Ecological Economics 129 (2016) 230–240

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Survey

Individual preferences regarding environmental offset and welfare compensation: a choice experiment application to an offshore wind farm project

Charlène Kermagoret [a,*], Harold Levrel [b], Antoine Carlier [c], Jeanne Dachary-Bernard [d]

[a] Ifremer, UMR 6308, AMURE, Unité d'Economie Maritime, rue Dumont D'Urville, 29280 Plouzané Cedex, France
[b] CIRED, AgroParisTech, 45 bis avenue de la belle gabrielle, 94736 Nogent-sur-Marne Cedex, France
[c] IFREMER, DYNECO, Laboratoire d'Ecologie Benthique, Technopole Brest-Iroise, BP70, 29280 Plouzané, France
[d] IRSTEA, UR ETBX, 50 Avenue de Verdun, Gazinet, 33612 Cestas Cedex, France

ARTICLE INFO

Article history:
Received 17 October 2014
Received in revised form 4 April 2016
Accepted 15 May 2016
Available online 1 July 2016

Keywords:
Offshore wind farms
Environmental offset
Welfare compensation
Choice experiment method
Discrete choice modelling
Recreational users

ABSTRACT

This paper uses the choice experiment method to investigate the preferences of local communities with respect to various compensatory measures in connection with a development project. A survey was conducted among recreational users of the bay of Saint-Brieuc, where an offshore wind farm is currently planned. The goal is to identify the preferences of the bay's users with respect to various compensation possibilities: monetary compensation, investment in publicly owned assets, or the ecological restoration. Two multinomial logit (MNL) models and a latent class (LC) model are used to explore the preferences and some sources of heterogeneity within the community. The results of this study show that form of compensation is an important determinant of preferences and has an effect on the acceptability towards the compensation principle. More precisely, results shows that compensation is better accepted if it obeys the principle of strong sustainability, which includes ecological restoration for the gain of the population as a whole and which excludes monetary transactions, associated with the bribe effect. The study also highlights the naturalists' specific attitude for who compensation should be determined within a regulatory framework, one which imposes compensatory measures related to objectively determined ecological impacts.

1. Introduction

Under the stimulus of the "Climate and Energy" package of measures adopted in 2008 and the energy policy objectives that it establishes throughout the European Union, efforts to reduce greenhouse gas emissions have been strengthened. These objectives include the obligation to diversify the energy mix of the Member States by expanding the proportion of renewable energy sources in their total energy production. Given the potential of its seas and ocean, France has decided to focus on Marine Renewable Energy (MRE) and has put this political commitment into effect by issuing two successive invitations to tender (in 2011 and 2013) for the establishment of offshore wind farms along its coastlines. Rapid development of these MRE technologies nationwide is necessary to ensure compliance with the energy goals set for 2020. This implies for the government to be solicitous of public views and to undertake measures for ensuring public support since the locals otherwise might oppose them to the point of undermining their development (Krueger, 2007; Haggett, 2011; Wolsink, 2007).

Like other large public works projects, offshore wind farms are sometimes contested by local opposition movements. These are often loosely equated with the NIMBY (Not In My Back Yard) phenomenon. The NIMBY phenomenon, or syndrome, refers to local residents' resistance to the construction of a publicly or privately owned facility which may possibly be detrimental to their neighborhood (Jobert, 1998). But in fact, the demands advanced by these coastal populations more often indicate that they have been insufficiently consulted and arise out of their perception that there is a threat to the environment and/or to their interests as a community, rather than reflecting the selfish attitude evoked by the term NIMBY (Wolsink, 2010; Devine-Wright, 2005). This highlights the dichotomy between the diffuse character of the collective benefits created by the development project, and the concentration of negative externalities in the directly affected territory. In view of the potential risks to the environment and to the coastal population, various public policy tools have been developed to facilitate the acceptance of projects by local residents, including compensatory measures (Cowell et al., 2012; Gray et al., 2005). The Kaldor-Hicks compensation principle is theoretically supposed to guarantee an increase in the well-being of the population as a whole with no net loss to any

* Corresponding author.

http://dx.doi.org/10.1016/j.ecolecon.2016.05.017
0921-8009/

individual member if compensatory payments are instituted (Hicks, 1934; Kaldor, 1939).

Yet the issue of whether compensation makes such development projects socially acceptable continues to be widely discussed in the literature (Zaal et al., 2014; Frey et al., 1996; Himmelberger et al., 1991). On the one hand, neoclassical economic theory holds that monetary payments can compensate for the loss of utility and, more generally, that changes in well-being can be measured in monetary terms (Groothuis et al., 2008). On the other hand, numerous case studies show that the level of local acceptance of development projects decreases when individual monetary compensation is instituted (Ferreira and Gallagher, 2010; Frey and Jegen, 2001). Two explanations are proposed for this second finding: a bribe effect, where individuals or communities feel that they have been bought off (even if the compensation is collective), and the effect of crowding-out of public spirit, which reduces the sense that the project contributes to the common interest.

The question then is how and to what extent compensation can offset the loss of well-being and environmental damage without generating the negative effects of bribe and crowding-out, and create agreement and social acceptance of the project. A second question is whether, in certain circumstances, compensation can never offset the perception of the impacts of the project. One factor which might overcome these negative effects is the nature of the compensation:

- It seems that the bribe effect could also be reduced if compensation were made in non-monetary form rather than in the form of individual or collective cash payments (O'Hare et al., 1983).
- The elimination of personal motives would be mitigated if the compensation benefited the well-being of the community, in the form of investment in collective assets such as local infrastructure (Mansfield et al., 2002; ter Mors et al., 2012).

There is little research that focuses simultaneously on the principle of compensation and on MRE. However, Westerberg et al. (2012) have analyzed the preferences of tourists who experience impacts on the landscape and found that, in general, willingness to accept monetary compensation decreases as the distance of the wind farm from the coast increases. Their study also shows that the minimum distance of the wind farm those individuals are willing to accept decreases when the project is accompanied by environmental policy measures and/or the establishment of artificial reefs, which are viewed as substitutes for monetary compensation. By contrast, research by Alexander et al. (2013) focusing on the commercial fishing community has found that there is no consensus among this population to the effect that compensation is the appropriate way to offset the impacts. Nonetheless, to promote social acceptance via the tool of compensation, these authors recommend the establishment of a community fund which would enable this population to diversify the types of fishing it practices and/or support locally-based initiatives, rather than offering the fishers monetary compensation on an individual basis.

These findings lead us to propose the following assumptions:

- The community's demand for compensation is expressed differently depending on the nature of the compensatory measures proposed.
- There is preference heterogeneity within the community, depending firstly on the cultural practice of individuals in the territory and secondly on the socioeconomic characteristics of the individuals concerned.

We propose to examine these assumptions here by investigating the preferences for compensation in a population affected by the installation of an offshore wind farm. The area under study is the bay of Saint-Brieuc (Brittany, France), where an offshore wind farm is currently being developed (Fig. 1). Our goal is to identify the preferences of the bay's users with respect to various compensation possibilities. To do this we have used the choice experiment method. The value of using this method to fulfill the paper's objectives is due to the fact that it can measure the ex ante effects of a public development or policy in a particular locality (Dachary-Bernard and Rivaud, 2013).

The attributes selected reflect our desire to balance several different types of activity relative to compensatory measures. First, these attributes include various types of compensation: welfare compensation (monetary indemnification and investment in public assets) and environmental offset. Second, these attributes target different types of ecosystem service, directly or indirectly. Use of the choice experiment method allows us to take into account the complementarity and substitutability among these attributes and to predict how demand will change in response to changes in one or more properties of the issue being evaluated (Rambonilaza, 2004). In our case study, in order to evaluate the losses and gains arising from the offshore wind farm project in the bay of Saint-Brieuc it is assumed that the proposed types of compensation - monetary indemnification, investments in public assets, and environmental offset - and the impacts that they seek to offset constitute elements of the utility function of the respondent. These characteristics of compensation will be affected by the various measures to be implemented, or not, in the scenarios, and will in turn have an effect on user utility.

The results of this specific case study will also provide some general elements about the understanding of individual preferences and motivations in the context of a development project.

2. Materials and Methods

2.1. The Empirical Background

The bay of Saint-Brieuc is one of the first sites in France selected for invitations to tender for the development of offshore wind farms. Previous research carried out in the area shows that local people have a fairly clear idea of how the project might affect the environment of the bay of Saint-Brieuc and, indirectly, the well-being of its users (Kermagoret et al., 2014). However, they have a much hazier understanding of issues relating to compensation for these impacts and they seem to have divergent views on the principle of compensation itself. While the required Environmental Impact Assessment (EIA) is currently under way and should identify some of the types of environmental offset needed, negotiations between the project's promoters and the local commercial fishers have been in process for several years and already seem to have significantly influenced the overall compensation structure that is envisaged. The proposed compensatory measures include concrete environmental measures, investment in public assets for the benefit of the populations potentially impacted by the project, and monetary payments in the form of subsidies. Beyond the negotiations already under way with this key group, it seems worthwhile to identify the preferences of the local population and especially of the coastline's recreational users so as to better understand how their claims for compensation are being formulated. The Saint-Brieuc area has a substantial presence of recreational users, a fact which largely contributes to determining the overall acceptability of the wind farm. However, so far they have not been taken into account, or only slightly, in questions of compensation. The preferences of this category of individuals with respect to the compensation to be put in place in connection with the wind farm seem relatively unclear, but they do perceive a threat to their own interests in the locality. They are focused on cultural services (via the idea of landscape and support for recreational uses), provisioning services (for recreational fishing in the bay), and regulatory services (which ensure the proper functioning of the ecosystems affected by the project).

2.2. Questionnaire Design

The questionnaire is in four parts. It was tested through a sample of 20 individuals, randomly selected, before readjusting the questionnaire. The first part is designed to characterize the recreational activities that