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PERCEPTIONS OF OFFSHORE WIND FARMS AND COMMUNITY DEVELOPMENT: CASE STUDY OF FANGYUAN TOWNSHIP, CHUNGHUA COUNTY, TAIWAN

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Key words: Offshore Wind Farms (OWF), green energy development, community engagement, stakeholder empowerment, traditional industries, community-based tourism

ABSTRACT

Surrounded by the ocean, Taiwan has many rich marine cultural resources that have benefited its coastal communities and led to the development of diverse traditional marine industries. A typical example is the unique tradition of "Sea Buffalos Working in the Oyster Field", which has been practiced for over a century in Fangyuan Township of Changhua County. The cultural landscape of buffalos and workers cultivating oyster fields has been recognized as a precious cultural heritage by both local and international parties. However, Fangyuan Township is facing a turning point due to the installation of offshore wind turbines. Development-promoting public agencies and the private sectors are both in need of a new vision of communities in which a viable combination of new, green-energy-based industries and traditional, culture-based industries is allowed to take shape. With that in mind, we reviewed several other localities' experience of green-energy development and its effect on the community. We also analyzed how traditional cultural properties have been incorporated into the tourism industry in Fangyuan Township while also investigating the potential impact of the development of offshore wind farms (OWF) on traditional oyster cultivation there. A series of interviews and meetings with key stakeholders were held to examine, from different points of view, the benefits offered to the community by OWF developers and governmental decision-makers. Our normative case of Fangyuan for providing community benefits by reviving the local culture and encouraging tourism based on both traditional activities and OWF appeared to be received favorably by all involved.

I. INTRODUCTION

A search for new sources of clean energy to mitigate the prospect of climate changes is now underway. The power grid is undergoing a transformation as countries across the globe seek to achieve zero emissions for power systems before the year 2050 (IPCC, 2018). Owing to uncertainty in the global power market, and also due to changes in the renewable energy policies of various nations, the detailed outlook for the wind power industry is unpredictable; however, wind power will certainly play a significant role in energy systems in the future. Taiwan is a country that relies upon imported energy for as much as 98% of its power supply (Bureau of Energy, Ministry of Economic Affairs [henceforth BOE], 2019). Faced with such a high reliance on fossil fuels and with doubts about the safety of nuclear power plants and ways to dispose of nuclear waste, public opinion in Taiwan is shifting towards the goal of a low-carbon and nuclear-free home land in the next few decades (Taiwan Research Institute, 2019). In light of the shortage of self-produced energy and the island's great dependence on imported energy, as well as the "Greenhouse Gas Reduction and Management Act" promulgated in 2015 (Laws and Regulations Database of ROC, 2019) and the Paris Agreement reached in UNFCCC COP21 (UNFCCC, 2019), Taiwan is bound to follow a path of energy transition and must seize this opportunity for green growth. Among the potential sources of renewable energy, offshore wind energy is probably one of the most practical ones for this island, with an estimated capacity of at least 6-10GW in the Taiwan Strait (Lai et al., 2012). Offshore wind power thus offers Taiwan a fine opportunity to increase the proportion of renewable energy in its power supply. Establishing offshore wind farms (OWF) would also encourage localization of the power supply chain..

When BOE (2015) issued its "Directions of Zone Appli-

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cation for Planning of OWF", 36 "Zones of Potential" (ZAP) were specified and offered to wind power developers either by application or by auction. On 30 April 2018, 7 applicants were awarded sufficient grid capacity to commission 10 OWF (BOE, 2018a). Then, at the auction completed on 22 June 2018, 2 companies were commissioned to first complete 4 pilot projects and then provide a total of 1,664MW by 2025 (BOE, 2018b). In all, 2 domestic and 5 foreign investors have begun to work in the Taiwan Strait. Geographically, Changhua County including Fangyuan exceeded all other jurisdictions, with a promised output of 2,400MW that represents 62.6% of the total envisioned new wind-power capacity.

The Energy Policy Bridging and Communication Division (EPBCD) of the National Energy Program-Phase II (NEP-II) was established within MOST (Ministry of Science and Technology) in 2014 to bridge and foster communications, as well as alleviate conflicts among the BEO, developers, the local public, politicians, and communities about renewable energy issues (NEP II, 2014). Such problems commonly arise from the pursuit of controversial projects such as the development of offshore wind power, but EPBCD has encouraged meaningful public engagement and partnership during both the decision-making phase and project implementation. With respect to the development of communities and offshore wind power, it engages local stakeholders, OWF developers, engineers, central and local agency decision-makers, and others, encouraging them to learn from each other and to carefully consider the trade-offs involved in developing OWF. In this paper, which summarizes the authors' activities on behalf of EPBCD, we try to show how community engagement and benefit sharing can be integrated to offer community support despite the initially conflicting viewpoints of those involved. Community engagement refers to the processes through which a developer interacts with the community to guide the development of a project. It is a general term used to refer to many activities including communications, consultation, participation, and co-development (e.g., Cass et al. 2010; Lane and Hicks, 2017). Although use of the term has become commonplace, its implementation in practice has been haphazard, with varying degrees of commitment to genuine community participation in directing the process and outcomes of development. There is no single best way to do community engagement, and no one-size-fits-all approach, but several key factors in its successful implementation in other wind-farm-developing countries have been noted (Lane and Hicks, 2017).

The present study was conducted in the Fangyuan coastal region, where 5 OWF developers are planning to construct 10 OWF. Fangyuan Township is located in the southwestern coastal area of Taiwan and consists of 26 villages with a total population of approximately 36,000 people. The main economic activities include commercial fishing centered at Wangkung Harbor and agriculture, with the former particularly important because of its dominant role in the township's history and economy. Oysters are a main commercial species and represent a strong cultural-heritage value for the area's population. Fangyuan Township also attracts tourists owing to its abundance of marine cultural properties. Here we present the steps taken so far to implement community engagement in Fangyuan and to inspire new sea-based small businesses to benefit the community as the marine fisheries there are impaired. We also discuss the likely future of culturally valued traditional practices like the "Fangyuan Sea Buffalos" (Lin, 2015; Pan, 2017).

Our working assumption has been that community benefits linked to OWF can provide a means of smoothing the way for community approval of the installation process (Lin et al., in prep.), and so we also report on and try to rationalize the rather high degree of ambivalence we found among the townsfolk with respect to the development-based benefits on offer. There are different opinions, based on different public-policy viewpoints, as to why and whether wind farms need to be installed off Fangyuan. A platform for negotiation is required for stakeholders and OWF developers to arrive at a mutual understanding of the irrespective viewpoints. As we had hoped, the stakeholders and developers and local government were able to come together to devote themselves to the common goal of regional prosperity. The developers also recognized the importance of planning and developing of industries based on local cultural properties, some ideas for which are described below.

II. METHODS AND DATA COLLECTION

As one facet of EPBCD's NEP-II project starting in 2014, we worked for more than 5 years in Changhua County to investigate how to facilitate discussions among Fangyuan Township's stakeholders with respect to renewable energy development, the tourism landscape, wetland conservation, and cultural properties. The most important goal was to empower stakeholders to become participants and practitioners in Fangyuan's community development. The provision of community benefits is of great importance for offshore wind project development and approval in Taiwan. How to achieve this in ways acceptable to the many different stakeholders is a big challenge. In the present study, on behalf of EPBCD, we first reviewed the history and prospectus for OWF development off Fangyuan and in nearby regions, as well as the known environmental impacts of offshore power installations, which can involve noise, visual intrusion on the natural landscape, impingements on local cultural heritage and fishing rights, and so on. We also reviewed how cultural attributes and tourism have been affected by or have accommodated themselves to OWF in various places around the world.

Lane and Hicks (2017) indicated that successful community engagement with respect to large-scale infrastructure development projects depends on several key factors, and we reviewed the steps taken so far by OWF developers and relevant government sectors to see how well these factors have been addressed:

Table 1. Meetings and workshops held in this work.

Date	Place	Title
2015.06.30	Fangyuan Township, Changhua County	2015 Energy Development and Sustainable Community Forum
2015.08.30	Fangyuan Township, Changhua County	2015 Renewable Energy Development and Marine Culture Education Camp
2015.12.31	Fangyuan Township, Changhua County	2015 Outlook for Development of Cultural Tourism in Fangyuan Township Forum
216.08.29	Chunghua Fishery Association, Changhua County	2016 Sea Buffalo and Sustainable Community Forum: Cultural Properties and Tourism Development in Fangyuan Township
2016.12.15	Fangyuan Township, Changhua County	2016 Rethinking OWF and Coastal Communities' Development Forum: Experience of Returning Youth
2016.12.16	National Taiwan Ocean University, Keelung	2016 The 2nd Conference on OWF and Fishing Communication Platform: Regulations on OWF Development Assistance Fund
2017.03.30	Changhua Fishery Association, Changhua County	2017 Fangyuan Communities Sharing Platform of Information and Knowledge of Renewable Energy Series I: Era of Green, Sharing of Green and Win-win Situation
2017.10.23	Changhua Fishery Association, Changhua County	2017 Fangyuan Communities Sharing Platform of Information and Knowledge of Renewable Energy Series II: OWF Installation vs. Local Eco-system
2017.11.04	Changhua Fishery Association, Changhua County	2017 Fangyuan Communities Sharing Platform of Information and Knowledge of Renewable Energy Series III: Local Culture, Environment and Green Energy Education
2018.08.16	Wangkung Oyster Art Association	2018 Wind of Fangyuan: Green Energy and Local Curriculum Demonstrative Teaching Seminar

- starting engagement early in the development process
- integrating the development with local landscape values and local identity (tailoring to local context)
  completing a social feasibility analysis
- community (especially local) participation in decision-making and design (fair process)
  sharing the benefits from the development in an equitable way (fair outcomes)
- building trust and relationships between stakeholders
- regular and face-to-face engagement
- prioritizing an accessible complaints management process
- managing community engagement for legacy projects

The issue of community engagement is distinct from that of the above-mentioned community benefits, such as payments to the community from developers, local people's ownership of shares in the OWF, and the hiring of local people and local contractors. Community engagement was our major focus, as we mainly sought suggestions for reviving locally celebrated cultural properties with tourism potential, which could provide a realistic set of benefits. That is, we tried to use Fangyuan as a case study of changing perceptions of OWF and community development, changes that depended on ancillary goals such as the revival of local cultural properties and transformation of traditional fishing. We tried to help the key stakeholders in such matters to present their requirements to OWF developers and relevant government agencies.

For specific data on stakeholders' viewpoints at Fangyuan, we held a series of semi-structured interviews, symposia, workshops, and experience camps. Semi-structured interviews were conducted with different stakeholders including developers, members of the local public, non-governmental organizations (NGO), politicians, local fishermen, educators, local government officials, and consultants. Recordings, transcripts, minutes, questionnaires, etc. obtained at 10 symposia, workshops, and experience camps that we convened in Fangyuan (once in Keelung) over the courses of the 5 years provided additional valuable information as shown in Table 1.

III. RESULTS AND DISCUSSION

1. Impact of OWF on the Community and Community Acceptance and Participation in OWF

1-1. Community Engagement

Through semi-structured interviews, seminars, and workshops arranged by the present authors, OWF developers and local stakeholders were jointly able to construct a vision of Fangyuan's future development. Discussions of the impact of OWF installation and the feasibility of modifying Fangyuan's cultural tourism industry also took place.

For example, in a seminar held on 31 December 2015 (Lin et al., in prep.), participants representing key stakeholders (similar to those listed below) addressed the future direction of community development, the importance of environmental

protection, the decrease in the local population, and the challenges of maintaining a balance among the economy, environmental protection, and the preservation of traditional cultural values. The participants also reached a consensus about developing cultural-educational tours to present the "Fangyuan Sea Buffalo" as a distinct cultural attribute of the township, and about incorporating wetland conservation, agriculture, and fishery traditions into new types of tourism. As another example (Lin et al., in prep.), a workshop held at the Fangyuan Fishery Association in 2016 specifically focused on cultural tourism, because "Sea Buffalos Working in the Oyster Field" had recently been listed as a cultural heritage by Changhua County Government. Directors and other officials of Changhua County's Cultural Affairs Bureau, Department of City and Tourism, Department of Agriculture, Department of Economic Affairs, the Changhua Fisheries Association, Fangyuan Township Municipality, and the local aquaculture industry, as well as lawmakers, county council members, and representatives of the "Sea Buffalo" cultural tourism industry, were all in attendance. Stakeholders exchanged views and opinions on the County Mayor's vision for promoting green energy and culture, and discussed other community's experiences with renewable energy. In addition, participants were invited to witness the Fangyuan Sea Buffalos and the oyster fields first-hand, thereby allowing executives and local citizens to share informed opinions and make better decisions about cultural tourism and the wetland ecosystem (Lin and Hsu, 2017).

1-2. Community Benefits

Consideration of community benefits derived from offshore renewables is a relatively new idea anywhere in the world (Rudolph et al., 2014). It is important to allocate appropriate community benefits for people who live near or are potentially most likely to be impacted by development. Such benefits must not be confused with or be referred to as compensation measures or rewards, such as might be enforced legally to mitigate losses for or impacts on relevant third parties, such as fishers or environmental organizations, caused by offshore development. Nor are they in any way to be regarded as bribes for consent. Rather, community benefits can build local support for a project if they are perceived as a means of creating greater equity (Aitken et al., 2014: 68). They may be offered for a number of reasons (Rudolph et al., 2014):

1) *Voluntarism by developers as good practice of community engagement.* Community benefit schemes from offshore renewables were first introduced by some developers in the UK for Round 1 offshore wind farm projects in 2001 in order to replicate the positive experiences from onshore wind farms. Since there were no regulations, community benefit packages were arranged on a voluntary basis between the developer and potentially affected communities (Cass et al., 2010).
2) *Statutory conditions imposed by authorities.* Community benefit schemes can also be statutory conditions of a development plan. For example, the winners of Taiwan's "Offshore Wind Potential Zones Installed Capacity Allocation" competition described above must allocate 3% of the assistance fund to investment in environmental and social responsibility affairs (BOE, 2015). However, such statutes are not common, and only a few authorities have imposed regulations that amount to material considerations in the planning process. For example, in the United States a particular scheme in Massachusetts legally obliges a wind farm developer to provide community benefits (Klain and Battista, 2015; Vineyard Wind, 2019). In Denmark, regulations state that at least 20% of the ownership of an OWF should be offered to local communities and adjacent municipalities (Green Economy Coalition, 2017). In Scotland, there is no legal obligation for developers to offer community benefits, but the Highland Council has introduced the most advanced community policy anywhere, which guides voluntarily contributions from developers and also regulates the distribution of benefit payments from offshore renewable (Highland Council, 2013).
3) *Demand from communities.* Explicit requests for community benefits can emerge as a direct response from communities demanding involvement in the harvesting of offshore renewables and the distribution of the resultant benefits. If there is a mismatch between the local costs of OWF (e.g., perceived, potential, or likely impact on scenic views, the local environment, preexisting activities like fishing, and anticipated future uses) and their regional or global benefits (e.g., decreased carbon emissions, diversified electricity sources), sharing the benefits of a project can enhance the social and economic outcomes for the local community and build further support for the project (Klain et al., 2017). Governments, developers, and communities often display different, and at times conflicting, understandings of community, benefit, and impact. Correspondingly, benefits are often delivered in different ways, depending on which set of definitions is being drawn upon. They may be focused solely on a particular local community or organization, or delivered more widely. As for Fangyuan, among the OWF developers working in Taiwan, Copenhagen Infrastructure Partners (CIP) has established an NTD 230 million (US$ 7.6 million) community fund for the benefit of local communities (CIP, 2018). Each year, NTD 3.3 million is to be awarded to support charitable, educational, cultural, and environmental activities in the community. Another developer, Ørsted, has signed a contract with a university in the community to support the development of a highly skilled workforce by providing training opportunities during the construction, operation, and maintenance phases of the project (Ørsted, 2017). The Hailong Project undertaken by Yu-shan Energy and NPI has signed a Memo of Understanding with the Wangkung Oyster Culture Association, a local NGO, promising cooperation on marine environmental matters, green-energy education, and the promotion of community development

(United Net News, 2018).

1-3. Fishing Conflicts

Because traditional fishing grounds and OWF sites in western waters off Taiwan greatly overlap, the fishing industry could be affected in several ways by the installation of OWF; it is the most vulnerable stakeholder of all. First, the noise of construction might permanently displace commercial fish species from their breeding and feeding grounds. Turbine construction, cable placement, and barge anchorages may disturb the sea floor habitat as well, and there are concerns about the future impact of the noise and vibration that will be created by running turbines (Shao and Shao, 2016). Secondly, because OWF require safety zones and have the right to exclude vessels from a certain distance around the turbines, some kinds of commercial fishing, particularly those using gill nets and bottom trawls, would face new constraints on their permitted areas of operation and thus suffer economic losses (Shao and Shao, 2016). These potential conflicts between OWF and fishing interests must be reconciled through early and ongoing consultations with the fishing community as regards both compensation for fishing losses and the selection of potential OWF sites. Because negotiations between OWF developers and fishermen on compensation for fishing losses are usually difficult due to haggling over prices (Ou, 2018), the Fisheries Agency (2016) has issued a "Standard of Offshore Wind Power Plant Compensation for Fishery". Although this standard is not compulsory, it has proved to be helpful in furthering negotiations (Ou, 2018).

Will offshore wind farms have an impact on the oyster industry and the "Fangyuan Sea Buffalo" tourism business? At the beginning of this project, we found that the oyster industry seemed unaware of any concerns regarding to the installation of OWF (Lin et al., in prep.), but preliminary indications suggested that water pollution may result from construction necessary for connecting power cables to onshore facilities (Lin et al., in prep.). The companies involved in OWF development are, therefore, looking for methods to eliminate or reduce risks caused by the cable landing, for example, by directing all developers' power cables along a single path to minimize the need for multiple connecting sites in wetlands (Taiwan Environment Information Center, 2019).

1-4. Opportunities for New Businesses

The introduction of novel kinds of marine-oriented small business has been suggested for affected fishing communities (Lee, 2015). For example, existing fishing boats, which already offer charter services to sports anglers, might be used to transport paying tourists out to view OWF facilities ("turbine-watching"), with the possible additional benefit of making the turbines more attractive to the public. Other tourist-oriented suggestions include the introduction of diving facilities, with OWF acting as artificial reefs, as well as the establishment of offshore floating restaurants in the vicinity of wind farms (Ou, 2018). On land, a wind-farm visitor center may serve as the focus for additional tourist attractions while also fulfilling its core educational and motivational purposes: dissemination of knowledge and improvement of the image of the green energy sector, especially in the eyes of the young generation of locals who are potential future employees in this sector. Even as they inevitably bring about certain changes in the commercial fisheries, OWF projects are expected to directly generate and support thousands of new employment opportunities (Lee, 2015). Even after the construction phrase, operations and maintenance of the facilities will represent the majority of total job-years because such jobs will endure for the whole 25-year lifetime of the wind farm. This will represent a significant increase in the number of opportunities for fisheries workers to obtain stable sources of full-time, year-round income. Such an addition of new year-round employment opportunities can be expected to have a positive and stabilizing impact on the fishing community, which traditionally represents one the most highly seasonal, regional economies in the region (Lee, 2015).

2. Challenges

To further develop Taiwan's ample wind resources, the island still needs to tackle a few issues, including environmental considerations, the threats posed by typhoons and earthquakes, and the current limitations of offshore wind generation technology. In particular, the social-economic and environmental impacts of OWF have yet to be considered. Disturbances to migrating birds and marine mammals, impacts on and losses to the commercial fishing industry, and repercussions for navigation and harbor development need to be predicted and appreciated, and their remedies planned for, well before any construction takes place. Otherwise, environmental issues will hinder progress, especially when environmental groups are already leery of the potential impact of offshore wind turbine on the marine environment (Lin et al., in prep.).

3. Local Environmental Needs and Supply Chain Localization

Unlike Western Europe, Taiwan often experiences natural disasters such as earthquakes and typhoons. This means that internationally available technologies are not fully applicable to, or compliant with, the situation in Taiwan. Companies engaged in OWF development need to cooperate with foreign firms but at the same time they must develop locally specific technical means of facing environmental challenges in Taiwan. Such efforts include research on and the manufacturing of key components of wind turbines and their foundations with anti-earthquake, anti-typhoon, and anti-corrosion characteristics (Flanders Investment & Trade Taipei Office, 2014: 15-16). One of the main purposes of the above-mentioned "Demonstration Incentive Program" and "Directions of Zone Application for Planning of OWF" was to stimulate local industrial development by encouraging wind-farm developers to invest in R&D on Taiwan-made turbine components. Another purpose was to encourage the improvement of local fleets with an augmentation of the country's skills in marine construction, operations, and maintenance. While the developers have had

to organize consortia or joint-venture companies with foreign corporations, they must also submit documentary evidence of their local supply chain to BOE for reviewing by the end of 2019 in order to obtain an electricity generating permit (BOE, 2015). This will ensure that local suppliers are connected with international supply chains and create higher value in the finished facilities. For example, the first four demonstration units installed by the two private awardees in the "Offshore Demonstration Incentive Program" will be manufactured overseas while those installed by the state-run Taiwan Power Company are meant to have a significant proportion of domestically-produced components.

4. Environmental Disturbance

According to researchers studying how wind turbines affect the environment, OWF will change regional ocean ecosystems in profound and unexpected ways. Most such research stems from Europe, where offshore turbines have been operating since 1991, but the results can nonetheless help to shape plans for deploying OWF in other parts of the world. In particular, local residents frequently express their concerns about OWF in terms of environment and safety. Environmental protection groups and ecological conservationists are concerned about impacts on marine species such as white dolphins, flight routes for migratory birds, and wetland conservation during OWF construction. In Taiwan, the potential and actual impacts of OWF on Fangyuan's environment need detailed, long-term study. Policies are required to balance the development and conservation of Fangyuan's coastal areas because such development will have an impact on the "Fangyuan Sea Buffalos" as a cultural industry and also on the maintenance of a sustainable community (Lin et al., in prep.).

5. Offshore Renewables as a Basis for Community-Based Tourism

It was suggested above that OWF may provide opportunities for new kinds of tourism-based maritime business. There is another way to organize such businesses so as to provide sociological as well as economic benefits. Community-based tourism is a form of sustainable tourism that allows visitors to connect closely with the communities they visit. It has been promoted as a means of development whereby the social, economic, and environmental needs of local communities are met through the offering of a tourism product. This emerging form of travel gives tourists genuine experiences, while allowing income generated by tourism to remain in the often rural, poor or economically marginalized community. Communities run these tourism enterprises, which provide services such as village tours, nature walks, history and culture experience, and local foods on their own initiative. Because communities are the owners of these tourism enterprises, they have the incentive to invest in a quality tourism product for tourists. Community-cultural tourism is a particular facet of community-based tourism in which at least some of the experiences are based on cultural properties. It benefits both cultural conservation and local communities themselves, by generating financing for management of the community culture. Community tourism of this sort not only encourages cross-cultural understanding between hosts and visitors but also embraces the bottom line of environmental protection, cultural conservation, social responsibility, economic health, and the enhancement of livelihoods. Community-based tourism may benefit both the community and tourists as follows (Responsible Travel, 2019):

For the community:

- It brings recognition and attention to the community.
- It augments the community's economy while diversifying its economic activity.
- It provides an alternative to unsustainable forms of income resulting from shortages of natural and human resources.
- It encourages conservation of natural resources, when the main product is related to wildlife or other natural resources.
- Tourism income is more likely to remain in the community.
- It encourages community pride and conservation of the community culture.
- It involves and encourages the participation of community residents.

For tourists:

- They receive a real experience and learn first-hand about the community from local guides.
- They have an opportunity to develop a deeper connection with the destination.
- They know exactly where the money will go and can feel good about it.
- In the case of ecotourism, they achieve the win-win benefits of supporting natural heritage conservation.
- They get a unique look at a particular destination.

Developing "green life" and "green industry" has become a promising way to achieve a sustainable civilization in 21st century. In Germany, the annual renewable share of electricity production reached 40.3% in 2018 (Fraunhofer Institute for Solar Energy System ISE, 2018). One particularly well-known "green" community there, Joined, has successfully implemented green life and green industry and thereby become a tourism attraction (Frantál & Urbánková, 2014). Recently, energy tourism has developed as a type of industrial tourism and also as a type of special-interest tourism. Such tours can serve for both educational and recreational purposes, and highlight the possibility of using green energy as a marketing strategy. Three additional cases of energy tourism, all in the Czech Republic, may be mentioned (Frantál and Urbánková, 2014): tours of coal mines, the information center at a nuclear power plant, and Dragon Kite Festivals held under wind turbines. Survey results showed, for example, that people who visited the nuclear plant site developed a significantly more positive attitude towards nuclear energy after their visit (Frantál and Urbánková, 2014). Other examples include en-

ergy tourism in the Danish islands of Lolland and Falster, where an offshore wind farm is considered an important component of the tour (Holm and Højbjerg, 2009), and a study of tourists' and local residents' views of a wind farm marketed as a "green tourism" spot near a Portuguese village (de Sousa and Kastenholz, 2015).

IV. CONCLUSION

The resistance to the Kuokuang petrochemical industry from 2003 to 2011 made Fangyuan famous and brought tourists to visit "Fangyuan Sea Buffalos" and the oyster fields (Lin & Hsu, 2017). From this experience, it became clear how a challenge can become an opportunity. The next challenge for Fangyuan will be the installation of OWF off Changhua County. Although the installation of OWF may have deleterious effects on the natural, cultural and industrial environment of Fangyuan as reviewed above, it could be perceived as an opportunity as well. Positive visions can be developed collaboratively by engaging both the community and developers in discussions and planning. For example, OWF can provide green energy for local residents and industries while also providing a basis for new educational energy tours and DIY courses for students and tourists. Multi-functional wind farms can encourage tourism by, e.g., serving as artificial reefs that conserve the marine ecosystem, enhance the seascape, and provide recreational opportunities. The same could be true for investments in a visitor center that combines green energy education and cultural attributes into one segment of the "Fangyuan Sea Buffalo" tour course. The turbines themselves can also be used as measurement and observation platforms to collect meteorological, marine biological, environmental, and bird-migration data for future research.

Public and private collaboration in community development is not an easy process, especially when it involves a manufactory industry with issues drawn from economics, environmental protection, the socio-cultural sphere, natural science, and politics. Often, lack of trust between citizens and governments or industrial companies is the fundamental issue of dispute. From our analysis of how Fangyuan developed a new form of cultural tourism from its traditional marine culture, we learned ways to manage the issues of cultural property and industry and to improve the prospects for development of a sustainable community. This case provides a prototype for constructing a public-private collaborative vision of green energy and cultural industry. On the one hand, local people know what the community needs, while on the other, they also face the greatest impact of whatever the policy implementation calls forth. Fangyuan's development of cultural tourism is an example of a bottom-up approach in which the local people define their cultural identity, develop an affinity for the land, people, and cultural products through their daily work, integrate community resources for the benefit of all, and develop cultural tourism or cultural creativity products in a unique and personal way. Cultural tourism and creative products developed through such a process will naturally be the most touching and powerful. In this process the government can best act as a provider of resources, a coach for the management of knowledge, an establisher of regulations, and a planner, eventually becoming a beneficiary of the new resources provided by a successful outcome.

Public and private collaboration in developing a green-energy cultural-creativity community should be approached in a holistic way during the planning phase. A new community model of renewable energy featuring co-ownership and cooperation could increase the social acceptance of installing and implementing of renewable projects, but there will be problems in unifying multiple ownerships for such an enterprise, and different patterns of citizen participation could affect the outcome of any particular effort to establish such a community. It has been suggested that inter-agency integration and support at the regulatory level may be helpful in this regard (Seyfang et al., 2013). Many factors are involved on the part of both industrial enterprises and governments: awareness of the unique local culture, promotion of green life and green industry through the implementation of green energy policies, making cooperation and cohesion of diverse local resources possible to bring regional prosperity, advocating green tourism to preserve cultural properties and developing cultural tourism in order to retain unique cultural attributes, and finally, assistance in local industrial transformation and in encouraging youths to return to their hometown. If the renewable energy industry and different levels of government can address all these points, a brighter future for Fangyuan will be at hand.

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