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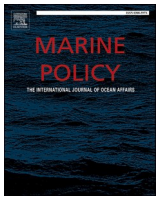
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Public perception of offshore wind farms in Ireland

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ABSTRACT

Public attitude towards onshore wind farm development in Ireland has been extensively investigated. Prior to this study, there was little or no understanding of the perception of the Irish public of *offshore* wind farms (OSWFs). At this critical juncture in the development of the sector, it is necessary to gauge public opinion regarding offshore wind farms. Data was collected using an online survey (n = 1154) between May and June 2019. Results detail the opinions and attitudes of the Irish public toward the development of renewable energy projects in Irish waters. Demographics showed a 49% male, 51% female split. Education levels and age ranges roughly follow the same distribution levels as seen in the 2016 census of Ireland. Results indicate that attitudes to planned offshore wind farms change significantly with education levels. The evidence suggests that the link between climate change mitigation by energy emissions reduction and offshore wind farms is an important aspect of public perception that supports the development of the sector in Ireland. Most of those questioned believed that Ireland is too reliant on foreign energy and agreed that Ireland is running out of its limited fossil fuel reserves. The majority of people also believed that the government is not doing enough to reduce carbon emissions and should invest in offshore wind farms. Sixty-three percent of those surveyed believed that offshore wind farms will increase Ireland's job creation potential. A clear majority of those who took part in the survey were in favour of offshore wind farms both on a local and national level. Just over half of the participants believed that offshore wind farms are the best solution to our energy situation. Thirty-seven percent of respondents trust offshore wind farm developers and 34% indicate that they were neutral on the subject. Fifteen percent of those who took part in the survey indicated that they mistrust developers. Approximately half of respondents had previous experience of offshore wind farms (the majority of whom had experienced offshore wind farms on holiday). A minority group had experience of offshore wind farms as a result of their daily commute or had an offshore wind farm in the vicinity of their homes. The data confirmed the hypothesis that experience of offshore wind farms has a significant effect on attitudes towards them. Results show that those with experience of offshore wind farms are more positive towards offshore wind farm development in Irish waters, than those with no experience of offshore wind farms. To further investigate the perception of those who are regularly exposed to offshore wind farms, a focus group involving five members of the public with regular exposure to Ireland's only wind farm, Arklow Bank Wind Park, was held. The scope of sentiment expressed towards the offshore turbines ranged from benign to extremely positive. Returning to the results of the national survey; in terms of the effect on wildlife, tourism and aesthetics, respondents found offshore wind farms to be relatively unobtrusive and in general a positive addition to the sea scape. This report provides a resource for the offshore wind industry and policy makers alike. The data would suggest that an opportunity exists to create a public awareness campaign as a next step, to build on the favourable national mood and public understanding of the role of offshore wind in decarbonising the economy.

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1. Introduction

International agreements, such as the United Nations Framework Convention on Climate Change, the Paris Climate Agreement, and the Sustainable Development Goals under Agenda 2030, are driving the need to produce electricity from renewable energy sources [15]. The Government's Climate Action Plan published in January 2019 acknowledges the need to shift towards sustainable development and electricity production from renewables. It sets out plans for an increased reliance on renewable energy from 30% to 70% by the year 2030, with streamlined consent systems, more efficient grid connection and subsidies for new technology development. With the launch of The Marine Area Planning (MAP) Bill [22] and the planned formation of the Marine Area Regulatory Authority (MARA), for the first time, Ireland has a clear and comprehensive roadmap for the regulated and sustainable use of our marine space. For the first time, there is a policy mandate for the development of offshore wind, with *a minimum* of 5 GW by 2030 [21].

Despite an offshore landmass of over ten times that of its terrestrial area and significant wind resources off its coastline, Ireland has, as yet failed to harness its offshore wind potential, with only 25 MW of installed capacity on the Arklow Bank Wind Park. However, this is set to change. Approximately 30 GW of proposed offshore wind projects are in the pipeline, at different stages of development, from very early to legacy project stages. As a result, it is necessary to gauge public opinion at this critical juncture in the development of the sector. Although on a global level, there is widespread support for renewable energy policies and clear championing of the development of renewable energy capacity [18,34,49], there is however a significant difference between the general acceptance of sustainable energy expansion and the acceptance of tangible, proposed renewable energy projects by the general public [9,34,50].

The Republic of Ireland has an abundance of terrestrial wind farms with circa 4275 MW (June 2021) of installed capacity and previous studies have investigated public attitudes towards onshore wind farm development [8,9,16,33,50]. Research has shown a range of varying attitudes including; a predisposition towards monetary trade-offs to allow for wind energy [52], growing support in general for wind energy in Ireland [33], and challenges facing social acceptance linked to landscape, biodiversity, health, noise and property value [16]. Currently there is little or no understanding of the perception of the Irish public of *offshore* wind farms [45].

The level of influence that public opinion has on the success or failure of renewable energy projects has been illustrated extensively in the literature [3,14,17,45]. With the advancement of wind technology both on and offshore, one of the challenges is that of public opposition of the siting of wind farms [42].

If developers chose to minimise their interaction with the general public regarding projects by taking the '*Decide, Announce, Defend*' approach, the public reaction can be that of social unease and protest, resulting in project disruption and delay as seen at an unprecedented level with the Corrib Gas Project [39] or even failure as in the case of the Cape Wind project [17,43].

This paper presents the findings of the first national survey of public perception of offshore wind farms in Irish waters and details the opinions and attitudes of the Irish public toward the development of these renewable energy projects. The study assesses the level of knowledge and understanding of the Irish public of climate change; their perception of electricity generation, its sources and generation choices; attitudes towards the Government and its role in renewable energy development and general perceptions of offshore wind power.

Stakeholders with a strong vested interest in offshore wind development in Ireland include fishers, ports, and tourism operators; however, the general public may also influence, and be influenced by, offshore wind developments. This gave rise to the following overarching research question: What is the current mind-set of the Irish *general public* with regard to offshore wind farm development? This led to the following research questions:

- What experience has the Irish public had with offshore wind farms to date?
- How do people feel about energy security?
- Do people relate wind energy to the challenge of climate change?
- Do people think the government should support the development of offshore wind, and how?
- How do people feel about specific issues of concern such as job creation, effects on wildlife and visual impact?
- Would people be inclined to object to the development of offshore wind farms in their area and why?

Each of these questions were used as a starting point from which the national survey questionnaire was formed. (All questions and resulting data can be found in Annex 1.).

Offshore wind research suggests that one of the greatest negative effects perceived by the public is visual impact [25,37]. However, findings are not uniform across the scientific literature regarding the factors that contribute to different attitudes to visual impact or other objections.

2. Methodology

The approach to the research was informed by a number of previous national surveys undertaken in the UK [27], Denmark [38], and the US [17]. The methodology described below is an adaptation and combination of approaches which reflects the unique nature of the Irish situation.

The initial questionnaire survey was designed between January and March 2019 following a pilot and feedback from industry partners. Ethical approval was granted by the Social Research Ethics Committee of University College Cork on the 29th of April 2019. The Survey was then piloted using hard copy questionnaires disseminated throughout the MaREI centre, University College Cork, and the National Marine College of Ireland, Ringaskiddy Co Cork. An email was circulated prior to distribution explaining the survey and requesting that people participate. Hard copies were distributed by hand which allowed questions to be answered and further information to be given to participants if needed.

170 questionnaires were disseminated. 136 useable copies were returned. The aim of the pilot was to ensure the survey was structurally correct, comprehensible and complete. As a result of the pilot some questions were found to be redundant and therefore removed. Certain sections of the questionnaire were observed to be too long and as a result were re-sectioned and re-structured.

2.1. Sampling strategy

In compliance with University College Cork's public procurement procedure, *Interactions Research* was chosen to facilitate the distribution of the questionnaire survey. To ensure nationally representative results, respondents were geographically targeted through social media.

Online dissemination of the questionnaire allowed geographic targeting to ensure that responses were nationally representative (Fig. 1) and demographically typical of the Irish population. 1154 complete, useable responses were returned.

The survey questions were a combination of multiple choice, Likert scale and yes/no questions. The structure of the online questionnaire meant that unless the questions were answered it was impossible to advance to the next stage of the questionnaire, ensuring that all completed questionnaires would be included. Answers were saved in. CSV file format. Data were analysed using the programming package R [44]. Once all data were analysed, in compliance with GDPR requirements, all raw data and questionnaires were destroyed.

Scores for a particular variable from two respondent groups were

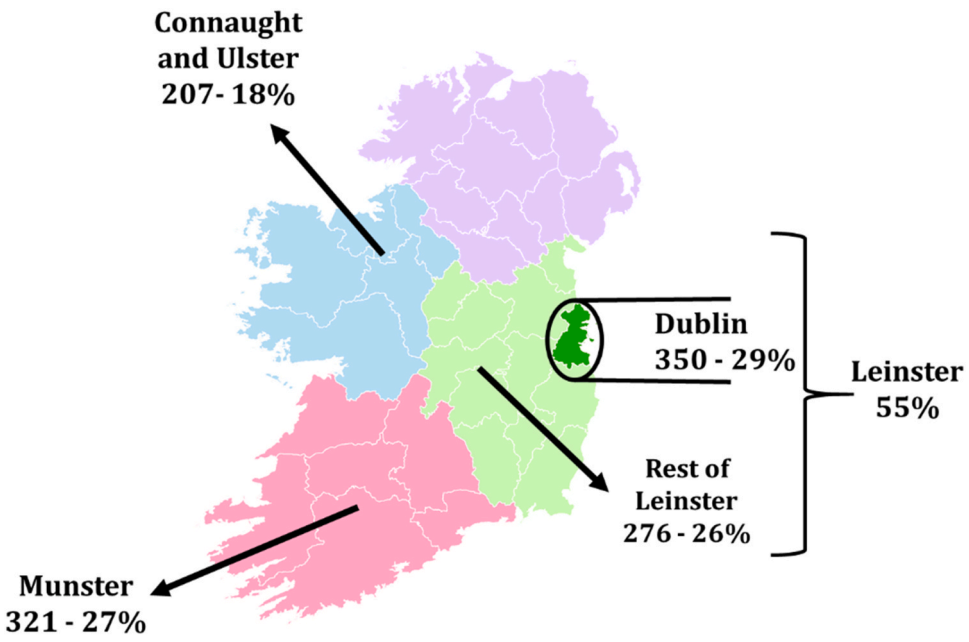


Fig. 1. National representative breakdown of useable questionnaires.

compared using a two-sample, two-sided Mann-Whitney non-parametric rank-sum test [29].

Scores for a particular variable from more than two respondent groups were compared using a Kruskal-Wallis non-parametric rank-sum test [29].

Associations between two variables were assessed by performing Pearson's Chi-square test [1] on contingency tables.

In order to investigate the opinions of the public who regularly see a wind farm in their daily lives, a focus group was held in Arklow in February 2020. Invitations were sent to local clubs, hotels and the Wicklow Municipal District Council. Participants who engaged in the focus group process included local councillors, representatives from Arklow Sailing Club and a resident of an area from which the wind farm is regularly seen. In total, five members of the public took part in the focus group, which meant that the focus group was not statistically representative of the community. However, individual opinions and experiences provided an insight into opinions from the local area.

A deep discussion was guided by open-ended questions. Questions were divided into three areas; the past (the experience of those who were living in the town when the original construction was undertaken), the present (the current attitude of the individuals in the focus group towards the existing wind turbines) and the future (opinions regarding plans for the expansion of the wind farm in the future).

3. Results

3.1. Profile of Respondents

Of the 1154 respondents of the online survey, 51% were male and 49% were female. Ages ranged from 16 to 55 + years old with the largest proportion of respondents being between 25 and 54. A majority of respondents own their own home (64%) with 33% renting their homes (3% of respondents either had other accommodation or left the answer blank). Forty-one percent of respondents lived in what they would describe as a rural setting, with 59% describing their surroundings as urban. Ninety-one percent of respondents had a secondary or higher education with 46% having a third level education. Of these 19% had a postgraduate education. One percent of the total number had an apprenticeship, and 3% had a primary education only. News sources were varied, with the largest proportion of respondents (23%) citing The Irish Independent as their primary printed news source.

3.2. People's experience of offshore wind farms

Of those who took part in the survey, 49% had seen an offshore wind farm before. Of those, 4% could see one from their house, 7% could see one on their commute to work and 41% had seen one while on holidays. In terms of coastal visits, 14% of those questioned had visited the coast in order to look at an offshore wind farm, with 5% avoiding the coast where they knew there was a presence of an offshore wind farm.

3.3. Ireland's electricity generation and energy supply situation

Sixty-five percent of respondents believed that Ireland is too reliant on foreign energy. Sixty-six percent believed that Ireland has a limited amount of fossil fuel resources which are running out. Seventy-eight percent of those who took part in the survey believed or believed strongly that generating electricity from offshore wind farms would make a difference to Ireland's carbon emissions, while 60% of respondents agreed or strongly agreed that Ireland has an energy problem and should not continue with existing energy resources (33% agreed, 27% strongly agreed).

3.4. The government and offshore wind farms

The objective of this section was to explore the public's opinion regarding the government and it's input to offshore wind farm development and carbon emission reduction efforts. Sixty three percent of respondents believed that the government is not doing enough to reduce carbon emissions, with 71% believing that the Irish Government should invest in offshore wind farms. Ten percent believed that the Irish Government should not invest in renewable energy.

3.5. How people feel about offshore wind farm power generation

This section involved 11 questions to explore perceived benefits of offshore wind. Fifty seven percent of respondents felt that the fishing industry and the offshore wind industry could co-exist. Twenty-five percent of those who took part agreed that the offshore wind industry could help the fishing industry, in response to this question 36%

remained neutral with 30% answering 'don't know'. When asked if offshore wind turbines would be detrimental to the fishing industry 14% agreed that they could be, with 24% disagreeing; again most answers were either neutral or 'don't know'.

With regard to the potential employment which could be created by offshore wind farm developments, 63% of contributors believed that offshore wind farms could create jobs in the surrounding areas but 21% believed that there would be no benefit for them if an offshore wind farm was built in their locality.

Thirty-seven percent of respondents trust offshore wind farm developers and 34% indicated that they were neutral on the subject. Fifteen percent of those who took part in the survey indicated that they mistrust developers (5% indicated strong mistrust). Fifty-one percent of respondents felt that offshore wind farms are the best solution to Ireland's energy situation.

Forty percent of those surveyed indicated that they thought offshore wind power generation is reliable, with 16% indicating that they believed that it is unreliable.

3.6. How people feel about offshore wind farms in general

This section covered areas such as wildlife, tourism and the aesthetics of wind farms. The majority of participants would not avoid a beach where offshore wind turbines were visible (58%) with 15% avoiding beach visits with turbines visible. 60% of those who answered shared the opinion that seeing offshore wind turbines made them feel that they were helping to stall climate change. Eight percent of those who took part agreed that offshore wind farms make them mad when they see them, but 66% of those who took part do not agree with that statement.

With regard to the effect that wind farms have on wildlife, 18% of those questioned believed that offshore wind farms harm wildlife. Thirty-one percent of respondents disagreed that offshore wind farms harmed wildlife with a similar amount remaining neutral on the subject. Sixty-nine percent believed that once constructed, electricity generated from offshore wind farms will be renewable and clean, with 4% believing otherwise and 10% not sure. Forty-one percent of participants would take a boat trip to see an offshore wind farm and 30% would not, 23% did not know if they would or not. Forty-nine percent of respondents found offshore wind farms interesting to look at whereas 35% do not really notice them when they look out to sea. However, 17% of respondents believed that offshore wind farms ruin beach visits with 50% believing that they do not ruin beach visits.

3.7. What people think is causing climate change

Most participants agreed that climate change is a reality (74%), with 65% of those questioned agreeing that it is related to demand for energy and 66% agreeing that it is as a result of both human activity and natural processes.

Fourteen percent believed that there is nothing we can do to reduce the speed of climate change, but 76% of those who took part in the survey believed that reducing carbon emissions will help to reduce the speed of climate change, and 74% agreed that if we don't change how we produce electricity we will face more severe climate disasters.

3.8. People's position regarding environmental activism

Seven of the total number of people who participated in the survey were a member of an environmental group. A majority of people would attend a meeting about a proposed OSWF in their locality (42%) with 26% not sure if they would attend and 32% stating that they would not attend. Twenty-eight percent of those questioned said they had previously taken part in a public rally and 47% agreed that they would take part in a future public rally (22% did not know if they would take part or not). Eighty-eight percent of participants believed that renewable energy is a good idea and 83% would support a transition to renewable energy. Fourteen percent of those questioned said that they would either actively or inactively object to an offshore wind farm planned for their locality with 87% either supporting, actively supporting or remaining neutral given that situation. If an offshore wind farm was planned for another part of Ireland, of those who took part in the survey, 93% would either support it actively or inactively, or remain neutral, with 7% objecting either actively or inactively.

Additional comments left by respondents on the Facebook feed can be seen in Annex 2.

4. Further analysis

Further analysis of the data was based on the information available regarding the profile of the respondents. In particular, it assessed the relationship between attitudes to and experience of offshore wind farms, the impact of education, the impact of urban versus rural living, and the influence of home ownership on public perception. All statistical tests were chosen a priori. A summary table of all statistical test outputs is provided in Annex 3 for convenience.

Inspection of the Spearman correlation matrix (below) for the main variables used in the following quantitative analysis on 1096 respondents (after removal of 62 observations with missing values) revealed the absence of any strong correlation between the independent variables, except—as could be expected—attitudes towards development of OSWFs at local and national levels *(r = 70%)*.

	loc_dev	nat_dev	exp	edu	home	rural
loc_dev	1.00	0.70	-0.05	-0.03	0.01	0.07
nat_dev	0.70	1.00	-0.05	0.00	-0.02	0.03
exp	-0.05	-0.05	1.00	0.00	0.09	0.05
edu	-0.03	0.00	0.00	1.00	-0.02	-0.02
home	0.01	-0.02	0.09	-0.02	1.00	0.15
rural	0.07	0.03	0.05	-0.02	0.15	1.00

Variable names are abbreviated as follows: attitude towards local development of OSWs (loc_dev: 1–5 on Likert scale), attitude towards national development of OSWFs (nat_dev: 1–5 on Likert scale), experience of OSWFs (exp: 'none', 'home/commute', 'holidays'), home ownership (home: 'own', 'rent'), dwelling area (rural: 'rural', 'urban').

4.1. The relationship between public attitudes to and experience of offshore wind farms

One hypothesis to be tested was that experience of offshore wind farms has a significant effect on attitudes towards them [38]. Of the 1154 respondents, 493 had experience of seeing offshore wind farms and 661 had not. Of those who had experience of offshore wind farms, 44 could see them from their home, 78 could see them on their commute to work and 470 had seen them while on holidays.

A Wilcoxon test highlighted that attitude towards offshore wind farms varied significantly with people's experience of them ($p < 1e\text{-}6$). Cross tabulation showed that those with experience of offshore wind farms had a more positive attitude towards the development of wind farms in their local area.

People who responded gained their experience of offshore wind farms from home, on commute or on holidays. Results show that these people were more positive towards offshore wind farm development in Irish waters, than those with no experience of offshore wind farms.

Because of the differences in the nature of their previous experience with OSWFs (at home or on holidays), further analysis was done to investigate if these positive results were influenced by the type of interaction. It can be summarised that the majority of Irish people who have seen OSWFs, have had that experience on holidays.

In order to investigate if the *nature of the experience* has a significant effect on attitude to OSWF those respondents who experienced OSWFs on their commute to work or could see them from their home were merged and compared to those respondents who have experience of

OSWFs on holidays. Twenty-three respondents had experience of OSWFs on holidays, on their commute to work and from their home (these were excluded from the analysis).

A Chi-square test revealed a significant association between the type of experience of OSWF and attitude towards the development of OSWFs in the respondent's locality ($p < 1e\text{-}7$). Table 1 shows that a higher proportion of those experiencing OSWFs on a commute to work or from home, had a more negative attitude towards OSWF development at a local level than those experiencing OSWFs on holiday.

4.2. Arklow bank offshore wind farm focus group

4.2.1. The past

None of the participants were formally involved in the consultation process during the construction of the existing wind farm but they remember a lot of 'hype' about it around the town. People in the town were aware that *"something was going on" (Participant 1)*. Some participants anticipated more traffic and activity around the port and recalled the noise and vibrations of the piling during construction. The group felt that the lack of social media at the time prohibited the flow of information to the general public about the original development, however those with a direct connection to the sea were more informed and attended information evenings. There was concern regarding the potential environmental impact of the wind farm and a lot of uncertainty as to what the impact would be on the town and surrounding area.

4.2.2. The present

There was consensus in the group that there has been no perceptible impact on the town since the initial installation of the wind farm. Periodically barges are seen traveling to or from the turbines for operations and maintenance. Overall, there is a perception that there is not as much direct employment from the wind farm as the participants originally expected. The participants agreed that the wind farm was a positive addition to the town: *"It is absolutely lovely to see the windmills and the yachts on a summer's day" (Participant 1*). The wind farm enhances the racing experience for sailors in the local yacht club: *"Here in Arklow, we don't have an island to race around, so we love to race to the windmills and back" (Participant 2)*. The wind farm was also considered to be an aid to marine navigation, highlighting where the sand bank is located. A resident of the area pointed out that the wind farm was a regular talking point for her children who have grown up looking at it. She summarised the general feeling in her area as: *"the wind farm is 'just there'" (Participant 3)*, and it evokes neither good nor bad feelings in her or for her family: *"It is just a given in our daily lives, you get up every day, you breath every day, the wind mills are there every day" (Participant 3)*. As a result of the presence of the wind farm, her children have grown up with a heightened awareness of renewable energy.

The focus group agreed that there is no interference with their everyday lives as a result of the wind farm and concurred that they would find it difficult to even agree on how many turbines are in the farm: *"If you ask the people on the street they couldn't tell you how many* [wind turbines] *there are" (Participant 3)*.

4.2.3. The future

There was general consensus that increased numbers of wind turbines would not cause concern: *"as long as there aren't wind mills all the way down the coast" (Participant 4)*.

There was agreement that honesty and transparency in explaining all aspects of the next phase of development, including the impact on fishing, would be key to successful progression of the future plans for the wind farm. Technical plans and drawings of the expansion should be explained in layman's terms: *"Take the jargon out of it" (Participant 5)*.

Three cross cutting themes emerged from the focus group: economics, public engagement, community benefit and aesthetics/social impacts.

4.2.4. Economic

Although there is some economic benefit to the pubs and hotels in the town from the operation and maintenance crews, in general the participants expected more long term employment arising from the original development. The tourism potential of the proposed wind farm expansion was discussed by the participants who believe that an observation deck could enhance opportunities for education and tourism. There was consensus that Arklow should secure its position as a hub for the development of offshore wind in Ireland and become a 'go to' destination for stakeholders interested in visual impact and other consequences of offshore wind in their local areas.

4.2.5. Engagement

There was concern that submissions arising from a public consultation process, may not be acted upon by the Council, given the experience of some of the participants in previous infrastructure plans for the town (including wastewater infrastructure and sea wall defences). This indicates a need to improve trust in the local planning system. There was agreement that the wind farm has great potential for tourism and education that currently was not being tapped in to, and this was an area that the group agreed should be focused on for future development.

Suggestions for the enhancement of the public engagement process included having a dedicated contact person available: *"a face, not just an email address" (Participant 3),* the use of social media to spread the word about meetings; a dedicated website including aerial views of the proposed wind farm and full pictures of the plans from different perspectives; and quarterly updates to be held in the local library with possible live streaming of the meetings for those who are unable to attend.

4.2.6. Community benefit

The local sailing club regularly hold a 'race around the windmills' which has gained sponsorship from the developer and the met mast owners. Advertisements for grant applications for community benefits are published in the local newspapers, but there was an overall feeling that more could be done to improve the public amenities within sight of the wind farms including public walkways and sea viewing areas.

4.2.7. Aesthetics/social

There was agreement that the current wind farm is widely accepted in the greater community. Support for additional development is likely to be linked to the extent of the footprint of new wind farm proposals, suggesting a need to optimise the design and layout of array formations. The offshore wind farm is seen as a positive feature for the sailing club, being used for races and as a navigation feature. The general consensus was that the windmills are better at sea than on land: *"they are huge and have a lovely leisurely spin on them, clear white with no noise, perhaps that's because of the noise of the sea" (Participant 4)*. The piling activity was the most audible effect during construction, but operation and maintenance noise can also be heard periodically in the town.

There was agreement that the wind turbines were pleasant to look at. Children are aware of them and as a result are more aware of climate change and electricity generation.

It was observed that people in Arklow don't notice the wind turbines and may even have difficulty in stating how many turbines there are.

The overall sentiment was that the wind farms had become part of

Table 1
Breakdown of attitudes towards local development of OSWFs depending on the type of experience of OSWF.

	Object Actively	Object not actively	Remain Neutral do nothing	Support not actively	Support actively
On Holiday	20 (5%)	22 (6%)	91 (23%)	181 (45%)	85 (21%)
Commute or home	20 (21%)	13 (14%)	23 (24%)	24 (26%)	14 (15%)

the town. They were seen as *"a bit of comfort when you come over the hill and you see the lights at night, you know you're home" (Participant 1)*. The wind farm has become part of the branding of Arklow, it is was commented that *"often when you see a picture of Arklow it usually includes the wind mills" (Participant 4)*.

4.3. The relationship between education and attitudes to offshore wind farms

According to Krueger et al. [36], education has a significant effect on attitude to offshore wind farms. Analysis was undertaken to test this hypothesis. Fig. 2 shows the distribution of respondents' education levels, which aligns with the distribution of education levels from the results of the National Census 2016 [11]. A Kruskal-Wallis test indicated that attitudes to planned OSWFs changed significantly with education levels ($p = 0.0009$). The data further indicated that support of wind farms increased with increased education levels (Fig. 2).

4.4. The relationship between home ownership and attitudes to offshore wind farms

A Chi-square test was performed to investigate the impact of home ownership (owner vs renting) on attitudes towards offshore wind farms. The test did not highlight any significant effect of home ownership on attitudes to offshore wind farms ($p = 0.6437$). Distribution of attitudes is shown in Table 2. Note that this distribution exhibits substantial imbalance, with a very low proportion of overall objectors (the corresponding cells being at most 5%), which limits the statistical accuracy of this test. To further investigate this relationship, responses of 'Strongly Object' and 'Object' were merged, as were responses of 'Support' and 'Strongly Support', to define a three-level categorical variable for 'overall attitude'. A Chi-square test applied to this aggregated data also failed to detect a significant association between attitude and home ownership ($p = 0.6540$). These conclusions however remain subject to limitations due to strong imbalance in the distribution of categories.

Table 2
Distribution of attitudes towards OSWF depending on home ownership.

	Object actively	Object not actively	Remain Neutral do nothing	Support actively	Support not actively
Own	16 (2%)	37 (5%)	283 (39%)	112 (15%)	285 (39%)
Rent	12 (3%)	15 (4%)	157 (41%)	57 (15%)	138 (36%)

(3% of respondents chose 'other' when asked if they rented or owned their home)

4.5. The relationship between urban versus rural dwellers and attitudes to offshore wind farms

To explore if the area (urban or rural) in which a respondent lives has an effect on their attitudes to offshore wind farms, a Chi-square test was applied to the data. Results showed that living in urban or rural areas had no significant effect on attitude towards OSWFs ($p = 0.3117$). Distribution of attitudes towards OSWFs depending on dwelling area are shown in Table 3. A Chi-square test performed on the three-level categorical variable 'overall attitudes' of Section 4.4 to address imbalanced representation of opinions across rurality groups also failed to highlight a significant association between area of residency and attitude to OSWFs ($p = 0.2047$).

Table 3
Distribution of attitudes to OSWFs depending on dwelling area.

	Object actively	Object not actively	Remain Neutral do nothing	Support actively	Support not actively
Rural	12 (3%)	29 (6%)	187 (39%)	76 (16%)	171 (36%)
Urban	16 (2%)	24 (4%)	273 (40%)	102 (15%)	262 (39%)

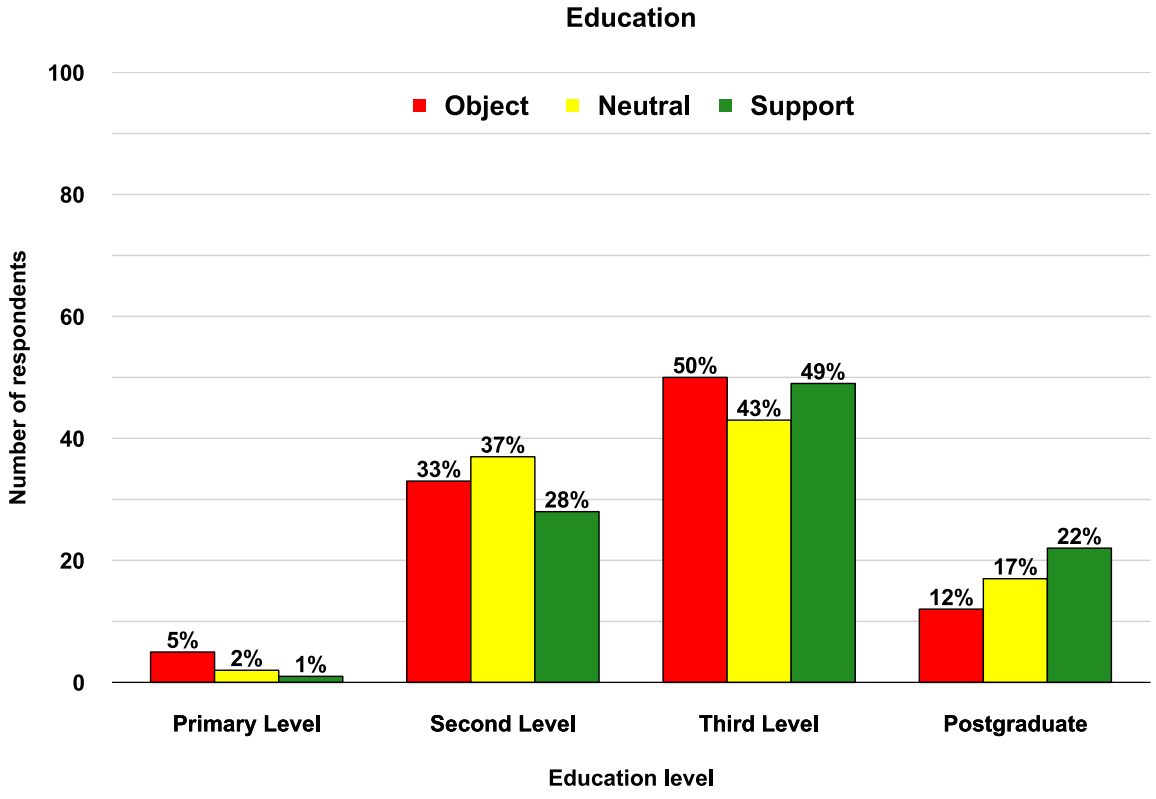


Fig. 2. Support for offshore wind farms as a result of education levels.

5. Discussion

Results of the study show that the general attitude of the public towards offshore wind farm development in Ireland is supportive. A considerable majority of people (87%), would facilitate the development of an offshore wind farm in their locality, either through active support or by not objecting. The figures are even higher in relation to how people would react to plans for wind farms off other parts of the coast (93%). However, we are at such an early point of departure with the development of the entire sector that the only real experience that Irish people have had with offshore wind farms has been on holidays, or for a very small percentage of the community direct exposure through proximity of existing projects. Of those who have regular and sustained exposure to Ireland's only wind farm, the sentiment is supportive.

It would appear to be an imperative that Government, industry and other influencers protect the positive predisposition amongst the public, despite an 'objection culture' becoming increasingly synonymous with large scale infrastructure development in Ireland [39], (as evidenced by failed projects such as the Apple data centre in Athenry). A strong conclusion is that overall the results of this survey present a generally positive and supportive outlook in relation to public perception of offshore wind.

The level of public support may be attributed to the positive view of job creation potential (63% believe that offshore wind farms could create jobs). The job creation potential of the sector has been documented by a number of studies [2,12]. The challenge of meeting expectations in relation to job creation may need to be addressed going forward to ensure the current strong levels of public support emerging from this research. This needs to be attended to in particular, because the supply chain is at a very early stage, and Ireland lacks the offshore capability of countries such as the UK and Norway. Strategic partnerships and stimulation of local content will be key components of delivering on job creation targets and to maintaining good public perception.

There is strong consensus among the general public that Ireland is too dependent on foreign sources of energy. While Ireland's energy import dependency decreased from 88% in 2015 to 66% in 2017 [30], the public recognition of this as an issue, given geopolitical instability, including concerns such as Brexit, is justified by Higgins and Costello [28]. The majority of respondents believe that electricity generation from offshore wind would have a positive impact of carbon emissions (78%), that if we don't change how we produce electricity we will face more severe climate disasters (74%) and that the sight of an offshore wind farm would solicit a feel good factor in relation to addressing climate change (66%).

The survey was conducted between May and June 2019, at a time when climate change was becoming inculcated in the public consciousness more than ever before. The whole of government approach to the publication of the Climate Action Plan in June 2019, as the survey was being undertaken, generated awareness of, and attention to the need for climate change adaptation. Perhaps even more significant in influencing public consciousness, has been the emergence of grass roots movements such as the Climate Extinction rallies, as well as the media spotlight on Greta Thunberg and school climate strikes.

Irrespective of which drivers have been most influential in generating awareness, the evidence suggests that the link between climate change mitigation by emission reduction and offshore wind is an important aspect of public perception that supports the development of the sector in Ireland.

It should be noted that the survey was undertaken at a time when 3.95 GW of offshore wind development was in the pipeline. Since then, applications for a further 26GWs of site investigation licences have been announced. Although many of these projects these have yet to proceed to planning, it could be argued that the perception of 'Ocean Grabbing,' well documented as an issue in the literature [5,6,19], may be gathering significance as an issue in the relatively short period of time since the survey was undertaken.

New activist groups have mobilised in 2021 to contest development proposals, such as Blue Horizon and South East Coastal Protection Alliance. These groups are calling for an overall ban on offshore wind farms within the 12NM limit [32]. This is, in essence calling for a ban on all fixed-bottom wind turbines, which are concentrated within 12NM in the Irish Sea, as a result of the coastal bathymetry. While the majority of public perception is that the fishing industry and offshore wind can co-exist (57%), this is a relatively slim margin, that could easily be tipped in the opposite direction by recent and increasing coverage of disputes in the media [31]. The issue of contestation between offshore wind and fishing may be linked to a lack of stakeholder engagement.

It is widely reported that early and meaningful stakeholder engagement is a fundamental pre-requisite to stakeholder buy-in and to ensuring public support for developments. This is supported by the findings of the focus group, the participants of which stressed the importance of timely, honest and transparent information from the developer in order to create and maintain support and good will of the local public. Despite the fact that this is well known and documented [10,15,34,35], it appears that some industry developers are risking the prospect of disputes with fisheries and communities by not engaging early enough, including at the pre-planning stage.

Results show that just 37% of respondents indicated that they would trust offshore wind farm developers, which on first reading is quite a low percentage, however 34% of respondents were neutral on the subject. Given that there has been little track record upon which to judge thus far, with the Arklow Bank Wind Park as the only developed site, developers have an opportunity to build trust with those of a 'neutral' stance—all the more reason to consider best practice in engaging with stakeholders.

In this survey the majority of respondents with experience of wind farms have gained their experience whilst on holidays which would suggest that they have only seen wind farms once or twice during a holiday taken once or twice a year. The lesser number of respondents; those who see wind farms on a regular and prolonged basis from home and on their commute to work, have a different experience of wind farms i.e. seeing them more frequently throughout the year, during different weather conditions and from varying perspectives. Results show that the type of experience an individual has of local OSWFs has a significant influence on their attitude, and that the effect of seeing OSWFs from home or on their commute creates a more negative attitude to OSWFs. However the findings of the focus group show that there is definite acceptance and a moderate sense of pride of those regularly exposed to the Arklow Bank Wind Parm, and that residents enjoy both looking at it and using it for recreational reasons. The Arklow Bank Wind Park has a relatively small number of turbines and it has been stressed that the positive view of the wind farm may be directly related to that fact. It must also be noted that not only the number of turbines, but the 'place-technology fit' of offshore wind infrastructure (the size, design, distance to shore, number and distribution of the turbines) was not taken into account in this study. The seven wind turbines in the Arklow Bank Wind Park have a 3.6 MW capacity and stand at a height of 124 m, compared to the potential 62 12/14 MW turbines with a tip height of 200 m proposed for Arklow Bank Phase 2, and how they fit into the east coast seascape, a fact which could potentially have a significant effect on local attitudes.

A further limitation to this analysis is that it does not take into account the *location* of the homes in question and their proximity to proposed nearshore wind farms in Ireland. Home ownership proximate to extant or potential offshore wind farm developments may significantly influence attitudes to offshore wind farms and is not analysed here. This is potentially an area for future research.

It can be anticipated that there will be natural fluxes in public perception as per the U shaped Wolsink Curve [51] which demonstrates the evolution of community acceptance of renewable energy projects over time; high acceptance during the early stages of the project with a decline in support during development phase, and a final upturn of

support to relatively high acceptance at the conclusion of project development. We can assume that given the limited development of wind farms in Irish waters that we are currently in the 'early stages' of the Wolsink curve. However Devine-Wright [13] concludes that there is no empirical evidence that public perception of wind energy improves over time. As a result an opportunity exists now to protect the general positivity which is presented by the evidence here.

As indicated above in the context of fisheries, the media have a role to play in influencing public perceptions. The most accessible source of information for the general public about wind farms and green energy is the mass media i.e. newspapers, television, radio and social media [26]. Other research has also shown that how the media frames messages and articles, directly affects the opinions and perspectives of the public who are exposed to them [46]. With the increasing interest in expansion of the renewable energy sector off the Irish coast, the Irish media is likely to play an increasingly significant role in reporting on offshore developments. The areas around which public attitudes can be measured, i.e. technical, economic, environmental, health and safety, political and aesthetic/cultural are currently used by the primary news sources in order to frame their messages regarding offshore wind farm development.

A small proportion of those questioned would not support wind farm development, by objecting actively either at a national (2%) or local level (7%). The fact that there is opposition to offshore wind farms is to be expected. What remains to be seen is whether the positive results of this survey will be weakened by the spectre of the 'Individual gap' [3,4]. This is where general and widespread support of renewable energy as a concept changes to opposition when an actual development is proposed locally [3].

The low percentage of objectors in this study follows the trend shown in previous studies whereby resistance to offshore wind farms is usually in the minority [48]. Nevertheless, however small, this is the cohort with which offshore developers must engage before, during and after project development to mitigate against potential project disruption. When developers do engage, often it is these contentious public meetings that are reported on in the media [26].

Seventy-one percent of respondents believed that the government should be investing more in the offshore wind sector with 63% agreeing that the Irish government is not doing enough to reduce our carbon emissions. Governmental strategy is now aligning with this sentiment, with the launch of the Climate Action plan in 2019 [21], followed by the call for public consultation and subsequent launch of the National Marine Planning framework [23] and ultimately the Marine Area Planning (MAP) Bill in 2021 [22]. The extent to which this will influence the co-location of activities and sustainable development of our maritime area remains to be seen.

It has been evidenced that countries who are further down the path of offshore wind farm development have experienced differing levels of OSWF project support; initial opposition to the development has been followed by acceptance of the offshore projects but more recently, as a result of increasing density of offshore wind farms, there is growing back lash against the development of further offshore wind farms [7,9].

To inform a public information campaign, Ireland can look to Europe and further afield to learn from mistakes made by more mature offshore wind industries. The example of the Cape Wind project in the US also shows how well planned, well financed, staunch opposition changed to increasing and eventually a majority of support over 10 years of social discourse [10,40].

6. Conclusion and recommendations

6.1. General support for offshore wind by the Irish public

Eighty-seven percent of respondents would facilitate development of an offshore wind farm in their locality, either through active support or not objecting.

Ninety-three percent of respondents would facilitate development of an offshore wind farm outside of their locality, either through active support or not objecting.

The current high levels of support for offshore wind in Ireland are influenced by previous exposure to offshore wind farms. The vast majority of respondents that have seen an offshore wind farm have, in fact, limited exposure to sighting of an offshore wind farm on a regular basis. Positive responses in the survey may be biased by the high numbers of people whose only experience of seeing an offshore wind farm was on holidays (49%). However results of the focus group show a positive attitude from those who see an offshore wind farm on a daily basis.

6.2. Targeting messaging - content

The data would suggest that there is merit in a national campaign to strengthen the perceived *direct* link between offshore wind and climate change, as:

- 78% percent of those who took part in the survey believed or believed strongly that generating electricity from offshore wind farms would make a difference to Ireland's carbon emissions;
- 74% agreed that if we don't change how we produce electricity we will face more severe climate disasters;
- 60% shared the opinion that seeing offshore wind turbines made them feel that they were helping to stall climate change;

and the perceived *indirect* link between offshore wind with energy security and climate change, as:

- 65% percent of respondents believed that Ireland is too reliant on foreign energy;
- 66% percent of people believed that Ireland has a limited amount of fossil fuel resources which are running out;
- 69% believed that once constructed, electricity generated from offshore wind farms will be renewable and clean.

If the general public see information framed in a positive way then they will be influenced by the framing of that information – e.g. if information is published that the majority of people in Ireland support local wind energy development (as shown by this survey) then they may and probably will be influenced by that information and so the current positive position of the Irish public can be built on to further influence positive perceptions of offshore wind farms in Irish waters.

Forty-nine percent of respondents in this study found offshore wind farms interesting to look at whereas 35% did not really notice them when they look out to sea. This could be as a result of Ireland's lack of offshore wind farms and the fact that the vast majority of respondents are on holiday when they see them. Eighty-two percent of people who took part in the survey believed that offshore wind farms do not harm wildlife and 63% felt that offshore wind development could lead to job creation. These factors need to be considered in communication with local stakeholder groups in a transparent way, on a project by project basis, by individual developers. These factors should also be considered at a national level, through integrated studies on cumulative impact, as part of the national dialogue on the energy transition.

This study serves as a baseline analysis of public perception of offshore wind in Ireland at a time when there was relatively little activity in the offshore development space. Further analysis into how home ownership in areas of close proximity to potential developments influences attitudes, and a more in-depth study of 'place-technology fit', should be the object of future research.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.marpol.2021.104814.

References

[1] A. Agresti. An Introduction to Categorical Data Analysis, 2nd ed.,, John Wiley & Sons, New York, 2007.
[2] Allan, G., Comerford, D., Connolly, K., McGregor, P., Ross, A.G., 2019. Economic and Environmental Impacts of UK Offshore Wind Development to 2029: the Importance of Local Content [WWW Document]. URL ⟨https://strathprints.strath.ac.uk/69299⟩/ (accessed 11.19.19).
[3] D. Bell, T. Gray, C. Haggett, The 'Social Gap' in wind farm siting decisions: explanations and, policy responses, Environ. Polit. 14 (2005) 460–477, https://doi.org/10.1080/09644010500175833.
[4] D. Bell, T. Gray, C. Haggett, J. Swarfield, Revisiting the 'social gap': public opinion and relations of power in the local politics of wind energy, Environ. Polit. 22 (1) (2013) 115–135, 2013.
[5] N.J. Bennett, In political seas: engaging with political ecology in the ocean and coastal environment, Coast. Manag. 47 (2019) 67–87, https://doi.org/10.1080/08920753.2019.1540905.
[6] N.J. Bennett, H. Govan, T. Satterfield, Ocean grabbing, Mar. Policy 57 (2015) 61–68, https://doi.org/10.1016/j.marpol.2015.03.026.
[7] D. Boffey, Dutch Fishermen to Sail Fleet into Amsterdam in Wind Turbine Protest, The Guardian, 2018.
[8] N. Brennan, T.M.V. Rensburg, C. Morris, Public acceptance of large-scale wind energy generation for export from Ireland to the UK: evidence from Ireland, J. Environ. Plan. Manag. 60 (2017) 1967–1992, https://doi.org/10.1080/09640568.2016.1268109.
[9] N. Brennan, T.M. Van Rensburg, Wind farm externalities and public preferences for community consultation in Ireland: a discrete choice experiments approach, Energy Policy 94 (2016) 355–365, https://doi.org/10.1016/j.enpol.2016.04.031.
[10] D. Bush, P. Hoagland, Public opinion and the environmental, economic and aesthetic impacts of offshore wind, Ocean Coast. Manag. 120 (2016) 70–79, https://doi.org/10.1016/j.ocecoaman.2015.11.018.
[11] Central Statistics Office. Census 2016 Summary Results - Part 1, 2016. URL ⟨https://www.cso.ie/en/csolatestnews/presspages/2017/census2016summaryresults-part1/⟩.
[12] G.J. Dalton, T. Lewis, Metrics for measuring job creation by renewable energy technologies, using Ireland as a case study, Renew. Sustain. Energy Rev. 15 (2011) 2123–2133, https://doi.org/10.1016/j.rser.2011.01.015.
[13] P. Devine-Wright, Local aspects of UK renewable energy development: exploring public beliefs and policy implications, Local Environ. 10 (2005) 57–69, https://doi.org/10.1080/1354983042000309315.
[14] P. Devine-Wright, Y. Howes, Disruption to place attachment and the protection of restorative environments: a wind energy case study, J. Environ. Psychol. 30 (2010) 271–280, https://doi.org/10.1016/j.jenvp.2010.01.008.
[15] J. Dwyer, D. Bidwell, Chains of trust: energy justice, public engagement, and the first offshore wind farm in the United States, Energy Res. Soc. Sci. 47 (2019) 166–176, https://doi.org/10.1016/j.erss.2018.08.019.
[16] G. Ellis, R. Cowell, C. Warren, P. Strachan, J. Szarka, R. Hadwin, P. Miner, M. Wolsink, A. Nadaï, Wind power: is there a "Planning Problem"? Expanding wind power: a problem of planning, or of perception? The problems of planning—a developer's perspective wind farms: more respectful and open debate needed, not less planning: problem "Carrier" or problem "Source"? "Innovative" wind power planning, Plan Theory Pr. 10 (2009) 521–547, https://doi.org/10.1080/14649350903441555.
[17] J. Firestone, W. Kempton, Public opinion about large offshore wind power: underlying factors, Energy Policy 35 (2007) 1584–1598, https://doi.org/10.1016/j.enpol.2006.04.010.
[18] J. Firestone, W. Kempton, M.B. Lilley, K. Samoteskul, Public acceptance of offshore wind power across regions and through time, J. Environ. Plan. Manag. 55 (2012) 1369–1386, https://doi.org/10.1080/09640568.2012.682782.
[19] P. Foley, C. Mather, Ocean grabbing, terraqueous territoriality and social development, Territ. Polit. Gov. 7 (2019) 297–315, https://doi.org/10.1080/21622671.2018.1442245.
[21] Government of Ireland, 2019. Climate Action Plan.pdf, 2019.
[22] Government of Ireland a, 2021. Marine Area Planning Bill.pdf, 2021.
[23] Government of Ireland b, 2021. National Marine Planning Framework.pdf, 2021.
[25] C. Haggett, Understanding public responses to offshore wind power, Energy Policy Spec. Sect. Offshore Wind Power Plan. Econ. Environ. 39 (2011) 503–510, https://doi.org/10.1016/j.enpol.2010.10.014.
[26] A. Hansen, Communication, media and environment: Towards reconnecting research on the production, content and social implications of environmental communication, Scopus (2011), https://doi.org/10.1177/1748048510386739.
[27] Hattam, C., Hooper, T., Beaumont (pml, N., Hattam, C., Hooper, T., Beaumont, N., 2015. Public Perceptions of Offshore Wind Farms.
[28] Higgins, P., Costello, R., 2016. What does Brexit Mean for the Energy Sector in Ireland? 13.
[29] M. Hollander, D. Wolfe, Nonparametric Statistical Methods, John Wiley & Sons, New York, 1973.
[30] Howley, M., 2018. Energy in Ireland 2018 Report 84.
[31] Irish Examiner, 2019. Fishermen unite to resist vast wind farm. URL ⟨https://www.irishexaminer.com/breakingnews/views/analysis/fishermen-unite-to-resist-vast-windfarm-962966.html⟩.
[32] Irish Examiner, 2021. Campaigners call for 22km exclusion zone for Waterford offshore wind farms. URL ⟨https://www.irishexaminer.com/news/munster/arid-40243970.html⟩.
[33] IWEA*, IWEA_Report_2018.pdf, 2018. *IWEA (Irish Wind Energy Association has since rebranded to WEI (Wind Energy Ireland).
[34] C.R. Jones, J.R. Eiser, Identifying predictors of attitudes towards local onshore wind development with reference to an English case study, Energy Policy 37 (2009) 4604–4614, https://doi.org/10.1016/j.enpol.2009.06.015.
[35] S.C. Klain, T. Satterfield, S. MacDonald, N. Battista, K.M.A. Chan, Will communities "open-up" to offshore wind? Lessons learned from New England islands in the United States, Energy Res. Soc. Sci. 34 (2017) 13–26, https://doi.org/10.1016/j.erss.2017.05.009.
[36] A.D. Krueger, G.R. Parsons, J. Firestone, Valuing the visual disamenity of offshore wind power projects at varying distances from the shore: an application on the delaware shoreline, Land Econ. 87 (2011) 268–283, https://doi.org/10.3368/le.87.2.268.
[37] J. Ladenburg, Visual impact assessment of offshore wind farms and prior experience, Appl. Energy 86 (2009) 380–387, https://doi.org/10.1016/j.apenergy.2008.05.005.
[38] J. Ladenburg, B. Möller, Attitude and acceptance of offshore wind farms—The influence of travel time and wind farm attributes, Renew. Sustain. Energy Rev. 15 (2011) 4223–4235, https://doi.org/10.1016/j.rser.2011.07.130.
[39] M. Lange, A.M. O'Hagan, R.R.N. Devoy, M. Le Tissier, V. Cummins, Governance barriers to sustainable energy transitions – assessing Ireland's capacity towards marine energy futures, Energy Policy 113 (2018) 623–632, https://doi.org/10.1016/j.enpol.2017.11.020.
[40] M. Lange, G. Page, V. Cummins, Governance challenges of marine renewable energy developments in the U.S. – Creating the enabling conditions for successful project development, Mar. Policy 90 (2018) 37–46, https://doi.org/10.1016/j.marpol.2018.01.008.
[42] M.A. Petrova, NIMBYism revisited: public acceptance of wind energy in the United States, Wiley Interdiscip. Rev. Clim. Change 4 (2013) 575–601, https://doi.org/10.1002/wcc.250.
[43] R. Phadke, Steel forests or smoke stacks: the politics of visualisation in the Cape Wind controversy, Environ. Polit. 19 (2010) 1–20, https://doi.org/10.1080/09644010903396051.
[44] R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL ⟨https://www.R-project.org/⟩.
[45] K. Reilly, A.M. O'Hagan, G. Dalton, Attitudes and perceptions of fishermen on the island of Ireland towards the development of marine renewable energy projects, Mar. Policy 58 (2015) 88–97, https://doi.org/10.1016/j.marpol.2015.04.001.
[46] A. Schmidt, Need for a wind of change? Use of offshore wind messages by stakeholders and the media in Germany and their effects on public acceptance, J. Environ. Plan. Manag. 60 (2017) 1391–1411, https://doi.org/10.1080/09640568.2016.1221799.
[48] R. Sokoloski, E.M. Markowitz, D. Bidwell, Public estimates of support for offshore wind energy: false consensus, pluralistic ignorance, and partisan effects, Energy Policy 112 (2018) 45–55, https://doi.org/10.1016/j.enpol.2017.10.005.
[49] Å. Waldo, Offshore wind power in Sweden—A qualitative analysis of attitudes with particular focus on opponents, Energy Policy 41 (2012) 692–702.
[50] C.R. Warren, C. Lumsden, S. O'Dowd, R.V. Birnie, 'Green On Green': public perceptions of wind power in Scotland and Ireland, J. Environ. Plan. Manag. 48 (2005) 853–875, https://doi.org/10.1080/09640560500294376.
[51] M. Wolsink, Wind power implementation: the nature of public attitudes: equity and fairness instead of 'backyard motives', Renew. Sustain. Energy Rev. 11 (2007) 1188–1207, https://doi.org/10.1016/j.rser.2005.10.005.
[52] Van Rensburg, T., Brennan, N., Kenny, P., Breen, B., 2018. An Economic Analysis of Wind Farm Externalities and Public Preferences for Renewable Energy in Ireland. SEAI.