## Survey on Nuclear Engineering Students' Perception of Government Nuclear Policy: Focusing on High-Level Radioactive Waste and Continued Operation

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\*Keywords : Perception, Nuclear, High-Level Radioactive Waste, Continued Operation

#### 1. Introduction

Recently, issues related to high-level radioactive waste disposal and the continued operation of nuclear facilities have emerged as major concerns in Republic of Korea's nuclear sector.

Republic of Korea, among countries operating nuclear power plants, has not yet selected a site for a permanent high-level radioactive waste disposal facility, and with temporary storage facilities nearing saturation, resolving this issue has become urgent.

Against this backdrop, this survey investigated and analyzed nuclear engineering students' motivations for selecting their major, career outlook, general perceptions of nuclear energy policies, and their opinions regarding high-level radioactive waste disposal and the continued operation of nuclear facilities.

### 2. Characteristics of Survey Participants

The survey was conducted online from November 8 to December 10, 2024, targeting 200 undergraduate and graduate students majoring in nuclear engineering from 15 universities across the country.

Of the respondents, 78.7% were undergraduate students aged between 19 and 24, with males accounting for 75.0% and females students accounted for 24.4%. By academic year, sophomores comprised the largest group, while graduate students constituted the smallest proportion.

# 3. Satisfaction with Nuclear Engineering Major and Perception of the Field

Overall, students majoring in nuclear engineering expressed positive perceptions and high levels of satisfaction regarding the nuclear field.

Nonetheless, as students advanced to higher academic years, their evaluations of the major became more multifaceted and complex, with upper-year students especially highlighting a need for specific career support programs and improvements in the research environment.



<Figure 1> Factors Influencing Satisfaction

with Major by Academic Year



Positive perceptions of the nuclear field were reported by 94.8% of respondents, with 53.4% indicating "very positive" and 41.4% indicating "positive."

The most significant reason for positive perceptions toward the nuclear field was "energy efficiency" at 84.2%, followed by "economic benefits" (75.8%), "contribution to environmental protection" (50.9%), "potential for technological advancement" (50.3%), "strengthening energy security" (42.4%), and "others" (0.0%), indicating that nuclear engineering students prioritize economic efficiency.

#### 4. Perception of Government Nuclear Policies

Regarding opinions on the proportion of nuclear power, the response "should be increased from the current level" was highest at 82.8%. The preferred scale for additional nuclear power plant installations was "5 to less than 10 plants" at 31.9%. The subsequent scales were "10 to less than 15 plants" (27.8%), "1 to less than 5 plants" (21.5%), "15 or more plants" (17.4%), and "Other" (1.4%).



Nuclear Power Plant Construction

As reasons for expanding the proportion of nuclear power, "responding to increasing energy demand" was highest at 85.4%, followed by "economic efficiency" (72.9%), "reduction of carbon emissions" (59.0%), "strengthening energy security" (47.2%), "enhancing technological competitiveness" (32.6%), and "other" (1.4%).

In a survey on nuclear engineering students'

perceptions of government support policies, more than 70% evaluated the government's support level as insufficient or very insufficient, indicating diverse responses across various items. Government support was identified as necessary throughout the nuclear sector.

The primary reason for insufficient government support was "need for workforce training" at 77.5%, followed by "need to enhance international competitiveness" (72.5%), "insufficient research funding" (69.2%), "need for improving research infrastructure" (50.8%), "dissatisfaction with the speed of technology development" (35.0%), and "other" (1.7%).

# 5. Perception of High-Level Radioactive Waste and Spent Nuclear Fuel Reprocessing Policies

Over 90% of nuclear engineering students responded that addressing the issue of high-level radioactive waste was extremely urgent. With temporary storage facilities nearing capacity, realistic management limits are becoming clear, and 87.9% of students emphasized the need for policy-driven spent nuclear fuel reprocessing.

Additionally, reasons for supporting high-level radioactive waste disposal sites included "job creation" (71.0%), "boosting local economies" (49.1%), and "improving local infrastructure" (38.5%), indicating a belief that this could aid national economic growth.

Meanwhile, neutral responses indicating "average" efforts at the national level for high-level waste management suggest unclear policy improvement directions. This highlights the need for transparent information disclosure and public deliberation.



#### Transactions of the Korean Nuclear Society Spring Meeting Jeju, Korea, May 21-23, 2025

#### <Figure 4> National Efforts Regarding Securing High-Level



High-Level Radioactive Waste Disposal

National-level measures for managing high-level waste ranked "raising awareness about the importance of constructing waste disposal sites" highest at 77.5%, followed by "building national consensus" (61.8%), "improving relevant regulations" (60.1%), "strengthening communication with local residents" (52.0%), "developing waste management technologies" (43.4%), and "other" (3.5%).

It was emphasized that addressing high-level radioactive waste requires social consensus through increased awareness and understanding, beyond mere technological solutions.

## 6. Perception of Nuclear Facility Continued Operation Policies

Regarding continued operation of nuclear plants, positive opinions among nuclear engineering students stood at 81.0% (strongly support: 51.1%, support: 26.9%).

The leading reason for supporting continued operation was "economic efficiency" at 80.9%, followed by "effective utilization of existing facilities" (68.8%), "securing energy stability" (53.2%), "technological reliability" (45.4%), and "other" (1.8%).



Respondents indicated that continued operation ensures national energy supply stability, offers better economic efficiency compared to building new plants, and positively influences local economies and job creation. However, potential social conflicts and insufficient trust with local residents were highlighted as crucial issues needing resolution in the process of promoting continued operation.



<Figure 7> Positive Impacts of Continued



Operation of Nuclear Facilities

Regarding standards for extending operation periods, "possible upon verification of technical safety" was highest at 88.4%, followed by "operation should follow original design lifespan" (11.0%), and "other" (0.6%).

About 51.4% of nuclear engineering students evaluated current safety review procedures for continued nuclear facility operation as appropriate, while 37.0% remained neutral, suggesting partial confidence but incomplete certainty in the procedures.



<Figure 9> Adequacy of Safety Review Procedures for Continued Operation of Nuclear Facilities

Regarding communication with local residents about continued operation, "average" responses were at 52.6%, while 85.5% ("agree": 38.7%, "strongly agree": 46.8%) emphasized the necessity for social deliberation. Opinions indicated the need for regular public hearings, briefings, and stakeholder consultations to enhance transparency and independence in safety assessments, ensuring active incorporation of resident feedback in policy decisions.







### <Figure 11> Necessity of Social Deliberation on Continued Operation of Nuclear Facilities

National-level measures for continued nuclear facility operation were highest in "policy establishment" at 63.4%, closely followed by "communication and consensus-building with local residents" at 58.7%.



<Figure 12> National-Level Measures Regarding Continued Operation of Nuclear Facilities

Survey results suggest that institutional arrangements, including relevant legislation, and improved accessibility to government policy information for residents are necessary for harmonizing opinions between experts and residents, thereby promoting local community development.

### 7. Conclusion

This survey examined the perceptions of nuclear engineering students regarding overall nuclear sector satisfaction and prospects, government nuclear policies, high-level radioactive waste management, and continued operation of nuclear facilities.

The survey revealed that 94.8% of students held positive perceptions of the nuclear field, primarily due to energy efficiency (84.2%). Moreover, 82.8% supported increasing nuclear power proportions, primarily to meet rising energy demands (85.4%).

About 90.1% emphasized urgency in addressing highlevel radioactive waste issues and reprocessing spent nuclear fuel. For continued facility operation, 81.0% showed positive attitudes, recognizing effective utilization of existing infrastructure and energy stability.

Overall, students reported high satisfaction with their major, although their views on government nuclear policies remained neutral. Economic efficiency was identified as a key reason for justifying waste management and continued operation. Moreover, social consensus through deliberation was also considered essential.

However, due to sample biases toward certain educational institutions or specific student years, this survey may not fully represent all nuclear engineering students. Future research will address these limitations in greater depth.

### ACKNOWLEDGEMENT

This work was supported by the Korea Energy Information Culture Agency and the University Student Division of the Korea Nuclear Forum.