

# Public acceptability of offshore wind and tidal energy in Guernsey

## Summary report

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## Executive summary

### Background & method

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This document reports on a questionnaire survey study that investigated public acceptability of renewable energy development in Guernsey, focusing on offshore wind and tidal energy. The study builds on the findings of two earlier studies, all of which were part of a 3-year PhD research project at the University of Exeter (for summary reports see [www.guernseyrenewableenergy.com](http://www.guernseyrenewableenergy.com)). This PhD is part-funded by the States of Guernsey's Renewable Energy Team (part of Commerce & Employment), alongside matched funding from the UK Economic and Social Research Council.

The questionnaire that was used in this study was completed by a representative sample of 469 individuals, and measured acceptability of renewables in general as well as of three specific, hypothetical offshore wind and tidal energy projects:

- A 10-turbine nearshore wind project, producing electricity only for Guernsey, owned by the States, and leading to an increase in electricity prices of 5-10%
- A 100-300-turbine wind project, further offshore, mainly for export, likely to be owned by an external investor, and increasing electricity prices by 10-20%
- A 25-turbine tidal energy farm, using wholly submerged tidal turbines, only producing electricity for Guernsey, owned by the States, and increasing electricity prices by 20-30%

### Support for renewable energy in general

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In general, tidal energy emerged as the best supported renewable energy technology in Guernsey (86% of respondents are in support), before solar and wave energy (81%; 80%) and ahead of

Technology	% support	% object	% neither	% don't know
Offshore wind	58%	23%	15%	5%
Tidal energy	86%	2%	8%	4%
Wave energy	80%	4%	11%	6%
Solar energy	81%	4%	12%	3%

offshore wind energy (58%). Similarly, while 23% object to the principle of offshore wind development in Guernsey, only 2-4% object to development of the other three technologies.

Respondents moreover widely agree that Guernsey should make use of its natural resources to generate electricity locally (89% agree), while also commonly indicating that Guernsey needs to become more self-sufficient for its electricity (77% agree; 10% disagree), and rely less on other places for its electricity (71% agree). In other words, there is broad public agreement that renewable energy development that utilises local natural resources, enhancing independence and reducing vulnerability, is seen as something that is desirable and acceptable in principle.

### Support for three specified projects

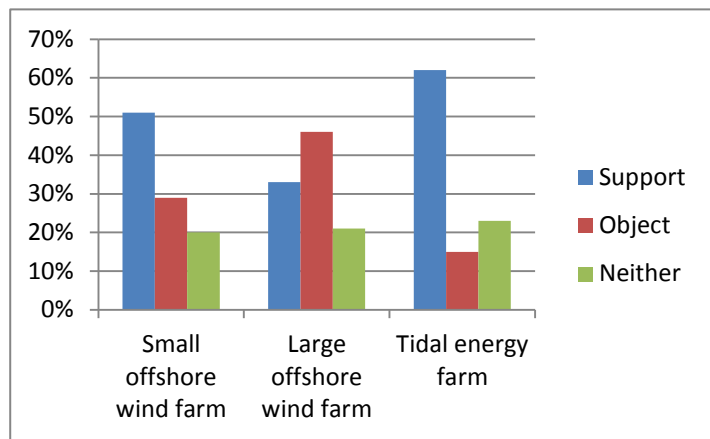
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However, support for a *specific* development is usually not as high as for a technology *in general*. Of the three projects described in the questionnaire, the tidal energy farm was the most popular (62% would support; 15% would object), before the small wind farm (51%; 29%), and the large wind farm (33%; 46%). This is substantially lower than the levels of support for the technologies *in principle* (as outlined above), a 'gap' which has frequently been found in previous academic studies. Importantly,

a substantial proportion for each (about 20%) indicated they would neither support nor object; possibly because they have not made up their minds yet or because it is not an important issue for them.

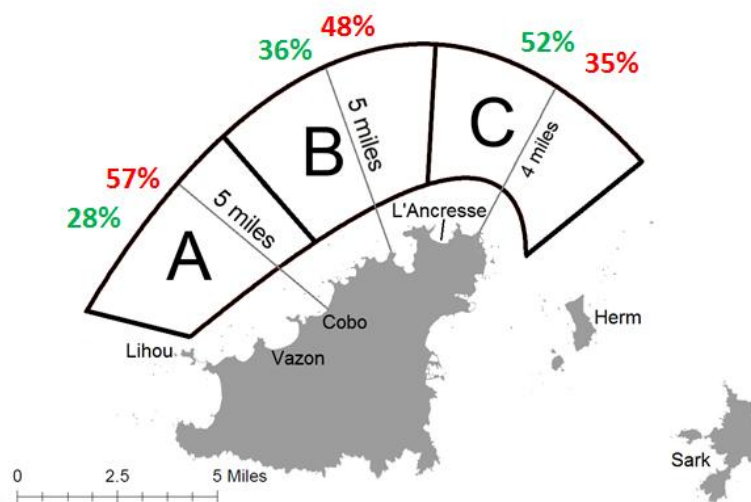
**Project 1: Small offshore wind farm**

A 10-turbine wind project (referred to in this document as the ‘small wind’ project), without spatial information, was supported by 51% of respondents.



Moreover, 65% of respondents indicated they like the idea of using the wind as a local resource; 55% like the idea that this development would generate electricity for Guernsey use only (20% disagreed with this), while a small minority of 15% felt this development would look visually attractive (60% disagree with this).

In following questions, a map was presented which showed three general areas, each significantly larger than the proposed development, that could potentially host this 10-turbine wind farm (A, B and C). Respondents were asked to what extent they would support this project in each of the zones; the green and red percentages indicate support and objection to the project in each zone.



This reveals strong differences in the support for offshore wind projects across different locations around Guernsey; zone C is the most popular zone (52% would support this 10-turbine offshore wind development in this area), while zone A is the least well-supported location (28% of respondents in support). It should be remembered, however, that these are broad zones, and that acceptability of these projects in even more specific locations may vary from these headline figures.

**Project 2: Large offshore wind farm**

The second project (the large offshore wind farm consisting of 100-300 turbines) was supported by 33%, and opposed by 46% of respondents. The findings suggest that this relatively low level of support is because respondents preferred a smaller wind farm that would only produce electricity for Guernsey (52% agreed; 24% disagreed), while also indicating that Guernsey should not be installing wind turbines if the electricity will be exported (60% felt this way; 24% disagreed). The project was also commonly seen as too large-scale for Guernsey (54% agreed; 25% disagreed), while a majority (54%) objected to such a development being owned by an outside investor. This suggests that a smaller scale renewable energy project that is for local use, rather than for export, and is owned locally, is likely to be substantially more acceptable than a large-scale, externally-owned, export-focused development, even if it would be closer to shore and therefore more visible.

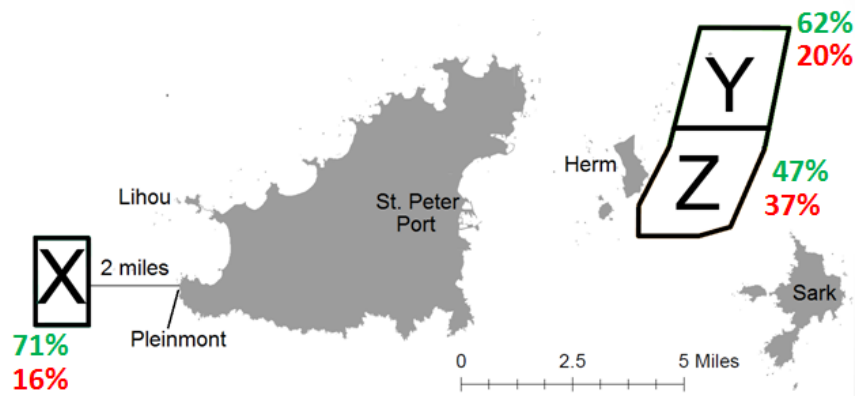
**Project 3: Tidal energy farm**

The third project described in the questionnaire, the 25-turbine tidal energy project, was supported by 62% of respondents in principle, while 15% objected. An even larger majority (86%) indicated

they like the idea of using the tides as a local resource, suggesting tidal energy is a very popular principle. That not all these 86% supported this particular project seems to be due to a majority (54%) indicating they would not support a development that would increase electricity prices by 20-30% (which was the price impact of this project, as described in the questionnaire).

Although this tidal energy project was described as using fully submerged, 'invisible' tidal technology, there are other tidal technologies that would be more visible from the surface. When asked about this, more people agreed (45%) than disagreed (27%) with the statement that 'I would object to tidal energy if it wasn't fully submerged and 'invisible''. This suggests that tidal energy being submerged is a relatively important aspect of its high acceptability, and the conclusions in this report therefore reflect only fully submerged technology.

Again a map was included in the questionnaire which showed the three zones that could be the most suitable for tidal energy development (see map on right), including one off the west coast and two sites in the Big Russel. The green



percentages on the map show that zone X is the best supported zone (71% support), while zone Y is also supported by a majority (62%). Zone Z is the least popular zone, with only 47% supporting the project in this location. Clearly, for tidal energy, as was the case for wind energy, the location of the development has clear implications for its acceptability – even if the technology is entirely submerged and therefore not immediately and obviously visible. This suggests that visual impact is not the only concern when it comes to protecting the most treasured places around the island – people may worry about wildlife or simply wish to keep an area as natural as possible.

### *Willingness to pay for green electricity*

With regard to the potential extra cost of these renewable energy developments, 61% of respondents indicated they were willing to pay extra for a portion of their electricity to come from offshore wind energy in Guernsey – for tidal energy this proportion was 74%. The majority of these indicated they would be willing to pay up to £100/year extra for this (23% up to £50 and 31% up to £100). Most respondents preferred paying for this through their energy bills (57%), while only 6% preferred the alternative option of using other Guernsey taxes to pay for renewables.

### *Differences across groups*

Offshore wind energy tends to be supported more by women, those aged between 18 and 49, and those with higher levels of education and higher incomes – a pattern that is commonly found in similar studies. However, this pattern is not replicated for tidal energy, which is roughly equally supported across all age groups and all education levels (though those on higher incomes are generally more supportive). This is a novel and unusual finding, as typically these patterns are true

across different renewable energy technologies. One explanation for this could be that tidal energy and the tides in Guernsey are less seen as a typical renewable energy technology, and more as something that is unique and integral to Guernsey. Moreover, residents from the Vale and St Sampson were generally less supportive of the small wind option, but not tidal energy.

## *Conclusion*

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This study has managed to identify broad patterns of public support for multiple general and specific (offshore) renewable energy technologies and developments. It found that for most technologies and specific proposals (sometimes small) majorities were in favour, suggesting there is a substantial body of support in Guernsey for most renewable energy concepts. The arguments in favour of these renewables strongly focus on these technologies being deployed for the benefit of Guernsey – emphasising local ownership, increased independence and electricity production for local use. These are all aspects that seem integral to the functioning and framing of any future renewable energy proposal, if it is to achieve substantial public support. A key qualification though is that it will be very important to carefully consider the siting of any offshore renewable energy project, as this study has found the location can substantially influence the level of support associated with various projects – even if they are adopting well-supported technologies like sub-surface tidal energy.

## 1. Introduction

This report presents the main findings of a large-scale questionnaire survey study into public attitudes towards renewable energy development in Guernsey. The study was carried out during the first quarter of 2015, as part of PhD research at the University of Exeter. This PhD is part-funded by the States of Guernsey's Renewable Energy Team (part of Commerce & Employment), alongside matched funding from the UK Economic and Social Research Council.

In-depth understanding of public acceptability of renewable energy at an early stage is important, as this allows evidence-based policy making, based on sound knowledge of public opinion, which can not only help to ensure the effectiveness and acceptability of any future proposals, but also serves to increase the democratic legitimacy of these.

This study built on two earlier, qualitative studies which investigated the prominent arguments and ways of thinking about renewable energy in Guernsey, with a focus on three offshore renewable energy technologies: tidal energy, wave energy and offshore wind energy. Summaries of these first two studies are available from the Renewable Energy Team's website ([www.guernseyrenewableenergy.com](http://www.guernseyrenewableenergy.com)). This report presents the findings of the third and final study conducted as part of the PhD, which aimed to quantitatively understand public acceptability of renewable energy types in general, as well as of specific offshore wind and tidal energy projects that could potentially be proposed in the future.

## 2. Methodology

### 2.1 The questionnaire

A large-scale questionnaire survey of the general public in Guernsey was chosen, as this methodology enables the drawing of conclusions about attitudes and views within the entire population. This contrasted with the two earlier, qualitative studies, which instead were more in-depth, but worked with smaller samples, and therefore did not allow generalised conclusions about the general population. The questionnaire that was used is attached as Appendix A at the end of this document.

The questionnaire was 10 pages in length and contained several sections:

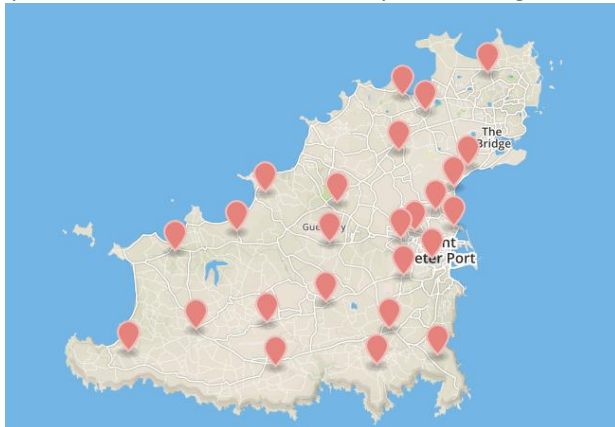
- Sections 1-4 collected opinions on the respondent's connection to Guernsey, Guernsey's current electricity system and the idea of using certain renewable energy technologies in Guernsey.
- In sections 5-7 three different renewable energy projects were described and attitudes towards them were measured – these projects may be possible in the future, but are not currently being proposed. The information that was presented about each three projects was compiled in conjunction with the Renewable Energy Team to reflect the most up-to-date understanding of both the technologies and their potential local implementation.
- Section 8 explored respondents' willingness to pay for electricity from renewable sources.
- Section 9 captured basic socio-demographic information about each respondent (e.g. gender, age, relative income, education, parish of residence).

Appendix A also contains the full set of results per question. Most questions were worded as a statement to which respondents could indicate their level of agreement on five levels, ranging from strongly disagree to strongly agree. In this document, for simplicity the answer categories 'strongly disagree' and 'disagree' were merged into one answer ('disagree'), and the same was done for 'strongly agree' and 'agree'.

## 2.2 Survey distribution

The questionnaires were distributed through a drop and collect method, individually dropping off and picking up each questionnaire at households across the island. This distribution method was selected for its typically high response rate (compared to alternatives such as postal or online sampling), which can help obtain a diverse sample that is fully representative of the Guernsey population aged 18+ (see 2.4). To ensure the sample was not biased towards those with an existing interest in renewable energy, the questionnaire was framed as being about ‘the future of Guernsey’, rather than renewable energy, and five £50 M&S vouchers were on offer to encourage higher response rates.

In order to obtain a spatially representative sample, a predefined number of households were randomly targeted within 25 predetermined zones across Guernsey’s ten parishes (see Figure 1). The questionnaire distribution took place during two weekends (31 January & 1 February and 7 & 8



March 2015), in order to capture all strata of the population, including those working regular office hours. Due to the time-consuming nature of drop and collect survey distribution, 16 research assistants were recruited to assist in distributing the questionnaires; 12 were local Sixth Form students (aged 16-17), who earned £1 per completed questionnaire; 4 others were University of Exeter colleagues who received a free trip to Guernsey in return for their help.

Figure 1. The 25 zones where questionnaires were distributed

638 questionnaires were delivered in person; in addition to this, 513 questionnaires were dropped through letterboxes (with the request to return the completed version by post), and a further 20 people were targeted personally through the researcher’s local network to obtain additional responses from those aged 18-29 (a group that was underrepresented in the initial sample). In total, 489 valid responses were received: a 42% response rate. 17 returned questionnaires were excluded from the dataset, as the responses suggested they had not been taken seriously (e.g. every question had the same answer). A further 20 cases were deleted from specific age groups and parishes that were overrepresented, to ensure the sample was as similar to the population on key socio-demographic factors. These 20 cases were chosen looking only at their gender, age and parish of residence, but not their scores on any other variable, the randomness of which ensured that their omission did not systematically influence the overall results of the study. Additional checks which compared the 20 deleted cases with the remaining dataset confirmed that these 20 cases were broadly similarly supportive of all three projects to the remaining dataset, as would be expected from random selection. Although this step reduced the overall sample size slightly, it benefitted the sample’s overall representativeness of the Guernsey population, which is very important when using a sample to draw conclusions about this general population. The final dataset on which this document reports consists of 469 cases.

## 2.3 Sample size

Generally speaking, samples are used because it is usually impossible to survey every single individual in a population. These samples should represent the population as well as possible, however because of the simple fact that they are approximations of the population, there is always a degree of error present in a sample (meaning that the results found in a sample deviate to some

extent from the actual figures in a population). There are two basic ways of reducing this error: ensuring a sample is representative of the population (see below), and ensuring the sample size is sufficient.

The larger the sample, the lower the error rate, and the more confident conclusions can be drawn from it. The question of what is an acceptable error rate (or: 'how big is big enough?') is however a difficult one with no straight answer, as depending on the source one uses this figure varies between 3 and 8%<sup>1234</sup>. A sample size of 469, for a population of just over 60,000, represents an error rate of between 4 and 5% (at a 95% confidence interval<sup>5</sup>), which was acceptable for the purposes of this research.

## 2.4 Sample representativeness

The representativeness, or the degree to which a sample accurately reflects the population, is in some ways even more important than the size of a sample – for instance if one is interested in understanding the views of the entire population, then a sample of 1,000 individuals aged 70+ would be less useful than a sample of 500 individuals of all ages.

The present sample accurately represents the Guernsey population in multiple respects. On key demographic characteristics, the sample is highly similar to the Guernsey population in terms of gender, age, and spatial distribution across the six electoral zones – see Table 1 for an illustration of the similarity in age profile between the sample and the population (Appendix B contains similar tables for all socio-demographic variables). Although no data are available on education levels in the Guernsey population, the sample achieved is very diverse in terms of the highest level of education achieved by respondents, suggesting a good spread of the population has been captured.

In terms of income, the questionnaire avoided asking respondents directly what their income is, as this tends to result in low response rates due the sensitivity of this information, and instead asked whether respondents estimated their income to be below, around or above the Guernsey average. The majority estimated their income to be around average (53%), with a slight overrepresentation of those with self-reported above average incomes (27%) compared to those below average (19%). Although there are some obvious limitations to estimating income this way (e.g. the accuracy of people's estimates), the point is that it provides a rough overview of the income levels in the sample, which are broadly what they should be in the population: mostly around average.

This all means that the sample obtained is very similar to (and therefore representative of) the Guernsey population.

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<sup>1</sup> [http://help.surveymonkey.com/articles/en\\_US/kb/How-many-respondents-do-I-need](http://help.surveymonkey.com/articles/en_US/kb/How-many-respondents-do-I-need)

<sup>2</sup> <https://www.statpac.com/statistics-calculator/sampling.htm>

<sup>3</sup> <http://www.raosoft.com/samplesize.html>

<sup>4</sup> Bartlett, Kotlrik & Higgins (2001). Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance Journal*, 19( 1), p. 43-50.

<sup>5</sup> The 95% confidence interval is a standard range used in social science. It refer to the potential difference between a figure found in the sample and the 'real' figure in the population. For example, if mean support for tidal energy in the sample is 4.50 (on a scale from 1 to 5), then using a 95% confidence interval, the 'real' figure could be up to 5% different from this number (2.5% on either side of the 4.50).



Age cohort	% of population aged 20+	% of sample
20-29	16.4%	14.6%
30-39	15.8%	14.6%
40-49	19.8%	18.2%
50-59	17.8%	20.1%
60-69	14.8%	17.0%
70+	15.4%	15.6%
<i>Subtotal</i>	<i>100%</i>	<i>100%</i>

Table 1. Proportion of those respondents that answered this question from each age group in the sample as compared to the population question (source: Population Bulletin 2013).

### 3. Results

#### 3.1 General support for renewable energy

The questionnaire measured public support for offshore renewable energy in several ways:

- Support for development of the technology in Guernsey *in general*
- Support for three specific developments
- Support for specific locations for these developments

The first type of support was measured by asking ‘In general, to what extent do you support or object to the development of the following energy technologies in Guernsey?’, for offshore wind, tidal energy, wave energy and solar energy.

The responses are captured in Table 2, which shows that in principle, tidal energy is the most well-supported renewable energy source (86% of respondents being in support), with wave and solar energy in close second. Very few respondents objected to these three technologies, while also only few respondents indicated a lack of understanding of the technology by ticking the ‘Don’t know’ option.

A different pattern of responses was found for offshore wind energy – although still a majority supported this technology in principle (58%), a greater proportion of respondents either objected or neither objected nor supported development of this technology in Guernsey.

	Support	Neither object nor support	Object	Don't know
<b>Offshore wind</b>	58%	15%	23%	5%
<b>Tidal energy</b>	86%	8%	2%	4%
<b>Wave energy</b>	80%	11%	4%	6%
<b>Solar energy</b>	81%	12%	4%	3%

Table 2. General levels of support for different renewable technologies in Guernsey, based on the question ‘In general, to what extent do you support or object to the development of the following energy technologies in Guernsey?’.

The patterns of objection are similar and even amplify this distinction between offshore wind on the one hand and the other three technologies on the other; 23% of respondents object to offshore wind in principle, while only 2-4% oppose the other technologies. It is also worth noting that for tidal energy, which studies 1 and 2 shows people do not necessarily know a lot about, the least respondents are undecided, which is striking, as the technology is surrounded by uncertainty at present.

Comparing these Guernsey data with similar data from the UK (based on data from the Department of Energy and Climate Change<sup>6</sup>), it becomes clear that offshore wind is substantially better supported in the UK, and much more objected to in Guernsey – see Table 3. This could be due to the fact that everyday life in Guernsey is very much intertwined with the sea, and everyone lives near the sea, which makes the idea of offshore wind energy something that might affect people’s lives. In the UK, by contrast, offshore wind may be more commonly perceived as being ‘out of sight, out of mind’.

For tidal and wave energy no separate data is available on a UK level, but support for the generic ‘wave/tidal’ energy at 74% is lower than the 86% support for tidal energy and the 80% support for wave energy that was found in Guernsey. This relatively high level of support for tidal energy in Guernsey was suggested by study 1 of this PhD to potentially be due to the tides being such a distinctive local resource, which is in many ways interwoven in everyday lives and local culture. Subsequently to many, tidal energy seemed to ‘simply make sense’ locally – a rationale that was not used for any of the other energy technologies. For solar energy, support levels were identical to the UK at 81%.

	<b>Support</b>	<b>Neither object nor support</b>	<b>Object</b>	<b>Don't know</b>
<b>Offshore wind</b>	58%	15%	23%	5%
<i>In the UK</i>	74%	18%	7%	1%
<b>Tidal energy</b>	86%	8%	2%	4%
<b>Wave energy</b>	80%	11%	4%	6%
<i>In the UK</i>	74%	20%	3%	2%
<b>Solar energy</b>	81%	12%	4%	3%
<i>In the UK</i>	81%	14%	5%	0%

Table 3. General levels of support for different renewable energy technologies in Guernsey, compared to the UK.

Public attitudes towards these renewable energy technologies in Guernsey can to some extent be linked to wider views held about Guernsey’s electricity system, which were explored in section 3 of the survey (see Appendix A). This revealed that a very large majority (89%) believes that Guernsey should make use of its natural resources (e.g. wind, tide, sun, wave) to generate electricity locally (only 3% disagrees), 71% feels that Guernsey should not rely as much on other places for its electricity (10% disagrees), while 77% think Guernsey needs to become more self-sufficient for its electricity (6% disagrees with this). These views are complemented by widely shared views that Guernsey’ current electricity system is vulnerable (70% agrees, 6% disagrees) and in need of change (52% agrees; 10% disagrees). In other words, there is broad agreement within the Guernsey population that renewable energy development that makes use of Guernsey’s natural resources, reduces the vulnerability and enhances the independence of Guernsey’s electricity system is something that is desirable and acceptable in principle.

<sup>6</sup> Wave 12 of DECC’s Public Attitudes Tracker: <https://www.gov.uk/government/statistics/public-attitudes-tracking-survey-wave-12>.

### 3.2 Support for specific renewable energy developments

Support for a technology *in general* is rarely the same as support for *a specific development*, as the former tends to be higher than the latter. Several academic papers have argued there exists a ‘gap’ between high levels of support for technologies *in principle* at a national level, while at the same time specific projects in a specific place are met with lower levels of support and sometimes strong opposition<sup>7</sup>. Therefore the questionnaire described three hypothetical, but specific developments that could potentially be constructed in Guernsey in the future, and investigated public attitudes towards each. The description of each development contained information on the technology, its visual impact, the number of turbines, effects on local electricity prices, and likely ownership model (see Appendix A for the full description provided for each hypothetical development).

The three developments described were:

- A 10-turbine nearshore wind project, producing electricity only for Guernsey, owned by the States, and leading to an increase in electricity prices of 5-10%
- A 100-300-turbine wind project, further offshore, mainly for export, likely to be owned by an external investor, and increasing electricity prices by 10-20%
- A 25-turbine tidal energy farm, using wholly submerged tidal turbines, only producing electricity for Guernsey, owned by the States, and increasing electricity prices by 20-30%

Figure 2 shows relatively large differences between the levels of support for each of the developments. The most widely supported development is the tidal energy development (62% of respondents are in support); however there is also a large difference between the support for the small and the large offshore wind farm, with much higher levels of support for the small offshore wind farm (51% vs. 33%). Only for the large offshore wind farm do more people disagree than agree with the statement that they would support this development – for both the small wind and tidal energy farm more than half of respondents say they would support such as development.

For all three developments, about 20% of respondents ticked the option ‘neither agree nor disagree’, which suggests that they have either not yet made up their mind or do not care strongly about whether or not these developments would go ahead. This is important given that only some information is provided about the proposed project – several participants indicated they needed more information to form a judgement. In other words, these 20% might still decide to oppose a wind project once they found out more about it.

It is also worth pointing out that public support for these specific developments is markedly lower than the general levels of support *in principle* outlined above and in Table 2, which as outlined earlier is a common finding. Unfortunately, the extent of the difference between both figures cannot be compared to previous studies, as these did not measure or report these figures.

In any case, this ‘gap’ may be explained by the fact that the project descriptions gave a lot of information on the development – they are made more real – for example on costs, ownership model, and electricity generated, and therefore it could be said there are more potential reasons to oppose the project. This contrasts with the question on general technology acceptance, where the technologies were not specified at all.

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<sup>7</sup> Bell, Gray & Haggett (2005). The ‘Social Gap’ in Wind Farm Siting Decisions: Explanations and Policy Responses. *Environmental Politics* 14(4), 460-477.

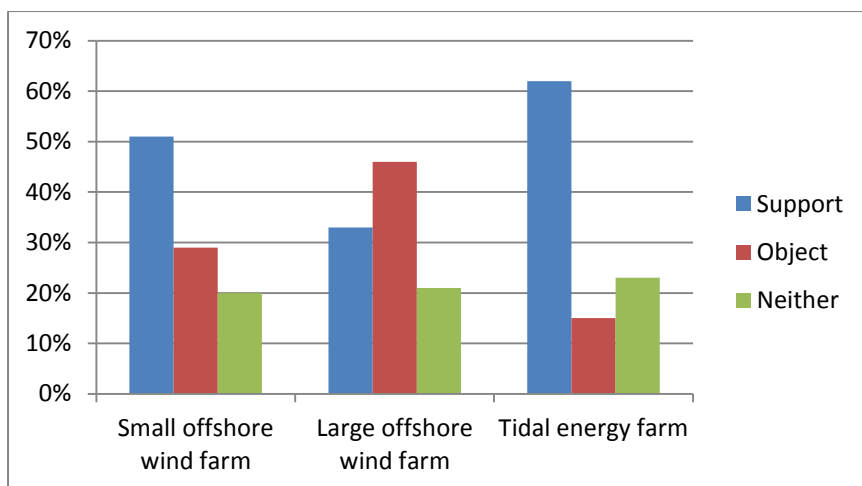


Figure 2. Responses to the question ‘I would support this development’, for the three hypothetical developments described in the questionnaire.

Public attitudes towards these three hypothetical developments will now be discussed in more detail in the next three sections.

### 3.3 The small offshore wind development

Figure 2 showed the small majority (51%) supporting this development, while about one third (29%) opposed it – the subsequent questions in the questionnaire were designed to understand these patterns of responses (Appendix A provides a comprehensive overview of these data). This shows broadly positive public attitudes towards some aspects of the described small offshore wind project; 65% of respondents like the idea of using the wind as a local resource (21% disagree), while 55% of respondents like the idea that this development would generate electricity for Guernsey (20% disagree). However, wind turbines are also commonly, though by no means universally, seen as visually unattractive (60% feel this way). Regarding the potential increase in local electricity prices to help pay for the development, 35% of respondents indicated that they would not support a development that increases electricity prices by 5-10%, while 37% disagreed with this, suggesting they would not necessarily object to such an increase in prices (more detail on this in section 3.6). Finally, there was very strong support for such a development being owned by people living in Guernsey (63% agree, only 7% disagree). So, while a majority likes the idea of using the winds around Guernsey and the development being Guernsey-focused, it is not commonly seen as visually attractive, while non-local ownership would also seem problematic.

In the next section of the questionnaire a map (see Figure 3) showed three nearshore zones to the north/northwest of Guernsey that could, according to research by the Renewable Energy Team, potentially be suitable for siting this smaller, nearshore wind farm. Respondents indicated their support and acceptance<sup>8</sup> of this development in each of these zones, to explore what would be the most widely acceptable place for such a development. The green percentages in the map above show the proportion of respondents that would support the described 10-turbine wind farm in each of the zones – the red percentages reflect the proportion that would object to it in each zone. This shows that Zone A is the least widely supported area for this development (with only 28% of

<sup>8</sup> There are different ways of measuring public views on renewable energy, and recent studies have shown that different wording yields different answers: more specifically, asking whether someone would ‘accept’ a development gives more positive responses than asking whether they would ‘support’ a development (see Batel, Devine-Wright & Tangeland (2013). Social acceptance of low carbon energy and associated infrastructures: A critical discussion. *Energy Policy* 58, 1-5). Therefore both were included in this question.

respondents expressing support for siting this small offshore wind farm in this zone), with zone B being slightly more supported (36%), and zone C substantially more widely supported as a site for offshore wind development, with a small majority in support (52%). This pattern is mirrored in the red numbers, which show zone A is the most widely objected to (by 57% of respondents), and zone C the least.

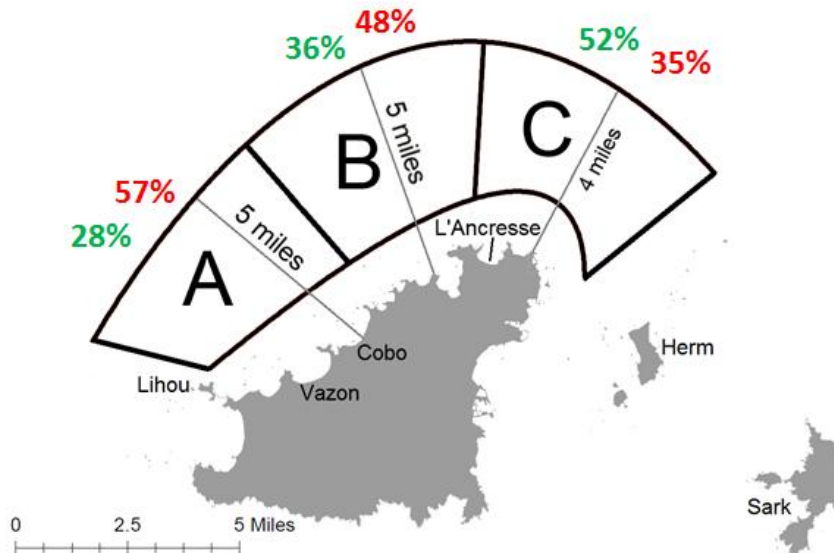


Figure 3. Proportions of respondents supporting and opposing the small wind project in the three zones

Table 4 clearly illustrates the potential importance of choosing an appropriate site for any future offshore wind development, as different places are to very different degrees supported as areas for development. Also, again looking back at the overall levels of support for wind energy outlined in section 3.1 (where 58% supported offshore wind), and support for the development itself (51% in support; section 3.2), it is worth noting that these levels drop even further if the development was to be sited in zones A or B (to as low as 28%), while slightly improving if the development was to be sited in zone C (to 52). It should also be noted that apart from measuring support, a question was also asked about ‘acceptance’ (‘I would accept this development in [zone A-C]’, which refers to a more passive stance of tolerating, but not necessarily active supporting a given development. Although the pattern of responses is identical, the figures are slightly more positive, as summarised in Table 4.

		Disagree	Neither agree nor disagree	Agree
Zone A	Support	57%	14%	28%
	Accept	54%	14%	33%
Zone B	Support	48%	16%	36%
	Accept	45%	14%	37%
Zone C	Support	35%	15%	52%
	Accept	34%	11%	55%

Table 4. Proportion of respondents agreeing or disagreeing with the statements ‘I would support this development in Zone [A-C]’ and ‘I would accept this development in Zone [A-C]’

This section demonstrates that although slight variations occur depending on the wording of the question, an overall high-level trend exists where the west coast is the least popular location for a

wind farm, with acceptability increasing in an eastwards direction – to such an extent that in zone C even a small majority expresses their support for a 10-turbine wind farm in that location.

### **3.4 The large offshore wind development**

Figure 2 showed that this was the least popular of the three described developments in the questionnaire, with only 33% of respondents in support<sup>9</sup>, despite 58% indicating their support for offshore wind in general (see section 3.1). The responses to questions 2 to 5 in the relevant section 6 (see Appendix A) reveal that several aspects lie at the heart of the low levels of support for this development. The first is the information that most of the electricity produced by this development would be exported and not used in Guernsey; 52% preferred a smaller wind farm that would only produce electricity for Guernsey (24% disagreed), while 60% felt that Guernsey should not be installing wind turbines if most of the electricity will be exported (24% disagreed). Moreover, the project was commonly seen as too large-scale for Guernsey (54% agreed; 25% disagreed), and a majority (56%) objected to this development being owned by an outside investor (which was stated in the information provided on this development). Also, the estimated increase in electricity prices of 10-20% as a result of this development was not supported by 53%. In other words, these results suggest that a development that only/mostly generates electricity for Guernsey use (i.e. the development discussed in section 3.3) rather than for export, is on a smaller scale, and owned locally, is more acceptable than a large-scale, externally-owned, export-focused development, even if it would be closer to shore and therefore more visible.

### **3.5 The tidal energy development**

Tidal energy was the most widely supported technology in general (86% in support – see section 3.1), as well as the most supported specific development (62% - section 3.2). Subsequent questions specific to this development revealed that 86% of respondents like the idea of using the tides as a local resource – suggesting that there is a widespread, intuitive positive association with the concept of making use of the strong local tides<sup>10</sup>. However, while 62% did state they would support this development, 54% also said they would not support a development (like this one) that would increase electricity prices by 20-30%. This means a small proportion of respondent contradicted themselves in their responses, which could potentially mean that there is very strong support for such a development, not everyone is accepting of significant price increases associated with such a development (more on this in section 3.6).

Only 22% indicated they would still support a development that increases electricity prices by 20-30% (despite 62% saying they would support the described development, which was already described as having that exact impact on electricity prices). As with the small offshore wind development, a majority (63%) preferred the development to be owned by the local community rather than an external investor (only 7% believe it should be owned externally). Finally, more people agreed (45%) than disagreed (27%) with the statement that ‘I would object to tidal energy if it wasn’t fully submerged and ‘invisible’’, which suggests that tidal energy being submerged is a relatively important aspect of its high acceptability.

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<sup>9</sup> One caveat to point out here is that this was the only development for which a single location was specified (because only one location seems to be technically feasible). Therefore it is possible that some respondents evaluated this development more negatively as they disagree with the location of it – something that would only be reflected in the questions on development siting for the other two developments.

<sup>10</sup> This is also something found in studies 1 and 2 of this PhD, summary reports of which will be available from [www.guernseyrenewableenergy.com](http://www.guernseyrenewableenergy.com).

Like for the small offshore wind farm, a map was included in the questionnaire which showed the three zones that could be the most suitable for tidal energy development (see Figure 4), including one off the west coast and two sites in the Big Russel.

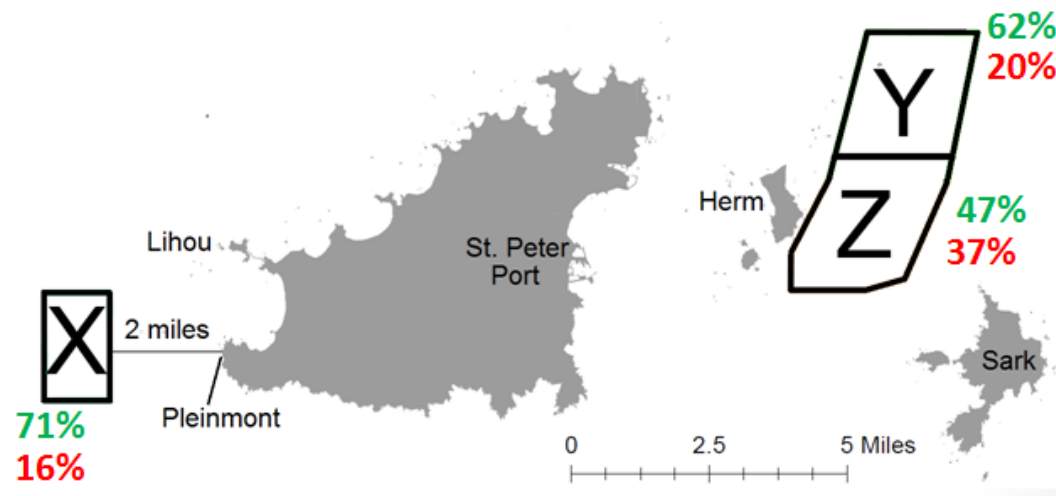


Figure 4. Proportions of respondents supporting and opposing the tidal energy project in the three zones

Table 5 shows that zone X is the best supported zone (71% support), while zone Y also has the support of a majority. Zone Z is the least popular zone, as less than half of respondents support the tidal energy development in this zone (47%), though 52% would accept this development in this location. Clearly, for tidal energy, as was the case for wind energy, the location of the development has clear implications for its acceptability – even if the technology is entirely submerged and therefore not immediately and obviously visible.

Although this reaffirms the value placed by islanders on Herm and the Big Russel, it is not immediately clear why an invisible, broadly supported technology in this location is not more widely acceptable. One suggestion might be that by offering several alternatives (i.e. the three zones), each zone is evaluated comparatively to the others – in this scenario the presence of a widely supported zone (zone X) made the others less acceptable. However, unless a study that only measures support for zone Z is conducted, this hypothesis remains speculation. Another explanation could be that people are concerned about wildlife, as for example the nearby Humps are known for its seals. Or it could be that people simply want the area to remain as natural as possible and object to the idea of large structures being placed in such a setting.

		Disagree	Neither agree nor disagree	Agree
Zone X	Support	16%	13%	71%
	Accept	14%	12%	74%
Zone Y	Support	20%	19%	62%
	Accept	17%	17%	67%
Zone Z	Support	37%	16%	47%
	Accept	33%	15%	52%

Table 5. Proportion of respondents agreeing or disagreeing with the statements 'I would support this development in Zone [X-Z]' and 'I would accept this development in Zone [X-Z]'

Clearly, both for the highly visible and relatively familiar offshore wind farm, as for the submerged, largely invisible, and more unfamiliar tidal farm, the location where the development is sited can make a very substantial difference in terms of the public acceptability of the entire development. This is even true to such an extent that a well-sited wind farm (i.e. in zone C) is even more popular than a poorly-sited tidal farm (i.e. in zone Z) – reversing the generally higher levels of support for tidal energy compared to offshore wind energy described in section 3.1.

### 3.6 Willingness to pay for renewable energy

The above sections have already shown that some people are willing to accept an increase in electricity prices if the electricity came from local, renewable sources. A number of additional questions aimed to further open up whether respondents would be willing to pay anything extra at all for electricity from offshore wind energy and tidal energy, how much, and how they would like to pay for this. As summarised in Table 6, 61% of respondents are prepared to pay extra to ensure their electricity comes from offshore wind, while 74% of respondents are willing to pay for tidal energy.

	Unwilling to pay anything	Willing to pay	Don't know
Offshore wind	30%	61%	9%
Tidal energy	17%	74%	10%

Table 6. Answers to the question ‘How much would you (as a household) be willing to pay per year, on top of what you pay already, for a portion of your electricity to come from [offshore wind energy / Tidal energy] in Guernsey?’

As the full results in Appendix A show, a majority (49-54%) of these indicate a willingness to pay below £100 / year, with between 12 and 20% stating they would be willing to pay over £100/year extra. Most respondents would like to pay for this through their electricity bill (57%), while only a few prefer the alternative option offered in the questionnaire of using other taxes in Guernsey to pay for renewables (6%) – 9% have no preference and 11% are not sure.

### 3.7 Differences between demographic groups

As mentioned in the methodology section, the questionnaire also recorded respondents’ gender, age, education, self-estimated relative income and parish of residence. This section discusses some additional analyses that have been performed in order to understand how support for the three energy developments varied across these socio-demographic segments.

In the below, reference is made to the average ‘supportiveness’ of each group using numbers between 1 and 5 – this is because responses were measured on a 5-point scale (i.e. 5 answer categories), with 5 representing total support and 1 representing total lack of support. Therefore, in the graphs below, higher bars represent a more supportive stance towards a particular development.

First of all, as illustrated in Figure 5, in terms of gender, women were more supportive towards the small offshore wind farm, while men were more supportive towards the tidal energy proposal. Both were equally supportive of the large offshore wind farm.



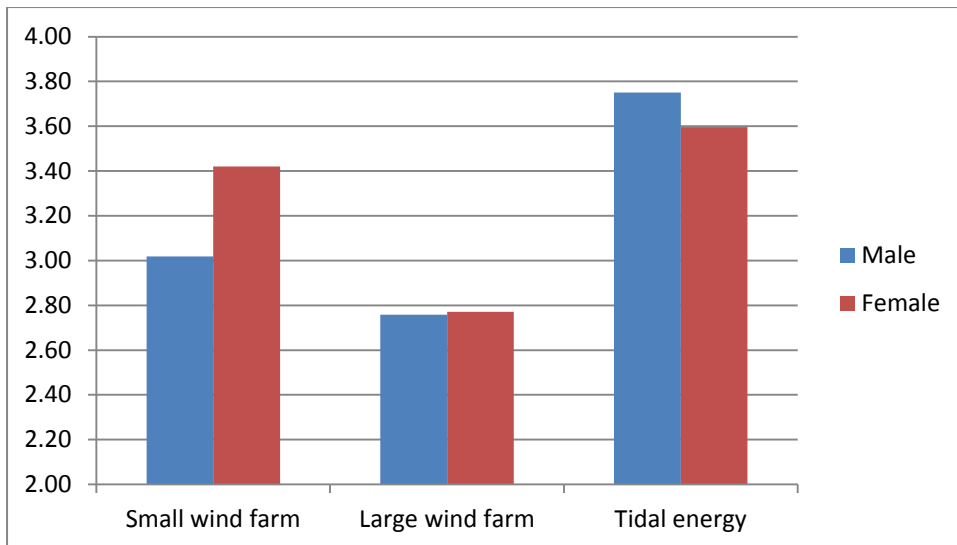


Figure 5. Average score on the question 'I would support this development' for the three described developments, split out by gender.

Figure 6 shows how different age groups evaluated the three developments. This shows that for both of the two offshore wind projects those aged between 18 and 49 are generally more supportive than those aged 50 and over, especially those aged 70+. However, this pattern is not observed for tidal energy, which is evaluated highly similarly across the different age groups.

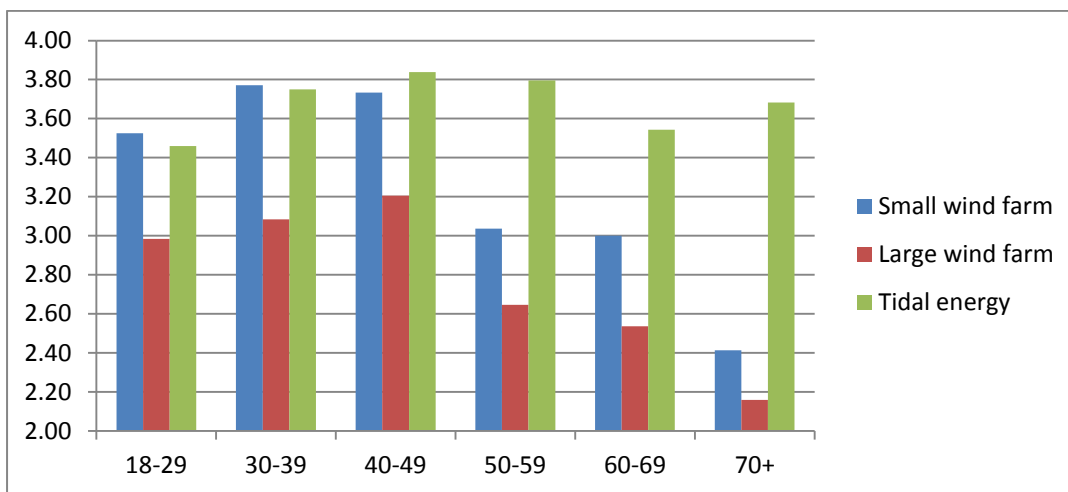


Figure 6. Average score on the question 'I would support this development' for the three described developments, split out by age cohorts.

Next, the two above variables (gender and age) were combined to look at support levels for the small offshore wind farm and the tidal energy farm. Figure 7 shows that support for the small wind project was consistently higher among females in all age groups than among males – with the exception of the 40-49 age group, where support levels are similar. This roughly confirms the impression from Figure 5, where it was shown that overall, women were more supportive of the small wind farm than men.

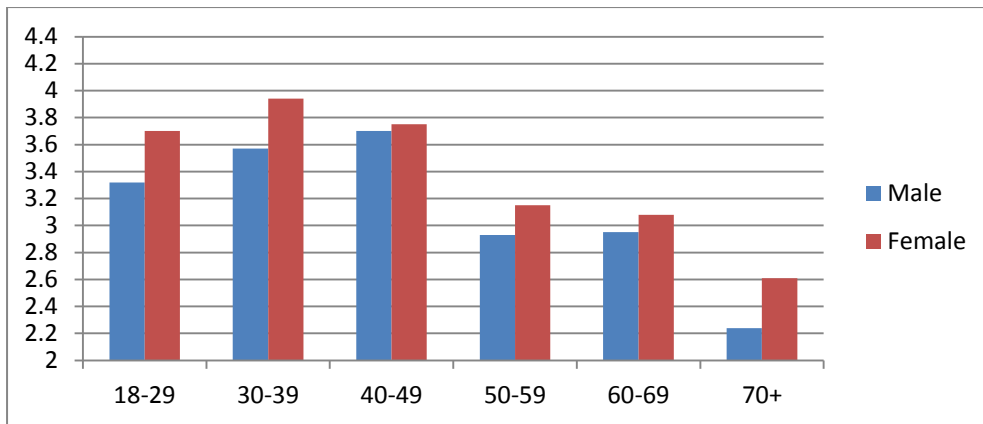


Figure 7. Support for the small wind farm by gender and age group

For the tidal energy project, men were more supportive than women across all age groups except the 18-29 age group, where women were more supportive of the tidal farm (see Figure 8).

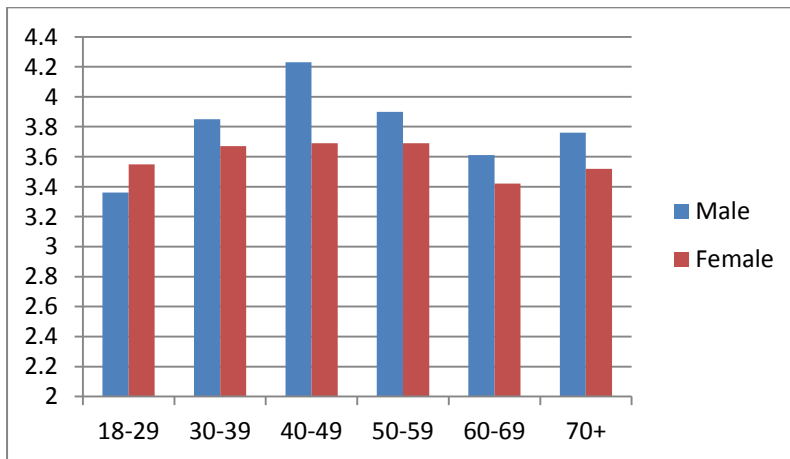


Figure 8. Support for the tidal farm by gender and age group

In terms of education levels, Figure 9 shows how higher levels of education are associated with more supportive evaluations of both offshore wind projects; those having completed A-levels or equivalent, or university degrees were especially more supportive than those without. Again, the same pattern is not apparent for tidal energy, which is again evaluated relatively similarly across the different groups, as was the case for the different age cohorts in Figure 6.

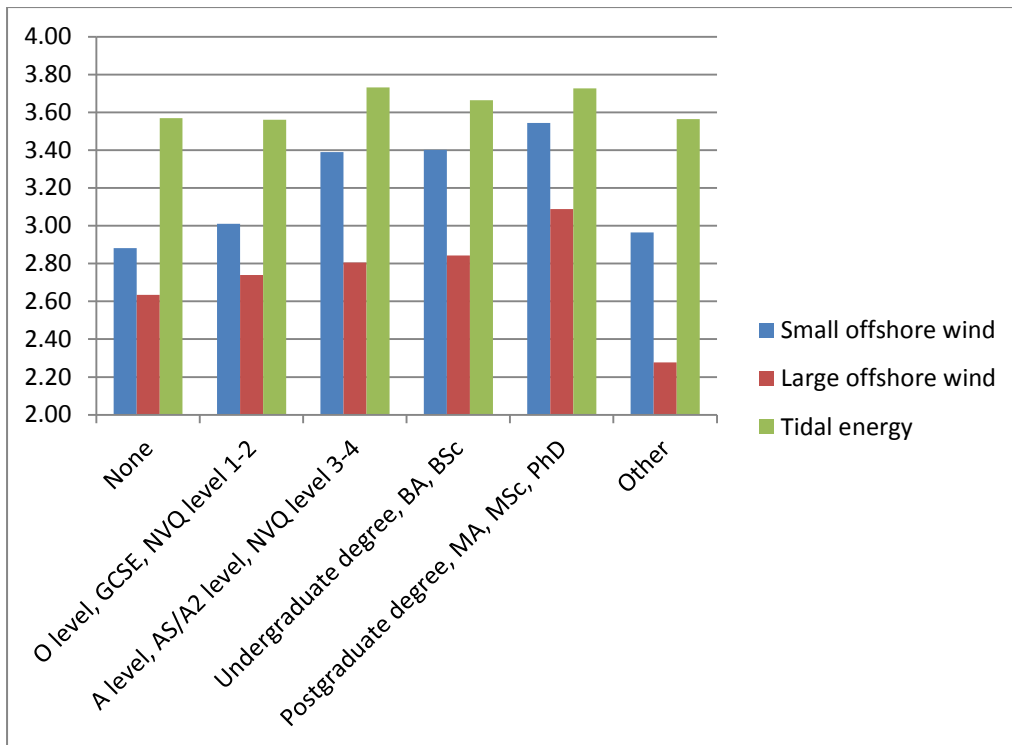


Figure 9. Average score on the question 'I would support this development' for the three described developments, split out by education level.

The next bar chart (Figure 10) presents the differences in support between three groups based on their self-estimated relative income. Here the same pattern is observed across the three developments described in the questionnaire: respondents with higher incomes tend to be more supportive than those with lower incomes.

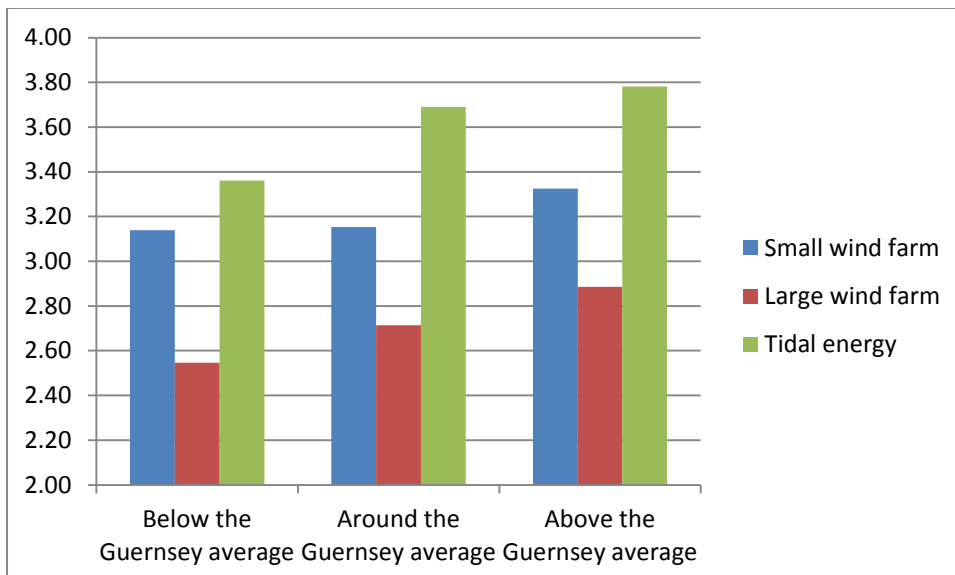


Figure 10. Average score on the question 'I would support this development' for the three described developments, split out by self-estimated relative income.

Finally, some analyses were performed to find out the extent to which attitudes varied spatially across the island, especially in relation to the different sites that were presented in the maps for both the small offshore wind farm and the tidal energy farm. In Figures 11 and 12 below, the

respondents were grouped based on the electoral district they live in, with the two St Peter Port electoral districts grouped into one. Generally speaking, it shows that those living in St Sampson and the Vale were consistently the least supportive of all three zones proposed for the small offshore wind farm. This runs contrary to what would be expected based on the NIMBY hypothesis, where those living in these areas would be expected to oppose the development in zone C (i.e. in their ‘backyard’), but not in zone A.

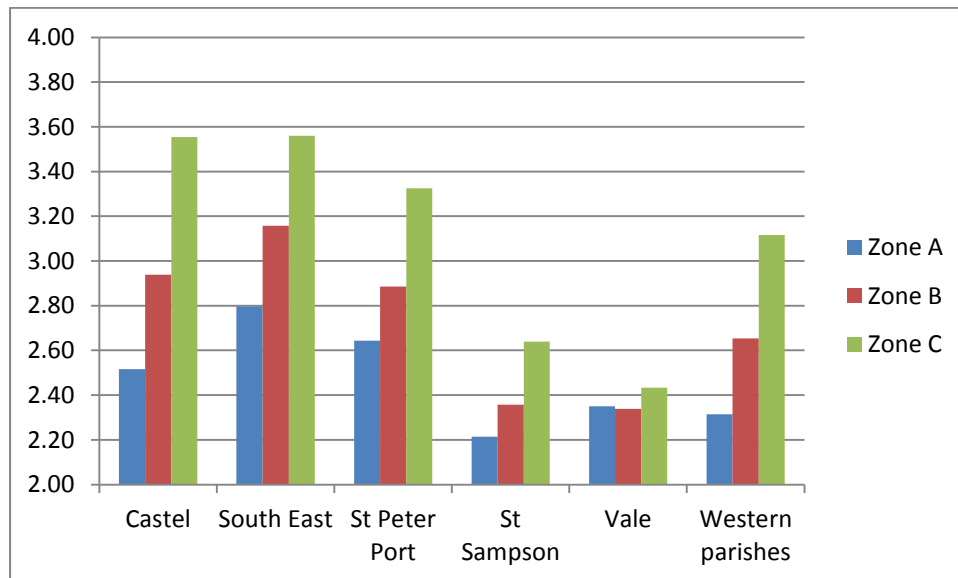


Figure 11. Average score on the question ‘I would support this 10-turbine wind farm in Zone [A-C]’, split out by electoral district.

Moreover, each district - except the Vale - shows the same pattern where zone C is evaluated the most positively, with zone B in second place, and zone A judged to be the least acceptable. In the Vale each zone was supported to a similar extent – suggesting that the Vale’s proximity to zones B and C causes a drop in support for these zones. However, it is not a case of ‘classic’ NIMBYism – in which case one would expect residents in the Vale to strongly oppose developments in zones B or C, while simultaneously being more supportive of development in zone A (which is further from their homes). However, this is not the case, as all zones are instead supported equally. This broad trend where respondents from the Vale and St Sampson were more negative towards this development could potentially be explained by respondents from the Vale being slightly older than average, while those from St Sampson had lower incomes and lower levels of education than average. All of these subgroups of the population were generally less supportive of this project, as shown in the graphs above.

For tidal energy, and the three zones identified as potentially suitable to host such a project, Figure 12 shows that across all districts zone Z is the least supported zone, and either zone X or zone Y is the best supported zone. Interestingly, this is also true for residents from the Western parishes – who live nearest to zone X, and therefore could be expected to prefer zones X or Y. However, again contrary to idea of NIMBYism, zone X and zone Y are the best-supported zones among residents from the Western parishes, while zone Z is by far the least supported zone for them. This illustrates that, although there are some patterns where respondents prefer the development to be sited further away from them, in general those living closer to a development are not always more negative, as often implied by the idea of NIMBYism.

On the other hand, the general pattern is that for two very comparable zones, zone Y and zone Z, the zone that is closest to the shore of a highly valued place (Herm / Shell Beach), which is zone Z, is

much less supported than zone Y, which does suggest that this particular energy development may be more popular when sited further away from a valued place (it's not just a traditional 'backyard'). This short discussion highlights that explaining public support and opposition to the rather simplistic idea of NIMBYism should be done very cautiously and in a nuanced fashion and is by no means a universal way of understanding public acceptability of energy infrastructure.

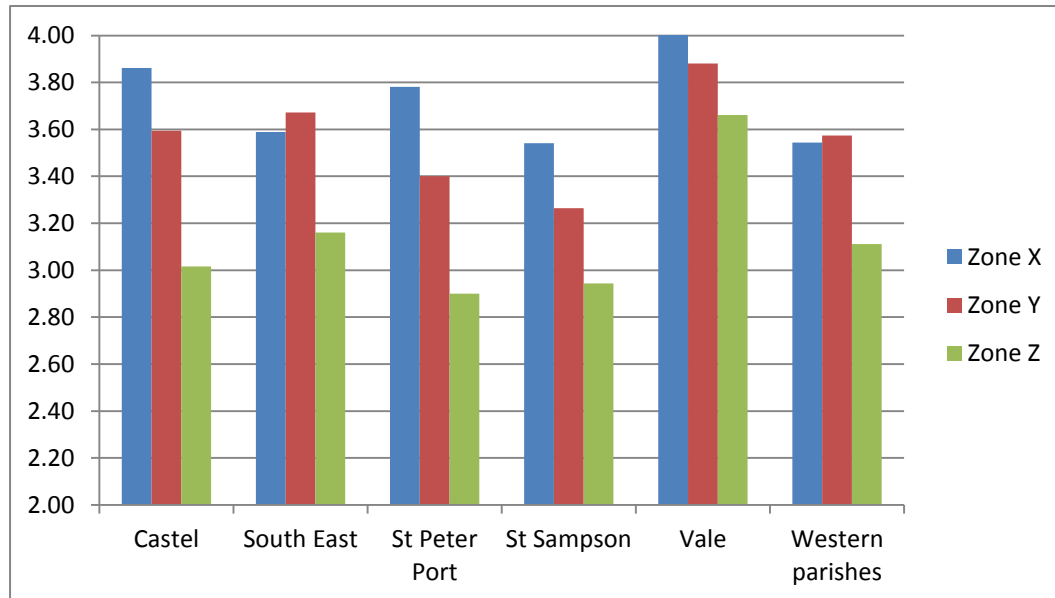


Figure 12. Average score on the question 'I would support this 25-turbine tidal farm in Zone [X-Z]', split out by electoral district.

#### 4. Conclusion

In conclusion, as has been observed elsewhere, public support for various renewable energy technologies *in principle* is relatively high in Guernsey – though less so for offshore wind energy – while support for specific projects is lower than this general figure. Nevertheless, a majority of respondents reacted positively to both the small offshore wind farm proposal and the tidal energy proposal, and potential zones suitable for development that were acceptable to a majority were identified for both proposals. Strong supportive arguments for renewable energy development seem to exist in terms of the broad public support for utilisation of Guernsey's natural resources to generate electricity and for making Guernsey's energy system more independent and self-sufficient. These themes were already highlighted as potentially very important in study 1 and 2 of this PhD – this study has now also confirmed the role played by these themes for the population.

Also, the survey has suggested that certain areas need to be avoided when planning these projects due to very low levels of public support for these developments in these zones. The west coast as captured in zone A, and the Big Russel very near Herm (zone Z) are prime examples of areas that seem to be less widely supported as sites for renewable energy development. Indeed, one of the key findings of this study has been that the siting of offshore renewable energy developments is a very important factor in shaping their acceptability. The study even suggested that, in principle, a poorly-sited tidal energy project can be supported less than a well-sited offshore wind project.

One key aspect that has run through the results is the importance of 'localness' in any renewable energy development: respondents highlighted the importance of developments being owned locally, producing electricity for local use, and developments that use distinctive local resources (i.e. the

tide). This suggests that any future development should ensure and emphasise benefitting Guernsey and its local community as much as possible, if it is to gain optimal levels of support.

A limitation of the present study is that the descriptions of the three renewable energy developments in the questionnaire were fairly limited (due to space constraints); important information about their spatial arrangement and subsequent visual impact was not given, potential impacts on wildlife were not discussed in detail, as were the need for onshore infrastructure or exclusion zones. It should also be remembered that participants' responses to this questionnaire concerned hypothetical developments. Opposition to actual developments has often been the result of aspects that typically enter the frame in the later phases of renewable energy implementation; such as feelings of being overlooked in decision-making processes, qualms about the consultation process, objections to the distributions of a project's costs and benefits (e.g. what benefits are received by local communities), or the public debate and the dominant voices within it. These issues are undoubtedly important in shaping overall public acceptability, but could not be covered by this research as the developments have not yet reached the stage by which those aspects are played out.

Nevertheless, this study has clear value in enhancing understanding of general patterns in public support and objection to (offshore) renewable energy developments in the future, as well as in providing an enhanced understanding of (the importance of) the different rationales in favour of and against certain developments. This work should therefore be able to assist in policy-making, as well as project development and the communication of this to Guernsey residents and stakeholders.



## Your views on Guernsey and its future

Fill in this 20-minute survey and enter a prize draw to **win one of five £50 M&S vouchers!**

Please make sure you've answered all the questions and have completed the entire survey.

If you have any questions please contact Bouke Wiersma at **[bw282@exeter.ac.uk](mailto:bw282@exeter.ac.uk)**

THANK YOU FOR YOUR HELP!

*If this questionnaire has not been collected by Thursday 5 February, we would be very grateful if you could send it to:*  
Peter Barnes  
Raymond Falla House  
PO Box 459, Longue Rue, St Martin  
GY1 6AF

### ***About this questionnaire***

This questionnaire is part of the research carried out in Guernsey by Bouke Wiersma, PhD student at the Geography department of the University of Exeter. His research is supported by the States of Guernsey's Renewable Energy Team (which is part of the Commerce & Employment Department), and will assist in informing States policy. More information about the Renewable Energy Team can be found at **[www.guernseyrenewableenergy.com](http://www.guernseyrenewableenergy.com)**  
All data collected in this survey will be stored safely and anonymously.

## Section 1 - Your personal relation with Guernsey

Please indicate to what extent you agree or disagree with each statement below by circling one number only for each statement: 1 means that you strongly disagree with a statement; 5 means that you strongly agree with a statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I cannot imagine leaving Guernsey for good	33 (7%) <sup>11</sup>	93 (20%)	78 (17%)	99 (21%)	160 (35%)	6
2. I often take photographs of various places in Guernsey	43 (9%)	101 (22%)	104 (23%)	144 (31%)	71 (15%)	6
3. I like to explore Guernsey and discover new places	9 (2%)	16 (4%)	108 (24%)	222 (48%)	105 (23%)	9
4. Even if there are better places, I am not going to move out of Guernsey	42 (9%)	99 (21%)	104 (22%)	95 (21%)	124 (27%)	5
5. From time to time I discover Guernsey anew	12 (3%)	42 (9%)	119 (26%)	226 (49%)	60 (13%)	10
6. There are many places in Britain and the world where I could live	24 (5%)	68 (15%)	65 (14%)	193 (42%)	111 (24%)	8
7. I have never considered if living somewhere else would be better	103 (22%)	206 (45%)	66 (14%)	48 (10%)	40 (9%)	6
8. It's more important to me how I live than where I live	20 (4%)	81 (18%)	143 (31%)	139 (16%)	75 (16%)	11
9. It wouldn't bother me to leave Guernsey and move elsewhere	129 (28%)	127 (27%)	91 (20%)	76 (16%)	41 (9%)	5
10. Guernsey's seas are a great resource to be utilised	9 (2%)	15 (3%)	60 (13%)	196 (42%)	184 (40%)	5
11. Guernsey's seas should be left alone as much as possible	38 (8%)	140 (30%)	150 (33%)	91 (20%)	42 (9%)	8

## Section 2 - Identity

Please indicate to what extent you agree or disagree with each statement below by circling one number only for each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I feel like I belong in this parish	15 (3%)	43 (9%)	151 (33%)	157 (34%)	96 (21%)	7
2. I feel like I belong in Guernsey	10 (2%)	21 (5%)	81 (18%)	179 (39%)	171 (37%)	7
3. I feel like a Guern	51	71	56	111	174	6

<sup>11</sup> All percentages in this appendix refer to the proportion of all valid responses that fall into each category (excluding those responses for which data are missing – these were instances where participants forgot to or chose not to answer a question, or their answer was ambiguous or not readable).



	(11%)	(15%)	(12%)	(24%)	(38%)	
4. I feel like a Channel Islander	31 (7%)	68 (15%)	86 (19%)	170 (36%)	107 (23%)	7
5. I feel English	109 (24%)	95 (21%)	90 (20%)	110 (24%)	58 (13%)	7
6. I feel British	32 (7%)	35 (8%)	90 (19%)	191 (41%)	116 (25%)	5

### Section 3 - Guernsey's current electricity system

At present electricity in Guernsey comes from two sources. On average, about 70% comes from France, through a cable on the seabed (this is mostly nuclear energy with some renewable), and the other 30% is generated by the power station at the Bridge (using oil).

Please indicate to what extent you agree or disagree with each statement below by circling one number only for each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I am happy with the current electricity system	23 (5%)	122 (26%)	182 (39%)	127 (27%)	14 (3%)	1
2. The current electricity system is in need of change	2 (0%)	45 (10%)	177 (38%)	196 (42%)	47 (10%)	2
3. Guernsey's electricity supply is vulnerable	1 (0%)	29 (6%)	109 (23%)	253 (54%)	75 (16%)	2
4. Guernsey should make use of its natural resources (e.g. wind, tide, sun, wave) to generate electricity locally	4 (1%)	10 (2%)	38 (8%)	201 (43%)	214 (46%)	2
5. Guernsey should not rely as much on other places for its electricity	4 (1%)	41 (9%)	93 (20%)	219 (47%)	111 (24%)	1
6. Being dependent on others for electricity is part and parcel of being an island	26 (6%)	120 (26%)	138 (30%)	167 (36%)	17 (4%)	1
7. Guernsey needs to become more self-sufficient for its electricity	3 (1%)	25 (5%)	77 (17%)	251 (54%)	109 (23%)	4
8. Electricity in Guernsey is unreasonably expensive	0 (0%)	50 (11%)	176 (38%)	161 (34%)	82 (18%)	0
9. Guernsey should not be using fossil fuels (which cause climate change) to generate its electricity	15 (3%)	54 (12%)	164 (35%)	158 (34%)	77 (17%)	1

## Section 4 - Renewable energy in Guernsey

In general, to what extent do you support or object to the development of the following energy technologies in Guernsey? *Please circle one number only for each technology*

	Strongly object	Object	Neither object nor support	Support	Strongly Support	Don't know	Missing data
1. Offshore wind energy	49 (11%)	58 (12%)	71 (15%)	147 (32%)	120 (26%)	21 (5%)	3
2. Tidal energy	1 (0%)	8 (2%)	36 (8%)	178 (38%)	224 (48%)	18 (4%)	4
3. Wave energy	4 (1%)	13 (3%)	51 (11%)	180 (39%)	190 (41%)	27 (6%)	4
4. Solar energy	3 (1%)	16 (3%)	58 (12%)	175 (38%)	200 (43%)	14 (3%)	3

## Section 5 - Offshore wind energy in Guernsey

In the future, an offshore wind farm could be developed near Guernsey, which would make its electricity supply more diverse and secure, and reduce its carbon emissions. One option could be to build a group of 10 wind turbines like the one pictured here (each 100 meters tall).

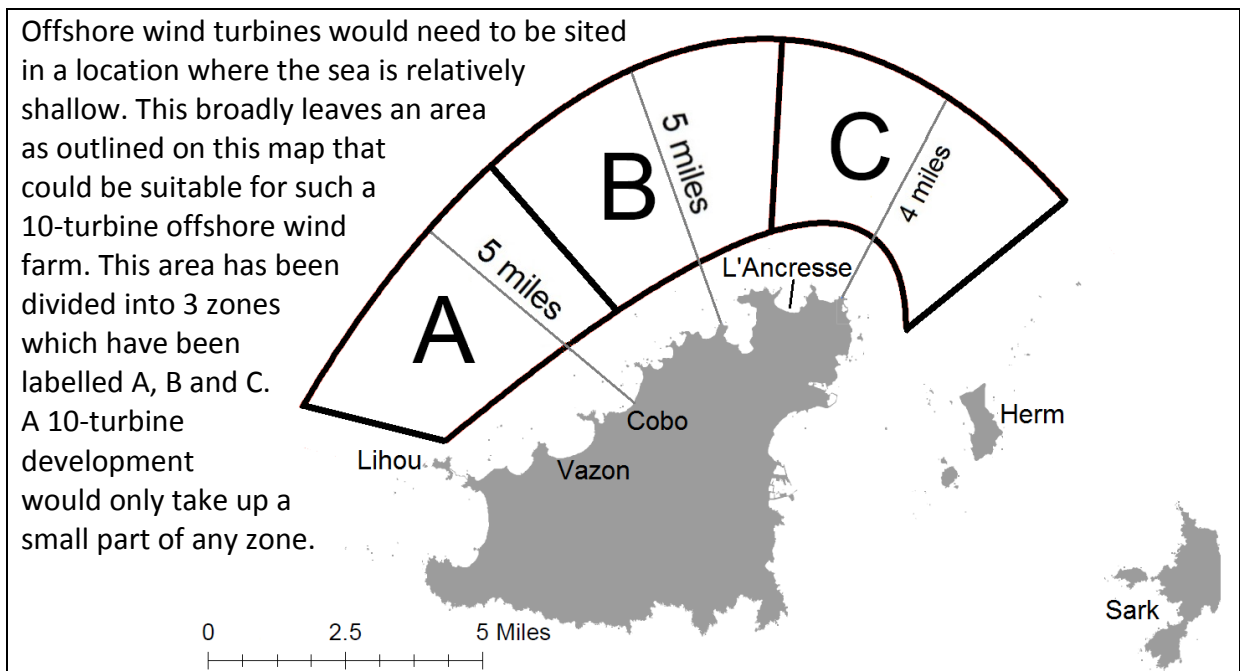
- The electricity produced by these 10 turbines would all be used in Guernsey, and they could produce about 25% of all the electricity consumed in Guernsey annually.
- Such a development could be wholly owned by the States of Guernsey.
- Such a proposal is estimated to increase electricity prices by 5-10%, adding £45 - £90 to the average annual electricity bill.
- This would be subject to a full Environmental Impact Assessment.



Please indicate to what extent you agree or disagree with each statement below by circling one number only for each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I would support this development	69 (15%)	65 (14%)	94 (20%)	170 (37%)	62 (14%)	9
2. This development would look visually attractive	138 (30%)	140 (30%)	110 (24%)	62 (13%)	11 (2%)	8

3. I like the idea of using this local resource (the wind)	43 (9%)	55 (12%)	62 (14%)	201 (44%)	98 (21%)	10
4. I like the idea of this development generating electricity only for Guernsey	42 (9%)	52 (11%)	112 (24%)	189 (41%)	65 (14%)	9
5. I would not support a development that increases electricity prices by 5-10%	45 (10%)	124 (27%)	129 (28%)	98 (21%)	65 (14%)	8
6. I would worry about its impact on wildlife	19 (4%)	78 (17%)	121 (26%)	178 (39%)	64 (14%)	9
7. This proposal would industrialise Guernsey	34 (7%)	113 (25%)	181 (39%)	103 (22%)	29 (6%)	9
8. This development would make Guernsey less unique	51 (11%)	141 (31%)	131 (28%)	99 (22%)	39 (9%)	8
9. I would prefer this development to be owned by an investor outside Guernsey	116 (25%)	172 (37%)	145 (32%)	18 (4%)	9 (2%)	9
10. I would prefer this development to be owned by people living in Guernsey	8 (2%)	24 (5%)	140 (30%)	196 (43%)	93 (20%)	8



Please indicate to what extent you agree or disagree with each statement below.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I would support this 10-turbine wind farm in Zone A	131 (31%)	109 (26%)	60 (14%)	82 (20%)	35 (8%)	52

2. I would accept this 10-turbine wind farm in Zone A	132 (32%)	92 (22%)	59 (14%)	94 (23%)	40 (10%)	52
3. I would support this 10-turbine wind farm in Zone B	113 (27%)	89 (21%)	67 (16%)	104 (25%)	47 (11%)	49
4. I would accept this 10-turbine wind farm in Zone B	113 (27%)	73 (18%)	58 (14%)	118 (25%)	55 (12%)	52
5. I would support this 10-turbine wind farm in Zone C	98 (23%)	50 (12%)	62 (15%)	139 (33%)	79 (19%)	41
6. I would accept this 10-turbine wind farm in Zone C	94 (22%)	49 (12%)	47 (11%)	147 (35%)	84 (20%)	48

### Now think of the COAST near these zones...

Please indicate to what extent you agree or disagree with each statement, **for each zone**, by writing down one number (1-5) in **each cell** of the table below:

**Strongly disagree**      **Disagree**      **Neither agree nor disagree**      **Agree**      **Strongly agree**  
                                  1                                    2                                    3                                    4                                    5

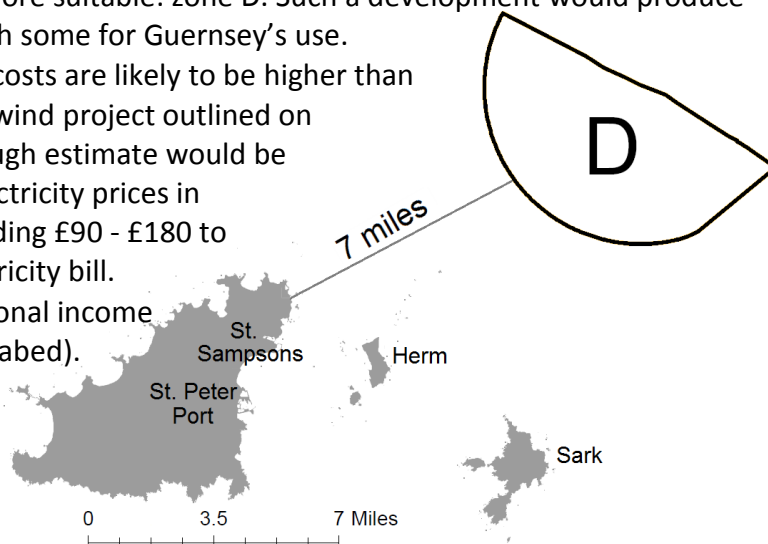
	<b>The coast near Zone A...</b>	<b>The coast near Zone B...</b>	<b>The coast near Zone C...</b>
<b><i>FOR EXAMPLE:</i></b>	<b>2</b>	<b>5</b>	<b>3</b>
...is an area of natural beauty	4.30 <sup>12</sup>	4.18	3.96
...has fantastic views	4.32	4.22	3.97
...is visited by many people	4.33	4.17	3.90
...is quite industrial	1.63	1.76	2.26
...is a pristine, unspoilt natural area	3.99	3.91	3.65
...is one of my favourite areas	3.96	3.80	3.63
...symbolises what Guernsey is all about	4.06	3.89	3.65

<sup>12</sup> Here, for simplicity average scores are shown – the full results can be obtained by emailing the author at bw282@exeter.ac.uk.

## Section 6 - Offshore wind energy on a larger scale

A different option to make Guernsey's electricity supply more diverse and secure, and reduce its carbon emissions, is to install a much larger wind farm (100-300 turbines), for which a different area may be more suitable: zone D. Such a development would produce electricity mainly for export, with some for Guernsey's use.

- As it is further offshore, costs are likely to be higher than for the smaller offshore wind project outlined on the previous pages; a rough estimate would be that it could increase electricity prices in Guernsey by 10-20%, adding £90 - £180 to the average annual electricity bill.
- Guernsey may get additional income (e.g. from lease of the seabed).
- Due to its increased size, it is more likely to be majority owned by an outside investor rather than the States of Guernsey.



Please indicate to what extent you agree or disagree with each statement below by circling one number only for each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I would support this development	95 (21%)	112 (25%)	95 (21%)	120 (26%)	32 (7%)	15
2. I would prefer a smaller wind farm that only produces electricity for Guernsey	45 (10%)	65 (14%)	108 (24%)	178 (39%)	57 (13%)	16
3. I don't think Guernsey should be installing wind turbines if most of the electricity will be exported	36 (8%)	72 (16%)	71 (16%)	168 (37%)	105 (23%)	17
4. I think this development would be too large-scale for Guernsey	27 (6%)	84 (19%)	101 (22%)	156 (35%)	84 (19%)	17
5. I object to such a project being owned by an outside investor	17 (4%)	58 (13%)	125 (28%)	140 (31%)	112 (25%)	17
6. I would not support a development that increases electricity prices by 10-20%	12 (3%)	78 (17%)	126 (28%)	126 (28%)	112 (25%)	15
7. I would rather have a wind farm that increases electricity prices by less, even if that would be closer to the land	60 (13%)	92 (20%)	131 (29%)	135 (30%)	34 (8%)	17
8. This would be the right location for such a development	56 (12%)	54 (12%)	147 (32%)	151 (33%)	46 (10%)	15

## Section 7 - Tidal energy in Guernsey

In the future, Guernsey might be able to use its strong tidal currents by developing a tidal energy farm near its coast. This would make its electricity supply more diverse and secure, and reduce its carbon emissions. One option could be to build a group of 25 tidal turbines that are fixed to the seabed (see image).

- These could be described as ‘underwater wind turbines’. They could be 25 meters high but deep enough to allow ships to pass over, with slowly rotating, 11-meter long blades.
- The electricity produced by these 25 turbines would all be used in Guernsey, and they could produce about 25% of all the electricity consumed in Guernsey annually.
- Such a development could be wholly owned by the States of Guernsey.
- This would be subject to a full Environmental Impact Assessment.



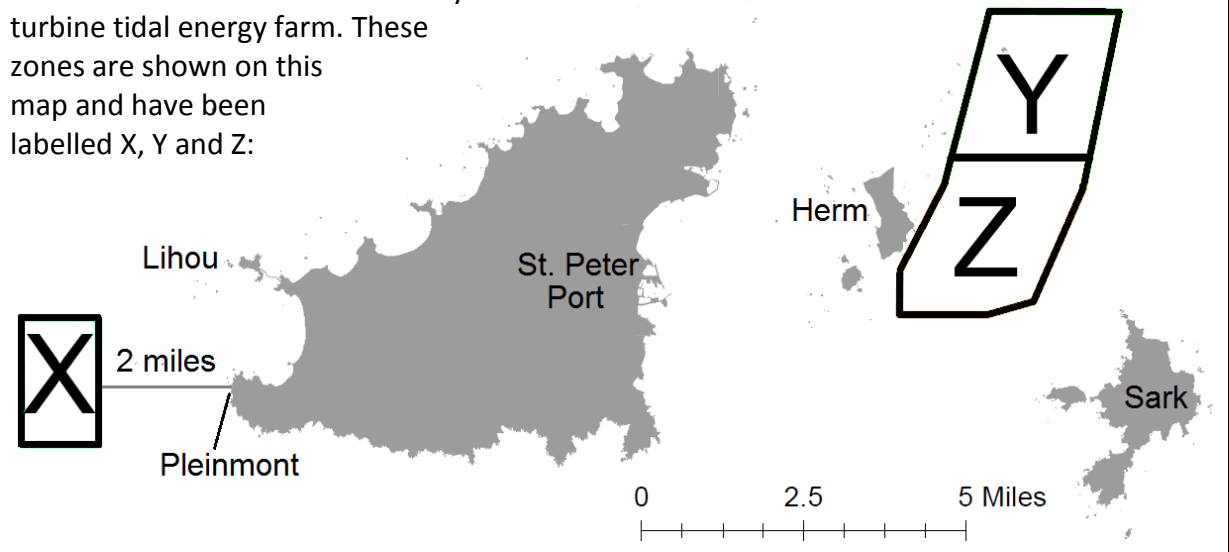
At present tidal energy technology is still very expensive, though in the future these costs may potentially come down gradually. In one scenario this 25-turbine development would increase electricity prices in Guernsey by 20-30%, adding £180 - £270 to the average annual electricity bill.

Please indicate to what extent you agree or disagree with each statement below by circling one number only for each statement.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I would support this development	17 (4%)	49 (11%)	105 (23%)	193 (42%)	93 (20%)	12
2. I would not support a development that increases electricity prices by 20-30%	19 (4%)	83 (18%)	110 (24%)	155 (34%)	94 (20%)	8
3. I like the idea of using this local resource (the tides)	8 (2%)	16 (4%)	41 (9%)	236 (51%)	161 (35%)	7
4. This proposal would industrialise Guernsey	41 (9%)	147 (32%)	192 (42%)	66 (14%)	14 (3%)	9
5. This development would make Guernsey less unique	78 (17%)	204 (44%)	134 (29%)	36 (8%)	9 (2%)	8
6. I would worry about this development's impact on wildlife	20 (4%)	79 (17%)	119 (26%)	185 (40%)	57 (12%)	9
7. I would prefer this development to be owned by	90 (20%)	177 (39%)	157 (34%)	23 (5%)	11 (2%)	11

an external investor						
8. I would prefer this development to be owned by the local community	7 (2%)	24 (5%)	138 (30%)	205 (44%)	88 (19%)	7
9. I would object to tidal energy if it wasn't fully submerged and 'invisible'	27 (6%)	95 (21%)	128 (28%)	131 (28%)	80 (17%)	8

Such a tidal energy development needs to be sited in a location with strong tidal currents and a suitable seabed. This broadly leaves three zones that could be suitable for such a 25-turbine tidal energy farm. These zones are shown on this map and have been labelled X, Y and Z:



Please indicate to what extent you agree or disagree with both statements below, for **each zone**, by writing one number (1-5) in **each cell** of this table:

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Missing data
1. I would support this 25-turbine tidal farm in Zone X	32 (8%)	33 (8%)	56 (13%)	188 (45%)	108 (26%)	52
2. I would accept this 25-turbine tidal farm in Zone X	32 (8%)	26 (6%)	48 (12%)	194 (47%)	109 (27%)	60
3. I would support this 25-turbine tidal farm in Zone Y	38 (9%)	44 (11%)	77 (19%)	175 (42%)	82 (20%)	53
4. I would accept this 25-turbine tidal farm in Zone Y	33 (8%)	37 (9%)	68 (17%)	186 (46%)	84 (21%)	61
5. I would support this 25-turbine tidal farm in Zone Z	68 (17%)	82 (20%)	67 (16%)	130 (32%)	63 (15%)	59
6. I would accept this 25-turbine tidal farm in Zone Z	65 (16%)	70 (17%)	62 (15%)	141 (35%)	67 (17%)	64

**Now think of the COAST near these zones...**

Please indicate to what extent you agree or disagree with each statement, **for each zone**, by writing down one number (1-5) in **each cell** of the table below:

Strongly disagree 1	Disagree 2	Neither agree nor disagree 3	Agree 4	Strongly agree 5	
			<b>The coast near Zone X...</b>	<b>The coast near Zone Y...</b>	<b>The coast near Zone Z...</b>
<b>FOR EXAMPLE:</b>			<b>2</b>	<b>5</b>	<b>3</b>
...is an area of natural beauty			4.00	3.82	4.23
...has fantastic views			4.14	3.78	4.21
...is visited by many people			3.70	3.36	4.00
...is quite industrial			1.61	1.79	1.67
...is a pristine, unspoilt natural area			4.04	3.97	4.12
...is one of my favourite areas			3.56	3.26	3.66
...symbolises what Guernsey is all about			3.66	3.37	3.72

**Section 8 - Costs**

1. How much would you (as a household) be willing to pay per year, on top of what you pay already, for a portion of your electricity to come from <b>offshore wind energy</b> in Guernsey? <i>(please circle only one option)</i>						
Nothing at all	Less than £50 per year	Between £50 and £99 per year	Between £100 and £149 per year	Over £150 per year	Don't know	Missing data
135 (30%)	101 (22%)	125 (27%)	42 (9%)	13 (3%)	42 (9%)	11

2. How much would you (as a household) be willing to pay per year, on top of what you pay already, for a portion of your electricity to come from <b>tidal energy</b> in Guernsey? <i>(please circle only one option)</i>						
Nothing at all	Less than £50 per year	Between £50 and £99 per year	Between £100 and £149 per year	Over £150 per year	Don't know	Missing data
78 (17%)	105 (23%)	144 (31%)	68 (15%)	21 (5%)	44 (10%)	9

3. How would you like to pay for this? <i>(please circle only one option)</i>						
I don't want to pay anything	Through my electricity bill	Through other taxes in Guernsey	No preference	Don't know	Missing data	
78 (17%)	260 (57%)	26 (6%)	41 (9%)	48 (11%)	16	

4. Are you currently paying your own electricity bills?	Yes –	No –	Missing data
	403 (95%)	21 (5%)	45



## Appendix B – Data on sample representativeness

Parish	Population data	Sample data	
	% of population	Number of respondents	% of valid responses in sample
Male	50%	221	50%
Female	50%	222	50%
<i>Subtotal</i>	<i>100%</i>	<i>443</i>	<i>100%</i>
No data		26	
<b>Total</b>		<b>469</b>	

Table C1. Number and proportion of respondents from each gender in the sample as compared to the population (source: Population Bulletin 2013).

Age cohort	Population data	Sample data	
	% of population aged 20+	Number of respondents	% of valid responses in sample
20-29	16.4%	61	14.6%
30-39	15.8%	61	14.6%
40-49	19.8%	76	18.2%
50-59	17.8%	84	20.1%
60-69	14.8%	71	17.0%
70+	15.4%	65	15.6%
<i>Subtotal</i>	<i>100%</i>	<i>418</i>	<i>100%</i>
No data		51	
<b>Total</b>		<b>469</b>	

Table C2. Number and proportion of respondents from each age group in the sample as compared to the population (source: Population Bulletin 2013).

Parish	Population data	Sample data	
	% of population	Number of respondents	% of valid responses in sample
Castel	14.1%	72	15.6%
South East	14.0%	67	14.5%
St Peter Port	30.1%	124	26.8%
St Sampson	14.5%	77	16.7%
Vale	15.3%	65	14.1%
Western parishes	12.0%	57	12.3%
<i>Subtotal</i>	<i>100%</i>	<i>462</i>	<i>100%</i>
No data		7	
<b>Total</b>		<b>469</b>	

Table C3. Number and proportion of respondents from electoral district in the sample as compared to the population (source: averaged from the 2001 Census data on population per parish & 2013 Population Bulletin data on number of 'domestic property units' per parish).

Parish	Population	Sample	
	% of population	Number of respondents	% of valid responses in sample
None	Not available	53	11.7%
O level, GCSE, NVQ level 1	Not available	101	22.3%
A level, AS/A2 elvels, NVQ level 3-4	Not available	83	18.3%
Undergraduate degree, BA, BSc	Not available	102	22.5%
Postgraduate degree, MA, MSc, PhD	Not available	57	12.6%
Other	Not available	57	12.6%
<i>Subtotal</i>		<i>453</i>	<i>100%</i>
No data		16	
<b>Total</b>		<b>469</b>	

Table C4. Number and proportion of respondents that achieved each education level in the sample (no data available for population)

Parish	Population	Sample	
	% of population	Number of respondents	% of valid responses in sample
Below the Guernsey average	Not available	87	19.3%
Around the Guernsey average	Not available	240	53.3%
Above the Guernsey average	Not available	123	27.3%
<i>Subtotal</i>		<i>450</i>	<i>100%</i>
No data		19	
<b>Total</b>		<b>469</b>	

Table C5. Number and proportion of respondents in each self-estimated relative income group in the sample.

Parish	Population	Sample	
	% of population	Number of respondents	% of valid responses in sample
Grown up in Guernsey	Data not available	306	65.2%
Grown up elsewhere	Data not available	151	32.2%
<i>Subtotal</i>		<i>457</i>	<i>100%</i>
No data		12	
<b>Total</b>		<b>469</b>	

Table C6. Number and proportion of respondents that did and did not grow up in Guernsey in the sample (no data available for population)