

# COLLEGE STUDENTS' OPINIONS IN THE CITY OF HIROSHIMA FOR/AGAINST RESTARTING NUCLEAR POWER PLANTS IN JAPAN

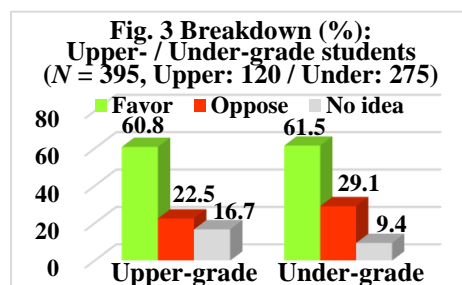
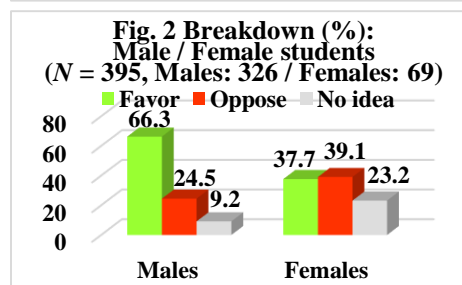
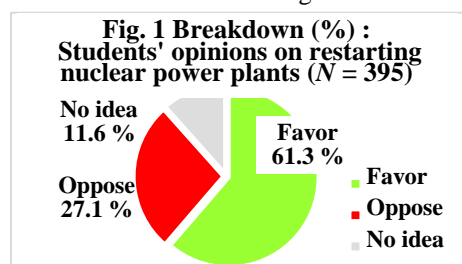
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## Overview

This presentation examines opinions of college students from Hiroshima regarding restarting nuclear power plants in Japan, based on their term-end essays. This survey, unlike conventional questionnaires, will help provide fresh perspectives to researchers, business personnel, and government experts in the energy and environmental sectors worldwide for the following four reasons.



First, the presentation clarifies the worldwide misunderstanding that a majority of the Japanese have preferred the shutdown of nuclear power plants since the 2011 off the Pacific coast of Tohoku Earthquake (hereafter, the 2011 Earthquake). In addition, it is impulsive to consider that the people in Hiroshima, where President Barack Obama made a speech in 2016 appealing the abolishment nuclear weapons, have opted for the absolute elimination of nuclear power.

Instead, the author's 2017 survey, as depicted in Figure 1, illustrates that 61.3% of the college students in Hiroshima favor restarting the nuclear power plants in Japan even after disasters such as the 2011 Earthquake or the nuclear bombing in Hiroshima in 1945.

Second, this presentation addresses the gaps in existing literature. As per the author's research using theses and databases such as American Economic Associations' Journals, the *Energy Journal*, and the J-stage of journal archives in Japan, no prior research studies have focused on the opinions of students in Hiroshima, except for the 2018 presentation by the author as described below.

Third, the author attempts to emphasize the importance of freedom of expression in classrooms. According to the confessions of students in the author's classes, many students in Hiroshima refrain from honestly expressing their opinions, mainly in obedience to coercive teachers across schools and universities. These teachers force their opinion of having a total ban on nuclear energy. The teachers' coercion and the students' self-control in order to achieve better academic grades, could deter the development of students' personality along with electoral democracy, and consequently hinder the efforts toward establishing a sustainable society. Therefore, the author suggests that freedom of expression should be assured in classrooms.

Fourth, the upcoming 2019 presentation will be an updated version of the author's original presentation, which was highly evaluated at the 2018 General Conference of the Japan Association of the Energy and Environment Education, one of the most prestigious academic associations in the energy and environment sectors in Japan. This upcoming presentation includes another survey for comparison, which was conducted in January 2019 in Osaka where the author currently works.

Thus, this presentation will surely contribute to the further development of government policy-making and corporate strategic planning as well as academic and practical research in the energy and environment sectors. The author does not have any political intention to favor or oppose the use of nuclear energy.

## Methods

The student's opinions are examined based on the essays submitted by them at the term-end examinations. The methods specified below are the ones that were mainly used.

Essay theme: "Express your opinion on restarting nuclear power plants in Japan with the reasons regarding why you favor or oppose the idea." Neutral answers such as "I have no idea. I belong to a neutral party" are also allowed.

Target/Sample: 557 registered undergraduate students from the Hiroshima Shudo University, aged between 18 and 24 years in the spring of 2017 (April to August) and fall (September to January) terms. The author formerly worked for the University until March 2018. The University's website is <http://www.shudo-u.ac.jp>.

Courses: Total four courses, comprising two basic and two advanced, at the Department of Environment Studies.

Basic courses: "Natural resources and energy issues" and "Introduction to environmental issues"

Advanced courses: “Policy studies of natural resources and energy” and “Policy studies for recycling society”  
Course outline: 90 minutes of each class during 15 weeks. Advantages, disadvantages, and worldwide trends of nuclear energy are explained at least twice in each class using several statistical data, reports, press releases, news articles, and campaign promises of political parties as well as pictures and videos taken by the author.

Statistical data for the explanation (summary):

Economy: unit cost (JP Yen)/per KWh in each power source, cost of maintaining or decommissioning nuclear reactors, radioactive contamination damages, impacts of demand boosting on national and local economies through employment opportunities and government subsidies

Environment: development of the Paris Agreement, trends of CO<sub>2</sub> emissions in Japan and the world, unit amount of CO<sub>2</sub> emissions per KWh in each power source,

Energy security: self-sufficiency ratio of energy in Japan and the OECD countries

Sources (summary): International: European Commission, IAEA, OECD, World Nuclear Association;

Domestic: government (Ministry of Environment, Agency for Natural Resources and Energy), companies (TEPCO, Mitsubishi Heavy Industries), news media (NHK, Nikkei Inc.).

Notice to students: In the syllabus and classes, the author ensured the following:

- (1) to welcome any opinion as long as it is clear and constructive; and
- (2) to decide the scores based on logicality, expertise, legality, and creativity.

Answering method: Through descriptive answers. The paper size is B-4 and double-sided.

Reference point: March 11, 2011 when the working of every domestic nuclear plant was temporarily stopped after the 2011 Earthquake. The rate of dependence on nuclear energy accounted for around 25% of the total electricity production before the 2011 Earthquake, while it currently accounts for around 2%.

Definition for judgment: The author has set the main categories as follows: (1) Favor, (2) Oppose, and (3) No Idea.

(1) Favor: Japan should maintain its dependence on nuclear energy.

However, “Favor” can be divided into the mid-sub categories as follows:

- (A) Expand: the rate of the dependence should be expanded to more than 25%.
- (B) Maintain: the rate should be maintained at around 25%.
- (C) Decrease: the rate should be decreased to less than 25%,
  - (α) although the dependence should be kept within the range of 1–24% at the maximum in the future.
  - (β) and the dependence should be 0% in the future when alternative energy sources are guaranteed.

(2) Oppose: Japan should immediately and completely stop the dependence by shutting down nuclear power plants in operation and totally abolishing the plants forever.

(3) No idea: Typical answers are “I have no idea. I cannot decide it” and “I belong to a neutral party.”

Advantages of the survey: Unlike the conventional opinion polls such as Gallup (2016) and JAERO (2018), the students tend to be well-informed in the lectures and answer seriously to secure better academic records.

## Results

The author has already conducted three statistical verifications under the following conditions:

Number (and percentage) of the answers: 395 (70.9%) out of the registered 557 students.

Composition ratio of male/female in the 395 answers: Male 82.5% ( $N = 326$ ); Female 17.5% ( $N = 69$ ).

First, 61.3% of the students favor restarting the nuclear power plants in Japan while “Oppose” accounts for 27.1% and “No idea” for 11.6% (Fig. 1). Even if the result is adjusted to eliminate the gender-based differences in the composition ratio, “Favor” would account for 51.9%. Second, “Oppose” is predominant among females (Fig. 2). Third, the rates of “Oppose” decrease and “No idea” increase among upper-grade students (Fig. 3). In addition, students that favor restarting the plants emphasized the importance of economic and employment impacts while students who oppose restarting were mainly concerned about radioactive contamination. And students who selected “no idea” tended to confess their difficulty in deciding.

## Conclusions

Majority of the students surveyed in Hiroshima favor restarting of domestic nuclear power plants. Moreover, the results indicate students tend to express their opinions honestly and seriously under some devised methods and conditions once they are free from being forced to accept the opinions of coercive professors. Therefore, the author suggests that professors should let the students decide the important challenges in the energy and environment sectors in order to develop students’ personality and electoral democracy toward establishing a sustainable society.

## References

Gallup (2016) <https://news.gallup.com/poll/190064/first-time-majority-oppose-nuclear-energy.aspx> (Last access: 2018.11.11)

JAERO (Japan Atomic Energy Relations Organization) (2018) *2017 Annual Survey of Nuclear Use* (in Japanese).