

Sustainability and Justice, the Case of Offshore Renewable Energy in Taiwan

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ABSTRACT

Fifteen of world's top twenty best offshore wind farms with strong winds are from Taiwan¹, and while the concept of sustainable development stood out from a range of possible solutions to deal with the challenge by balancing the environment, economy, and society, the importance and necessity of renewable energy have emerged. The purpose of this paper is to understand the relationship between sustainable development and social justice; how the affected communities evaluate the balance of their livelihood changes and the effectiveness of livelihood recovery in response to the global trend. The research takes the country's first and the only offshore wind project, Formosa 1, as an example, focusing on the procedural justice in the planning and construction process and the environmental justice of the entire project in the context of changes in the livelihoods of the affected people. Primary data was collected via fieldwork with fishers whose operation area is affected by the development. The main findings are (1) people's attitudes vary depending on how affected they are; (2) a democratic system should also guarantee rights in addition to the system; (3) a proper balance of environmental justice can effectively promote sustainable development. To conclude, only when justice and sustainability go hand in hand can the country gain more support from the people on the way forward.

Keywords: Sustainability, Procedural Justice, Environmental Justice, Renewable Energy, Offshore Wind, Formosa 1, Taiwan

I. INTRODUCTION

Development is a long process which aims to create good change, but there's also side effect emerge in between, and environmental crisis, as one of the shortcomings, has become a major obstacle to our path towards a better future. While more international agencies and national government are committed to alleviating environmental issues, Taiwan is also working hard to accelerate its energy transition toward sustainability so that reducing the proportion of global carbon dioxide emissions and strengthening the robustness of national security that has caused doubts due to the high imported rate of raw fuel materials.

As a national goal to become a nuclear-free country and renewable energy to account for 20% of power generation by 2025² (Presidential Office, 2016), when solar energy matures and grows steadily, and water and onshore wind have their geographical

¹ "Global Offshore Wind Speeds Rankings," 4C Offshore, accessed July, 12, 2020, <https://www.4coffshore.com/windfarms/windspeeds.aspx>

² "Promote renewable energy power generation target to reach 20% by 2025," Office of the President, last modified October 12, 2016, <https://www.president.gov.tw/NEWS/20783>

restrictions, the government advocates offshore wind energy become one of the main driving forces for renewable energy to achieve the goal. On the other hand, as a result of the special terrain for strong wind, Taiwan Strait has ranked as the world's top location for great wind farms. Therefore, the research takes the nation's first and the only offshore wind project, Formosa 1, as a case study and focuses on the social aspects in the planning, construction, and operation stages to explore its sustainability and justice from the perspective of affected communities. Since the offshore wind industry is just at the beginning of its surging and a wider application is underway, the experience of Formosa 1 is also expecting to become a model of the following development and ensure that the offshore wind electricity is economically viable, socially equitable, and environmentally friendly.

Formosa 1 started commercial operations in December 2019, and the research used it as a dividing line to distinguish the "process" and "outcome" parts of the project for analysis. The concept of procedural justice is applied in the planning and construction process of the development to assess the barriers to public participation in the national project and the degree of practice; the environmental justice investigates in the current operation stage aims to determine whether offshore wind electricity is a feasible solution to achieve inclusive sustainability.

II. Formosa 1 in Taiwan

The national development of offshore wind electricity in Taiwan began in 2012 with the announcement of a three-phase strategy, Demonstration Incentive Program, Potential Zones Construction, and a long-term plan to become a large zonal and national cluster³. Formosa 1 is one of the three selected projects from "Offshore Wind Power Demonstration Awards" of the first phase and is the first and only one that is in its operation stage while the other two and the candidates of phase two are still under construction⁴. Being launched at the end of 2019, Formosa 1 was constructed on the offshore of Miaoli, a county on the northwestern coastline of Taiwan and has 22 turbines to generate 0.128 gigawatts in total⁵.

The exclusive fishing right area of Nanlong Fishery Association is where Formosa 1 located (Figure 1) and there are 325 registered boats and 7 harbors under the association, among them, fishers from Longfong Fishing Harbor and Waipu Fishing Harbor are the majority and also the most affected communities of the development project. In terms of fishing methods, "gillnetting" and "pole and line" are the majority, and in the offshore wind project, the former are considered victims since the net they putting on the water needs to float with the flow and catch fish during the move but will be blocked by the newly installed turbine; the latter were seen as beneficiaries because the artificial reefs transformed from turbines will make them easier to fish. In an early survey of their intentions for offshore wind electricity, only 16% of fishers in favor of the development⁶ because most people do not understand the building and had debates on its effect, feeling that their livelihood would

³ "Directions for Allocating Installed Capacity of Offshore Wind Potential Zones," Ministry of Economic Affairs, 2018.

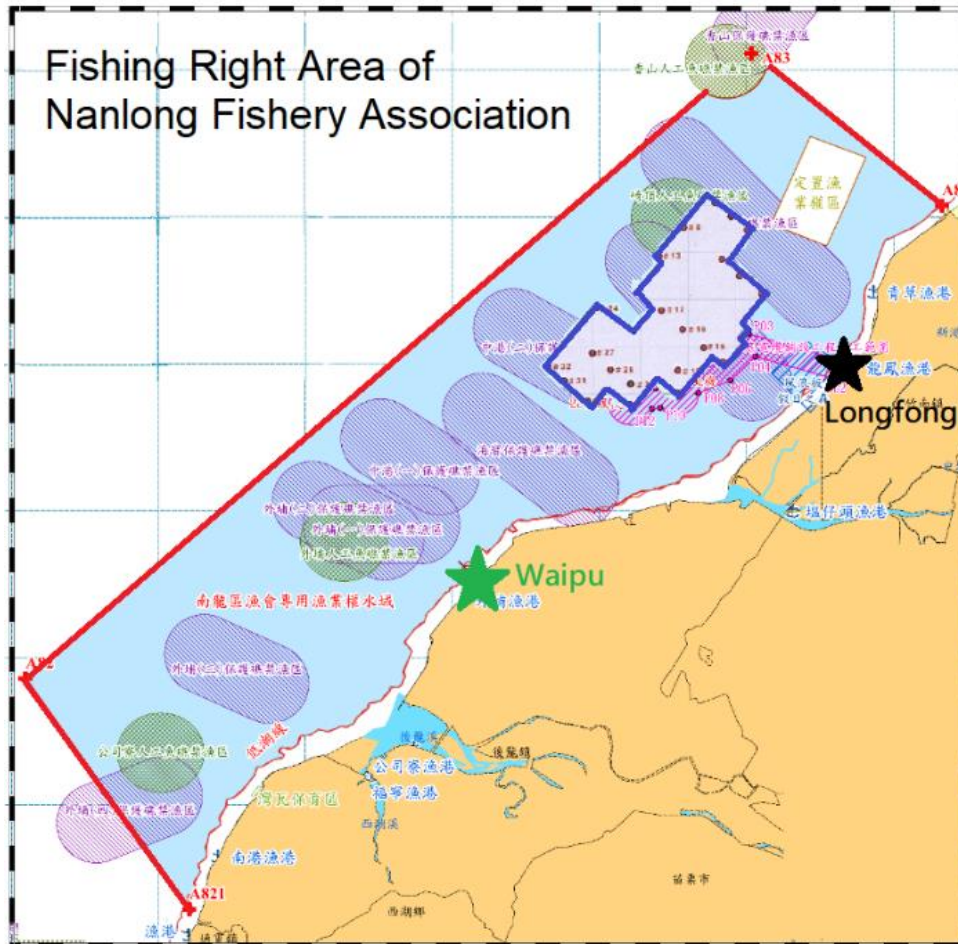
⁴ "The Renewable Energy Development Act," Ministry of Economic Affairs, 2019.

⁵ "Site Introduction," Formosa I Wind Power Co., Ltd, accessed July, 21, 2020, <https://formosa1windpower.com/location-c/>

⁶ "Environmental Impact Assessment Report of Zhunan Formosa 1 Offshore Wind Electricity," Formosa I Wind Power Co., Ltd, 2014.

be severely affected, and this also caused the follow-up issues. However, the construction of Formosa 1 began in 2015, two years after passing the Environmental Impact Assessment (EIA) and the disputes were continuing.

Figure 1.
Fishing Right & site



Note. Within the red line is the fishing right area of the fishery association; within the blue line is the location of Formosa 1; the black star is Lonfong Fishing Harbor; the green star is Waipu Fishing Harbor⁷.

III. METHODS

In order to understand the socio-economic dimension under the global trend of environmental protection and analyze the social perspective on sustainable development, the research uses qualitative analytical techniques with the data collected through two-month field survey in Taiwan, both in Mandarin and Taiwanese and translated into English afterward, and the most common response was gathered for analysis. Bilingual secondary literature, English and Mandarin, were reviewed to increase the adequacy. Moreover,

⁷ "Miaoli County exclusive fishery rights," Fisheries Agency, Council of Agriculture, Executive Yuan, 2016. Edited by the author.

owing to the difference in the degree of influence on the two fishing methods in two fishing harbors, the participating fishers were classified into four types to further understand their position. In total 15 one-on-one interviews and three group discussions were conducted, including fishers and members from Nanlong Fishery Association.

The framework of the research was separate from process and outcome, applying the concept of procedural justice and environmental justice respectively to examine the sustainability of offshore wind electricity in the context of the social dimension. Webler & Tuler⁸ divided the statements that constitute good participation in four viewpoints. This study uses the four key statements covered by all viewpoints as a measure of procedural justice, namely (1) reach out to everyone, (2) information accessibility, (3) meaningful interaction, and (4) satisfy diverse interests. And as Zuhair & Kurian⁹ indicated, socio-economic obstacles may also affect the result of public participation, which reduces the motivation of stakeholders, so “actor barriers” were involved in the examination of the process as well. Considering the result, according to Walker¹⁰ that “the criterion of just distribution should be expected to reflect the different meanings of goods and bads that emerge in particular contexts” (p. 44), the definition of the environmental commons being gains or losses varies from person to person. Therefore, the focus of the study is how the affected communities evaluate Formosa 1 after its completion in order to scrutinize the attitude of the fishers toward the project as a whole.

IV. Procedural Justice

The find of the process including site selection, Environmental Impact Assessment review, compensation negotiation, and construction stage. During the Environmental Impact Assessment, three public explanation meetings and three review committees were held. After the first public meeting, the developer was asked to have another explanation particularly for fishers, thus there's the second and third, and the first review pushed the revision of the project location and make the scope narrow to avoid the habitat of endangered Indo-Pacific Humpback Dolphins and stay away from most of the environmentally sensitive areas listed by the government (Figure 2¹¹). The assessment passed after the third review, yet the consensus did not achieve and there were still protests but the developer promised that they won't start the development unless getting the consent of the fisher of the association. With the adjustment of the site selection, the value of Environmental Impact Assessment was somehow shown, yet the lack of compulsory social communication in the process caused follow-up problems.

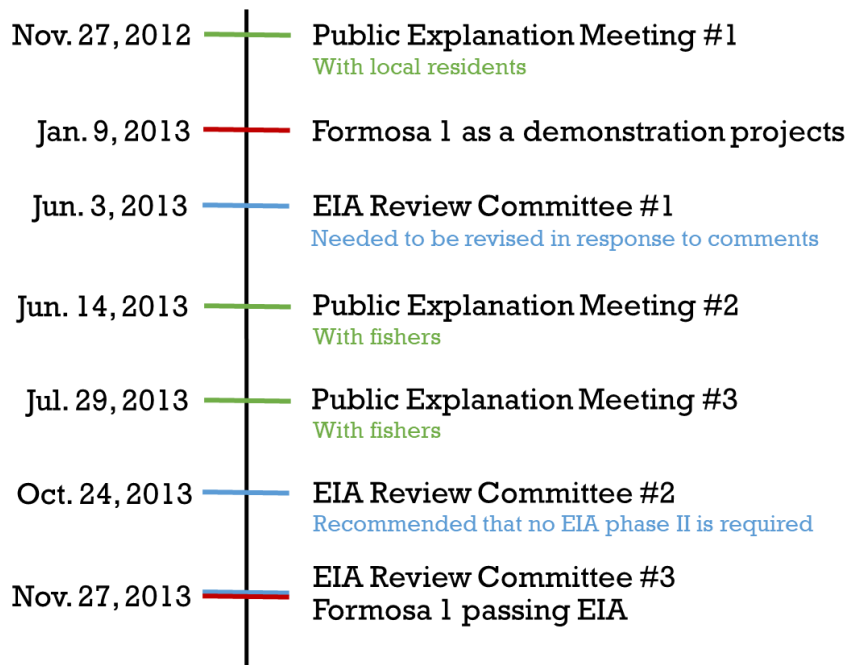
⁸ Webler, Thomas & Tuler, Seth. “Four Perspectives on Public Participation Process in Environmental Assessment and Decision Making: Combined Results from 10 Case Studies,” *The Policy Studies Journal*, (2016): 699-722. <https://doi.org/10.1111/j.1541-0072.2006.00198.x>

⁹ Zuhair, Mohamed Hamdhaan & Kurian, Priya. “Socio-economic and political barriers to public participation in EIA: implications for sustainable development in the Maldives,” *Impact Assessment and Project Appraisal*, (2016): 129-142. 10.1080/14615517.2016.1176404

¹⁰ Walker, Gordon. *Environmental Justice*. London, UK: Routledge, 2012.

¹¹ Information from “Environmental Impact Assessment Report of Zhunan Formosa 1 Offshore Wind Electricity,” Formosa I Wind Power Co., Ltd, 2014. Draw by the author.

Figure 2.
Timeline of Environmental Impact Assessment



Member fishers from Nanlong Fishery Association asked for compensation because they felt that their livelihood is severely affected by the project. By using the past catch data to fight with the developer, the amount added after every negotiation. The price increased from US\$ 1.6 million to 10.2 million, and the proportion of fishers' approval increased from 16% at the beginning to 65% in the fourth meeting. The compensation was finalized at the fifth negotiation between fishers and developer representatives, but the way it was distributed caused further problems. Some people find it unfair to divide equally because (1) different fishing frequency: some boat owners were no longer fishing but some still need to fish for making a living; (2) different fishing method: "gillnetting" group was negatively affected by the project while "pole and line" have relatively positive influence; (3) different fishing location: Formosa 1 is constructed on the offshore right outside the Longfong Fishing Harbor and Waipu is ten kilometers away, all of them receiving the same amount of fishery compensation. Therefore, a self-help group was established by the "gillnetting" fishers in order to fight for their right. The group lasted around one to two years and disbanded owing to internal issues like the lacking of unity, divergence, and the wavering of the leader. The compensation was still equally distributed and the development began since most of the members of the association agree on the project.

To review procedural justice from the records and interviews, (1) with free participation policy, in spite of having other concerns about participation, several interviewed fishers agreed that the process reaching out to everyone; (2) the information is published and accessible, however, with knowledge gap and some political issues, it's not comprehensive enough for the locals; (3) the opinion toward the interaction varied from person to person, some people have noticed their learning while the other denied the effectiveness; (4) from the revision of the project location, it was found out that the environmental interests were mostly satisfied but not socially. When it comes to actor

barrier, the distance to the Environmental Impact Assessment venue in Taipei City where has around a hundred-kilometer distance from Miaoli County, and the technical knowledge gap between the fisher and the developer were raised as barriers.

As the first project, everyone was learning while doing and some improvements were seen during the development of Formosa 1, including the delimiting of dolphin habitat, a tighter site selection regulation, more effective communication between developers, and the drafting of offshore wind compensation benchmark. But also issues that need more attention in the future development, for instance, the advance of public participation in siting process to prevent the damage of fishers' operation, the involvement of social aspect in Environmental Impact Assessment, as well as the trustworthiness of the government since a few interviewees had questioned the implementation of the authority with the commitment of the development contract.

V. Environmental Justice

Formosa 1 was launched at the end of 2019 and now in the operation stage, this chapter will focus on the result and future of the development of offshore wind. The perspectives toward the outcome were different between the two fishing methods, and so as their thoughts on environmental justice. In terms of the affected group, "pole and line" were considered beneficiaries because the environmental gains were greater than the losses, but for "gillnetting" fishers, the environmental bads were more than the goods, leading to an unbalanced result. The victim group even complained that it's the injustice under the tyranny of the majority in the democratic system and the right of minorities was buried in the trend of pursuing maximum benefit (Figure 3).

Figure 3.

	Environmental benefits	Environmental burdens	Environmental justice
Pole and Line	<ul style="list-style-type: none"> • Compensation • Possible job opportunity • Easier fishing with artificial reef transforming from wind turbine 	<ul style="list-style-type: none"> • Hidden risks when being close to the construction 	Seem as beneficiaries
Gillnetting	<ul style="list-style-type: none"> • Compensation • Possible job opportunity 	<ul style="list-style-type: none"> • Fishing operation be affected by turbines • Raising cost of time and oil 	Seem as victims (of majority tyranny)

As a solution for affected livelihood, the developer proposed a cooperation plan with fishers, but so far the effect was not really shown yet. (1) Fishery transformation: due to the regulations that the gillnetting fishing raft can only carry people with crew certificate and the high cost of new investment on other equipment, the transformation to sightseeing fishery is not so realistic; (2) cultivating of Marine Protected Areas: there is no immediate benefit for "gillnetting" fishers of the establishment of the area around the wind farm since their big rafts cannot drive close to the turbines; (3) set net fishing and cage culture cooperation: apart from the geographic inappropriateness of the new fishing method,

fishers also question the ambiguity of the cost expense and revenue sharing. For the not so optimistic future, in the end, fishers of gillnetting tended to accept the outcome since most of them are about to retire and have almost no kids to hand down. They just keep the career as long as possible until retirement making them end this expertise in their own hands. On the other hand, there has been controversy about the gillnetting method worldwide, especially under the global pressure of sustainability and ecofriendly, from the perspectives of outsiders who question the fishing operation, the promotion of the offshore wind farm might become an opportunity to terminate this not environmental friendly method in the other way.

As mentioned, the outcome and the opinion of environmental justice achievement were distinctive between two groups of the main fishing methods in the region, but some experiences can be learned. First, avoiding the overlapping of the fishing ground and project location can reduce many disputes derived from the fishery operation; second, more benefits like the subsidies of electricity price to give back to people with the NIMBY effect would be a measure for the government to ease the struggle; third, as industry transformation, the cooperation of the cross-departmental team and a more comprehensive policy is required.

VI. CONCLUSION

The finding of the research points out that firstly, the different impact on the two fishing method is the main reason for their different attitude, both during the project and after the completion. This has little to do with whether its sustainability or not, but how badly the development will affect the current life. Secondly, in the democratic system, theoretically, procedural justice should be guaranteed and the actor barrier should be avoided; the government should put more effort into the implementation and the issue caused by the mechanism, such as the tyranny of the majority. Thirdly, the balance of environmental justice is the main measurement for people to determine their intentions; once benefits outweigh burdens, the opinion tends to be positive. Therefore, in order to gain more support from the people on the way to sustainable development, how to reduce the environmental losses and increase the environmental benefits is the task for the nation.

The finally operating of the country's first offshore wind project greatly reduces the social concern and disputes of the new industry, yet the pursuit of procedural justice during the developing process and the balance of the entire environmental justice requires rigorous supervision and real implementation. Only when justice and sustainability go hand in hand can we gather greater strength and move towards a better future together.