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Social acceptance of ocean wave energy: A case study of an OWC shoreline plant

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ABSTRACT

Social acceptance, along with technical, economic and legal aspects, is a prerequisite for the successful adoption of renewable energies. Research into the social acceptance of the underlying implementation of different renewable energy technologies, such as grid connected photovoltaic solar, biomass and wind power plants, is increasingly gaining interest. Nevertheless, studies that address the issue of the social acceptance of sea wave energy plants are very rare. This article aims at making a contribution towards filling this gap analyzing the community acceptance of the oscillating water column (OWC) shoreline plant of Mutriku, a facility that has been subject of great interest due to its innovative technical characteristics. This article's findings emphasize the importance of effective and meaningful social involvement in the successful promotion and diffusion of renewable energy infrastructures such as wave energy plants.

Contents

Abbreviations: WE, Wave energy; OWC, Oscillating water column; NIMBY, Not in my back yard; EVE, Energy agency of the Basque Country (Ente Vasco de la Energía); BAG, Basque autonomous government.

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1. Introduction

Though often overlooked, social acceptance is one of the most important requirements for the successful adoption of any technology. Despite the fact that the theoretical importance of social acceptance has been highlighted e.g. [1–4], not until recently have they been given the attention they deserve in the applied studies of renewable energy projects e.g. [5]. This attention has been focused mainly in relation to the acceptance of wind energy infrastructures e.g. [6,7]. Other type of renewable energy projects has not garnered the same amount of vigorous inquiry.

In the specific case of wave energy (WE) projects, issues regarding social and public acceptance have largely been neglected in literature, despite there is growing interest around the world in the utilization of WE technologies [8]. This fact might be due to the particularly positive public opinion that seems to prevail with regard to this source of energy [9,10]. As we'll see, very few studies have addressed the issue of social acceptance of sea wave plants. This article tries to contribute towards filling this gap focusing in on a specific case study: the grid connected oscillating water column (OWC) plant of Mutriku, a facility whose specific technology exemplifies what made it subject of great international attention. e.g. [8,11,12]. This article summarizes the findings of specific qualitative research carried out recently, where, among many other modes of research, different stakeholders of the aforementioned renewable project were interviewed.

The remainder of this paper is organized as follows. In Section 2, current literature on the social acceptance of renewable energy infrastructures is reviewed. A short overview about the sea WE technology and the context of that research are presented in Section 3, while the specific objectives of the research and its methodology are presented in Section 4. In Section 5, the main findings of the case study carried out are presented. Those results are analyzed and discussed in Section 6. Finally, Section 7 contains the main conclusions and implication of this paper.

2. Social acceptance of renewables and the case of wave energy

The issue of social acceptance of renewable energies and renewable energy projects was largely neglected in the 1980s and 1990s, because of the perceived high level of general public support for renewable energy technologies [13]. Despite this high level of general acceptance, renewable energy projects can be socially rejected, although it might be seen as a contradiction [14].

In Table 1 we have included a review of the most relevant and recent academic literature on social acceptance of renewable energies and renewable energy projects as well as other related

Table 1
Summary of the literature review on the social acceptance of renewable energies, renewable energy projects and related topics.
Source: data collected by authors.

Study	Country	Methodology	Aim of the research	Main results
Achillas et al. [27]	Greece	Face-to-face interviews	Social acceptance for the development of a waste-to-energy facility	The NIMBY syndrome is evidently portrayed between the lines in the analysis. Likewise, responses reflect a significant gap of information at the level of local communities
Bronfman et al. [28]	Chile	Online survey	Validate a causal trust-acceptability model for electricity generation sources	Perceived benefit had the greatest total impact on acceptability, thus emerging as a key predictive factor of social acceptance
Devine-Wright [7]	Northern Ireland	Focus groups and Survey questionnaire	Analyze the importance of place attachment when explaining public responses to a tidal energy project	Place attachment and place-related symbolic meanings emerged as a significant, positive predictor of project acceptance
Dowd et al. [29]	Australia	Participatory action research	Investigate the social acceptance of geothermal technology	Despite the limited understanding of geothermal technology, it receives general support due to a major trend supportive to renewable energy sources
Erbil [16]	Turkey	Survey questionnaire	Analyze the level of understanding of what is clean energy among citizens	The clean energy concept is understood at the theoretical level but more information is needed to foster social acceptance
Gamboa and Munda [30]	Spain	Various participatory techniques	Social acceptance of wind park location	Some of the main factors for local conflicts and opposition to wind parks are the extensive land use, visual impact and fear for potential impacts on the tourism industry
Hall et al. [31]	Australia	Face-to-face interviews	Study the high levels of societal resistance to wind power and wind farms	Four common themes emerged that restrains the social acceptance of wind farms: trust, distributional justice, procedural justice and place attachment
Kraeusel and Möst [32]	Germany	Online survey	Social acceptance of Carbon Capture and Storage (CCS)	The attitude towards CCS is neutral and the social acceptance is an important factor for the willingness to pay for CCS
Liu et al. [33]	China	Survey questionnaire	Examine the social acceptance in the rural areas of renewable energy deployment	Rural residents are generally supportive for renewable energy development. Residents with higher level of income are more likely to be willing to pay more for green electricity, so are the younger people
Müggenburg et al. [34]	Ethiopia	Face-to-face interviews	Social acceptance of Pico Photovoltaic systems as a means of rural electrification	Apart from expected benefits in health, work and education, people also notice improvements in the autonomy of children, flexibility, security, family life and the reduction of stress
Shamsuzzoha et al. [35]	Scotland	Face-to-face interviews and Survey questionnaire	Social acceptability of renewable energy under economical, environmental and cultural perspectives	Involvement of the local community plays a crucial role in determining the acceptability of a renewable energy development
Swofford and Slattery [36]	USA	Survey questionnaire	Explore social perceptions of wind energy in Texas	Findings support the view that the use of NIMBY does not adequately explain the attitudes of local wind farm opposition.
Wolsink [37]	Netherlands	Case-study	A comparative study on three environmental policy domains: 1. The implementation of wind power; 2. The policy on space-water adaptation; 3. Waste policy	Authorities frequently promote infrastructures that conflict with their officially proclaimed policy objectives and they often confront local agents who support alternatives that are in fact more in accordance with the new policy paradigm
Yuan et al. [38]	China	Survey questionnaire	Social acceptance of solar energy technologies	High level of social acceptance and public awareness of solar water heater and low level of acceptance of solar PV