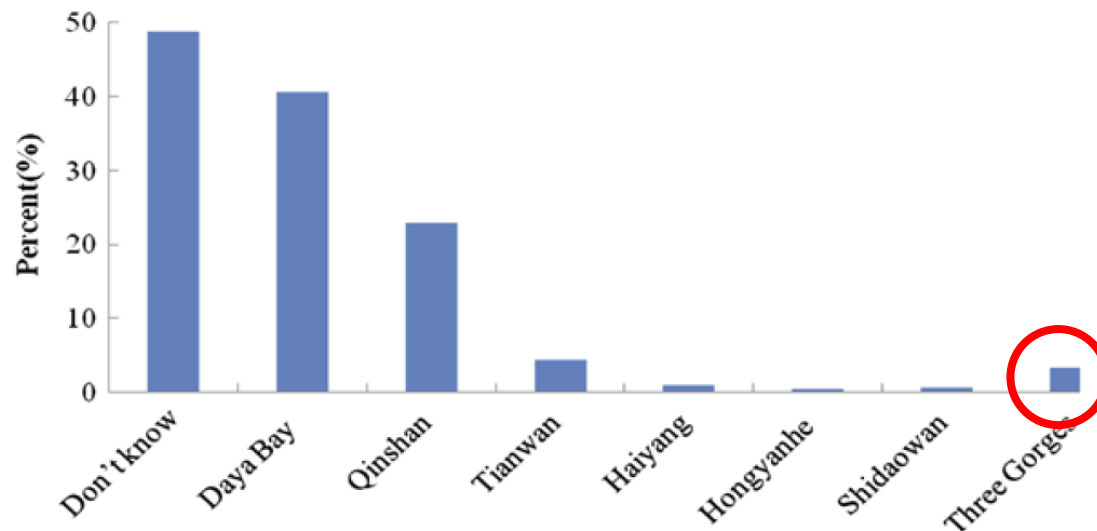
➤ When asked to name worldwide accident:

Name of nuclear accident	Frequency	Percent (%)
Japanese Fukushima Daiichi nuclear accident	400	91.9
Former Soviet Union (Do not know exact name)	46	10.6
Russia (Do not know exact name)	16	3.7
Chernobyl nuclear accident	30	6.9
Russia-Ukraine (Do not know exact name)	2	0.5
USA/Three Mile Island	2	0.4
UK	1	0.2
Do not know any nuclear power plant accident	21	4.8

Note: An earlier survey indicated that before Fukushima, only 20% of respondents have knowledge of nuclear power and 60% have not heard of nuclear power.

Fukushima was highly featured in the mass media.

➤ When asked on nuclear power in China:

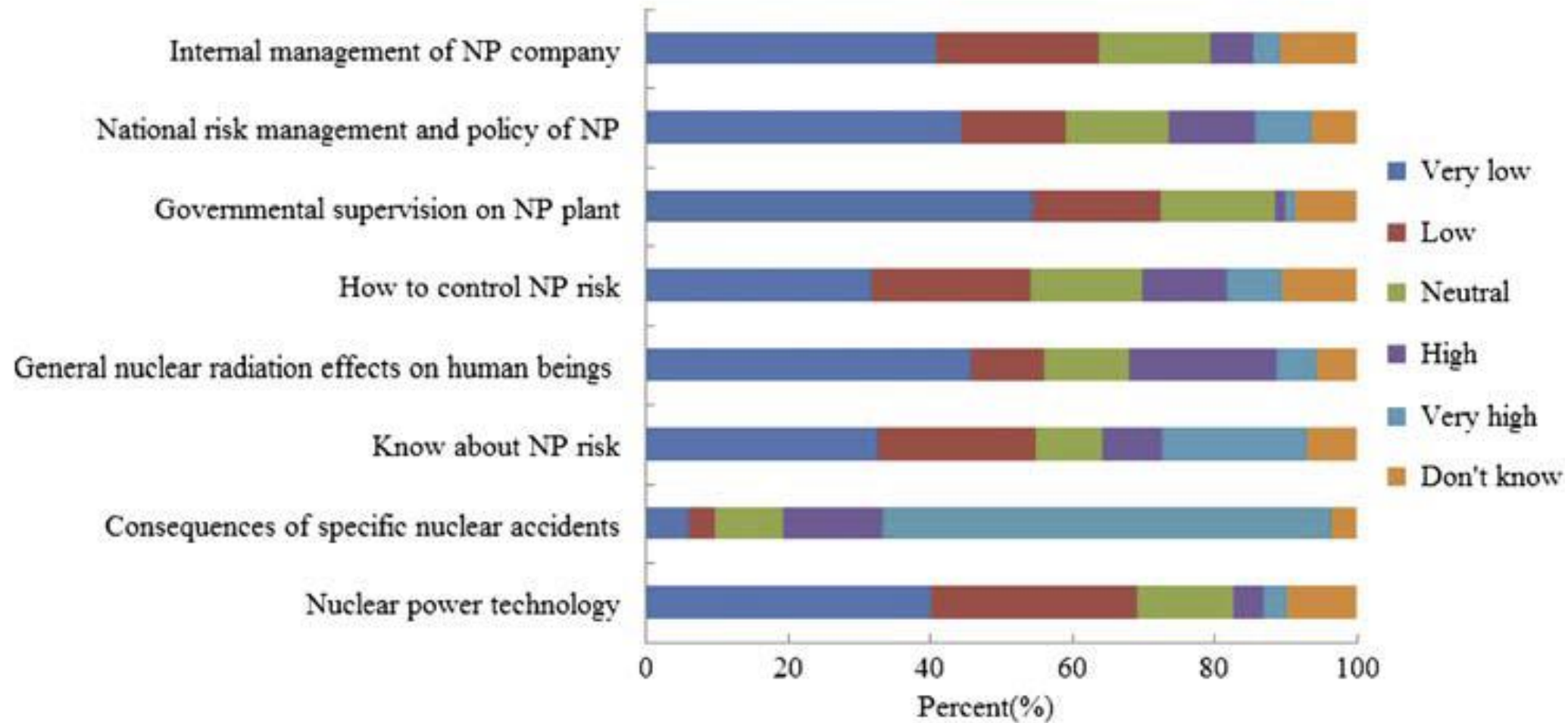


Daya Bay NPP and Qinshan NPP are the earliest NPPs built in China.

3% mistakenly thought that the Three Gorges hydroelectric project is a nuclear power plant

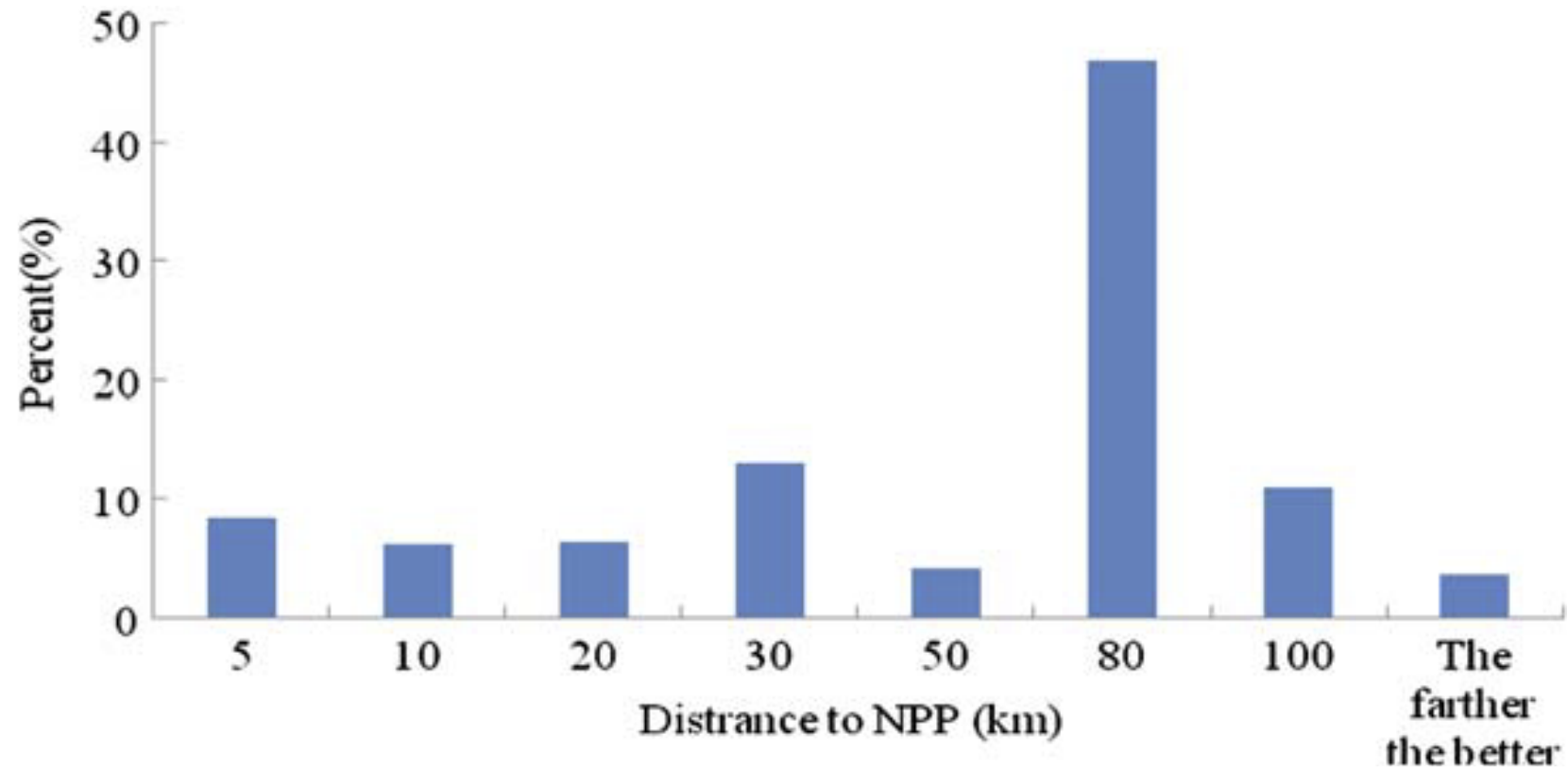
Level of Knowledge in Chinese Survey

- Survey indicated low level of knowledge of nuclear power technology, management and risks.



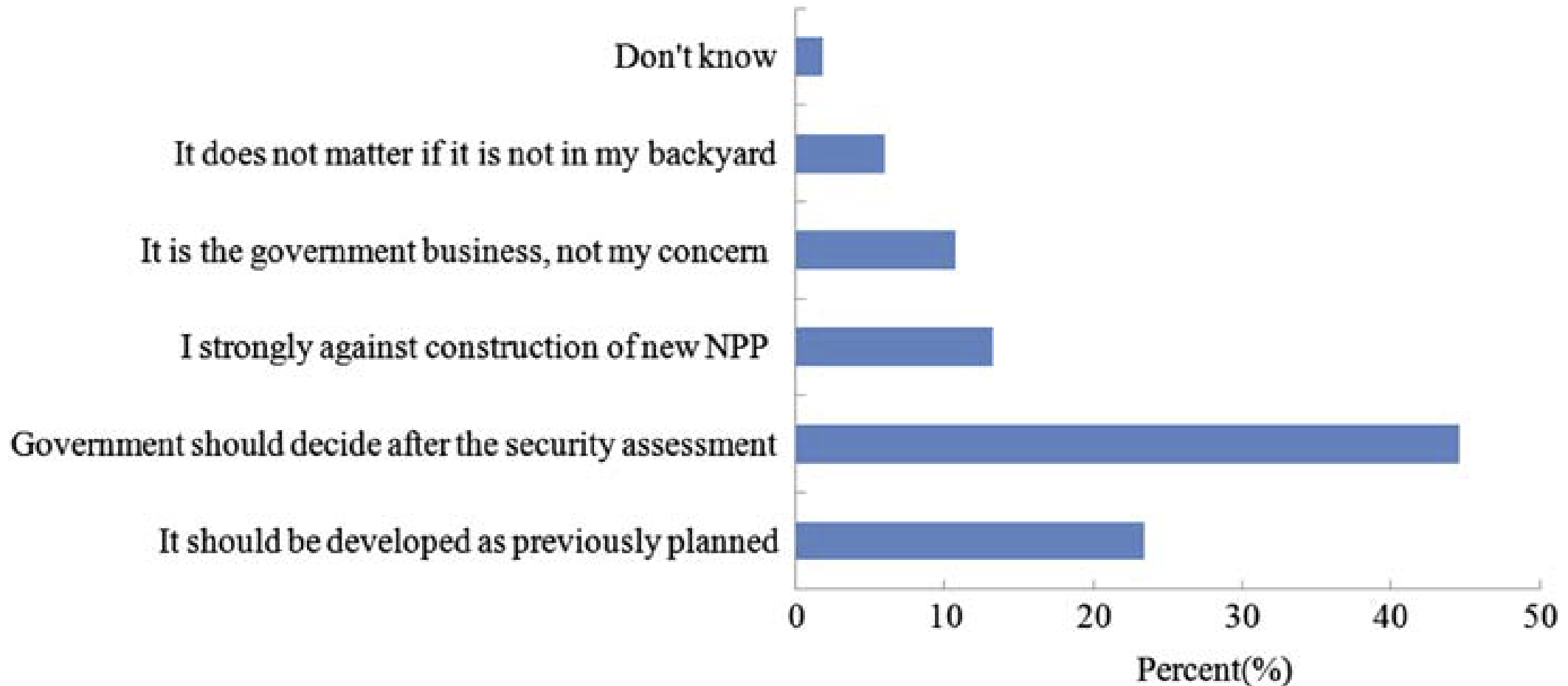
Level of Knowledge in Chinese Survey

- The perceived safe distance from the respondents' homes to the proposed nuclear power plant



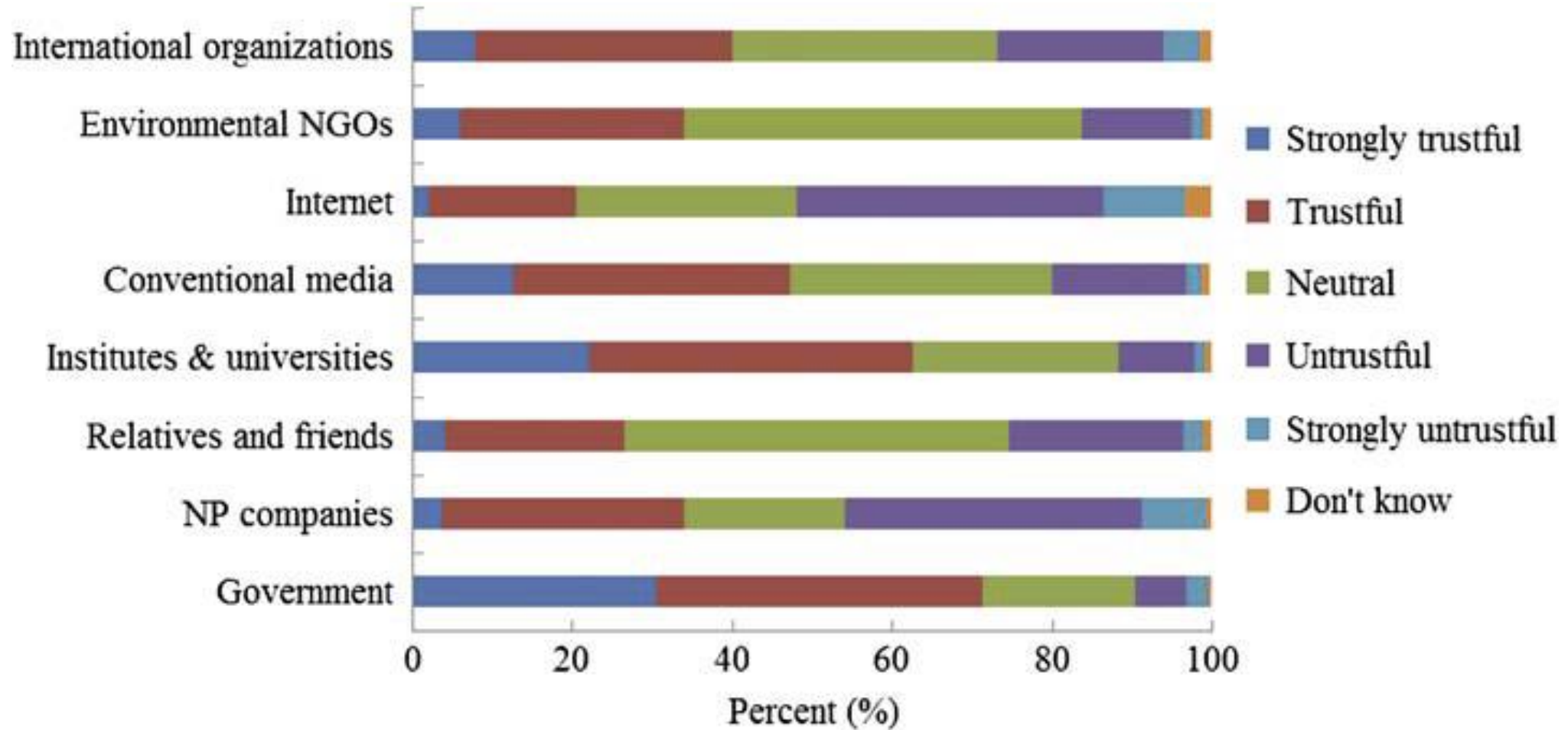
On Future Development of Nuclear Power in Country

- Letting the government decide seems to be most respondents' opinions.

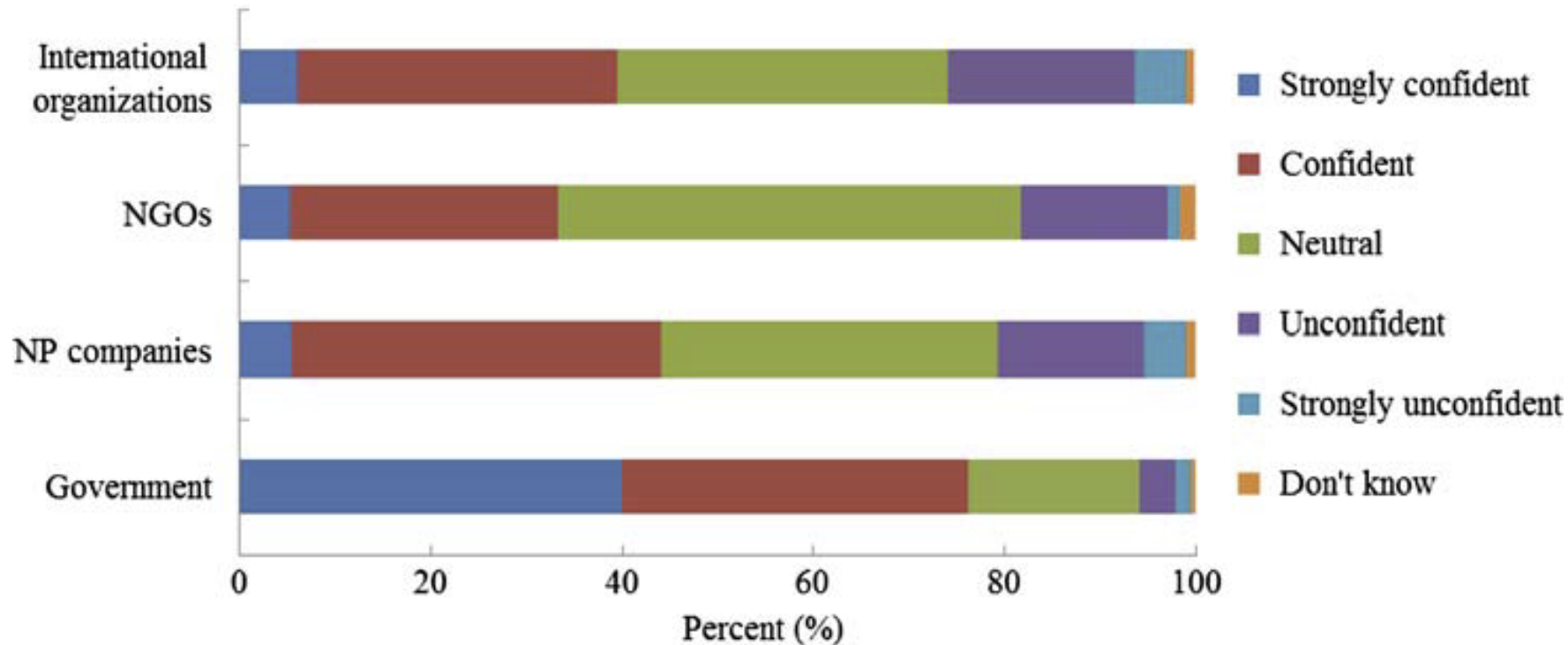


Degree of Trust in the Government

- Unlike most surveys done in Western countries and Japan, the government has the highest level of trust from the respondents.



Degree of Trust in the Government in Handling Accidents



- Some of the reasons given for trusting the government in handling nuclear accidents are
 - Government has the capacity to respond and solve the crisis
 - Previous accidents (non-nuclear) verified that the government is most trustful and reliable
 - A responsible government cares about and represent the public interest (and similar statements such as “Government serves the public”)
 - Strong and effective organizing capabilities for accident response