[*RECOGNITION AND DECISION MAKING STRUCTURE ABOUT INTRODUCTION OF NUCLEAR POWER IN MYANMAR*]

[Surim Oh, College of Engineering, Seoul National University, Republic of Korea, 82-2-880-8284, surim@snu.ac.kr]
[Inkyung Cho, College of Engineering, Seoul National University, Republic of Korea, 82-2-880-8284, ikcho98@snu.ac.kr]
[Soohyeon Kim, College of Engineering, Seoul National University, Republic of Korea, 82-2-880-8284, kimssoo@snu.ac.kr]
[Kyaw Zin Hpyo, Myanma Oil and Gas Enterprise, Republic of the Union of Myanmar, 95(67)411095, kyawzinhpyo@gamil.com]
[Eunnyeong Heo, College of Engineering, Seoul National University, Republic of Korea, 82-2-880-8323, heoe@snu.ac.kr]

Overview

This study aims to provide an analysis of the Myanmar government 's recognition and decision making structure about introduction of nuclear power. In particular, we studied the government's major decision-making factors affecting the introduction possibility and the introduction of nuclear power in Myanmar, and the recognition of government officials regarding nuclear power in a variety of perspectives. In order to derive more practical implications, surveys were conducted for Myanmar government officials, and for the analysis of the response results, an ordered logit-probit model and an analytic hierarchy process (AHP) were applied.

Methods

In order to derive the recognition and decision-making structure for the introduction of nuclear power in Myanmar, the surveys were conducted in two phases. The first survey is called the 'basic survey' which asked for the recognition of government officials on nuclear power. The survey also includes questions asking how much the respondents agree to the introduction of nuclear power. The results of the basic survey are analyzed by an ordered logit-probit model. The second survey is called the 'in-depth survey' and is the survey used to determine the decision-making factors of government officials when introducing nuclear power. Since the questions in the in-depth survey were designed based on responses obtained from the basic survey, the questions presented in the basic survey are linked organically. The responses for the in-depth survey are analyzed by the AHP method.

Results

The analysis results of the basic survey present two results of the ordered logit-probit analysis; firstly, with the introduction of nuclear power and the expansion opinion, the negative response ratio that indicates the recognition according to the viewpoints, and secondly, reading whether the expansion opinions increase in line with the recognition improvement.

Although Myanmar has no commercial nuclear reactor, observing the intention to expand nuclear power, 39% of Myanmar government officials supported the introduction and expansion of nuclear power. The neutral position of nuclear expansion is at a level of 39% similar to the supportive position while the opposition is only 22%. The negative response ratio revealed that Myanmar government officials cited the absence of technology and inherent risk of nuclear power, institutional conditions, and geographical conditions as main difficulties in expanding nuclear power. As a result of the ordered logit-probit analysis, the conditions contributing to nuclear expansion are the inherent risk of the nuclear power, geographical, environmental and social conditions. The more they are aware of nuclear power, the more they are willing to expand, or nuclear power in the future will increase the willingness to expand nuclear power as the conditions are expected to improve. Therefore, the above negative responses to the inherent risks of nuclear power, economic, geographical, social and institutional conditions could contribute to the expansion of nuclear power when such problems are improved. <Table 1>

<Table 1> Basic survey results: Negative response ratio and ordered logit-probit analysis results

Category	Negative response ratio	Ordered logit-probit	
		Correlation between the introduction intention and the recognition	Increase of the introduction intention according to the recognition improvement (X)
Technical conditions	92	0.992 (0.352)***	0.371
Inherent risk of nuclear power	88	-1.105 (0.413)***	3.019
Economic conditions	79	-0.313 (0.109)***	1.368
Conditions of International relations	76	-0.693 (0.273)**	0.500

Geographical conditions	83	-0.887 (0.273)***	2.428
Environmental conditions	51	-0.036 (0.129)	0.965
Social conditions	63	-0.626 (0.141)***	1.870
Institutional conditions	85	-0.685 (0.233)***	1.984

*Correlations between the 'expansion intention and the recognition are shown as coefficients that analyze the dependent variable according to the intention of nuclear power expansion, explanatory variable, and nuclear expansion conditions, significance ratio (*** 1%. ** 5%, * 1%) and standard errors (in parentheses). *** (** 1%, ** 5%, * 1%), (In parentheses).

* 'Increase ratio when the expansion intention improves is expressed as the odds ratio of the ordered logit - probit analysis, and it shows how many times the intention of expansion increases when the negative response decreases by 1.

As a results of in-depth survey, the Government of Myanmar reveals that environmental factors are the most important issue for the decision to introduce and expand nuclear power in the analysis of the upper factors. The importance of the decision-making factors is environmental>political and social> technical>economic factor in order. Looking at the lower-factors, the durability against natural disasters and mitigation of climate change are important in environmental factors. Secondly, social acceptance is considered as the first priority among political and social factors with high importance. <Table 2>

<Table 2> Result of the in-depth survey response

Upper decision factors	Lower decision factors	Weight
Technical factors (0.2478)	Expansion of the power supply	0.3132
	Energy technology development	0.3075
	Technical stability	0.3793
Economic factors (0.2234)	Nuclear expansion costs	0.3259
	Economic and industrial development	0.3415
	Influx of foreign capital	0.3326
Environmental factors (0.2665)	Mitigation of climate change	0.2531
	Resources and uranium reserve	0.2368
	Securement of nuclear related sites	0.2195
	Durability against natural disasters	0.2905
Political and social factors (0.2622)	Social acceptance	0.2845
	International Interests	0.1964
	Policy, law, institutional base	0.2699
	Stability against social risks	0.2493

Conclusions

The most important decision-making factor in the expansion of nuclear power in Myanmar is the environmental factor when the analysis is combined together. Geographically, Myanmar is an area where earthquakes occur frequently. Therefore, geographical research or seismic resistance technology is needed for introduction of nuclear power plants in Myanmar.

Political and social factors are also of high importance. In particular, Myanmar government officials answered that stability against social risks and social acceptance are important. It is because politically unstablility due to internal conflict in Myanmar and Fukushima accident.

Technical and economic factors are relatively less important. But according to ordered logit-probit analysis, there is a potential for improvement willingness to expansion through overseas financial and technical support.