

Heterogeneity of Preferences for Offshore Wind Power in the Four Promoting Prefectures in Japan: Evidence from a Choice Experiment Study

○Kengo IWATA*, Shinsuke KYOI**, and Yoshiaki USHIFUSA***

1. Introduction and Objectives

This study aims to investigate local citizen's preferences for implementing offshore wind turbines in four promoting prefectures in Japan: Akita; Chiba; Fukuoka; and Nagasaki. In Japan, the interest in renewable energies, such as offshore wind power, is growing to achieve zero greenhouse gas emissions by 2050. Several promoting areas have been designated for the development of offshore wind turbines. Although the development of offshore wind power is a critical instrument for achieving a decarbonized society, it may cause an opposition movement, especially in the local communities. Therefore, understanding the people's perceptions about offshore wind turbines is essential to building a consensus among local people and promoting offshore wind farms in Japan.

2. Methods adopted

This study conducted an online survey and a choice experiment for 2,400 respondents. In our settings, the choice experiment evaluates the people's preferences for the introduction of offshore wind turbines attributed to the distance to wind farms; the number of wind turbines; the impact on the marine ecosystem; the percentage of reduction in carbon dioxide emissions from electricity generation; annual payment per households for wind turbine operation. To include the heterogeneity of people's preferences in the model, we used a mixed logit model to estimate the preferences.

3. Main findings

Major findings are twofold. First, the public perception of offshore wind turbines differs among the four promoting prefectures. Regarding the promotion of offshore wind power, all four prefectures generally answered that it should be promoted, with Nagasaki Prefecture tending to be somewhat more proactive and Chiba Prefecture somewhat more reactive. Residents in Fukuoka Prefecture tended to be concerned about the impact on fisheries and marine ecosystems. People in Akita Prefecture tended to be concerned about the loss of scenery and the durability of offshore

* Kyoto University, Yoshida-Honmachi, Sakyo-ku, Kyoto, 606-8501, JAPAN.
E-mail: iwata.kengo.3c@kyoto-u.ac.jp

** Research Institute for Humanity and Nature, E-mail: skyoi@chikyu.ac.jp

*** The University of Kitakyushu, E-mail: ushifusa@kitakyu-u.ac.jp

wind turbines. Expectations for the development of new industries and the creation of local jobs as a result of the construction of offshore wind turbines were high in Akita Prefecture, while people in Chiba Prefecture had relatively low expectations. Second, heterogeneous preferences are estimated among local inhabitants (Table 1). In general, local individuals prefer the longer distance between the turbine and the shore. Locals demand fewer turbines. Local citizens do not prefer the construction of turbines that will have a negative impact on marine life. Residents prefer a reduction in carbon emissions from electricity generation by offshore wind turbines. Namely, people evaluate offshore wind turbines positively in terms of climate change mitigation, whereas negatively in terms of the impact on the landscape. Third, some key socioeconomic/behavioral factors affecting individual willingness-to-pay values are identified.

Table 1. Estimation results (pooled).

Variables	Coef.: Mean	Coef.: SD	WTP [95% interval] (JPY/household/year)
distance	0.10*** (0.01)	0.05*** (0.00)	56.73 [41.99 – 71.48]
nturbine	-0.04*** (0.01)	-0.00 (0.00)	-21.34 [-28.62 – -14.05]
species	-0.08*** (0.01)	0.04*** (0.00)	-44.87 [-54.75 – -34.98]
carbon	0.03*** (0.00)	0.03*** (0.00)	18.95 [13.22 – 24.68]
payment	-1.76*** (0.08)	1.56*** (0.09)	-

Log-likelihood = -13222.12; Observation = 43,2000
Note: Standard error are presented in parenthesis.

4. Conclusions

The results suggest that people's perceptions of offshore wind power in the four promoted provinces may differ from province to province, especially with respect to their concerns and expectations about the construction of wind turbines. In addition, Results imply that local people concern marine ecosystems and landscapes negatively influenced by turbines while they recognize wind turbines' contribution to climate change mitigation. Based on the findings, offshore wind farms need to develop strategies building consensus among stakeholders.

References

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