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« The case for offshore wind farms, artificial reefs and sustainable tourism in the French Mediterranean »

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The case for offshore wind farms, artificial reefs and sustainable tourism in the French Mediterranean**

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Abstract

As the French government strives to achieve their offshore renewable energy target, the impact of offshore wind farms on coastal tourism in the Languedoc Rousillon is now being questioned. To assess this issue, a choice experiment was undertaken to elicit tourist preferences for wind turbines at different distances from the shore. We also examined whether potential visual nuisances may be compensated by wind farm associated reef-recreation or by adopting a coherent environmental policy. The findings indicate that age, nationality, vacation activities and their destination loyalty influence attitudes toward compensatory policies. Two policy recommendations are suggested. First, everything else being equal, wind farms should be located no closer than 12 km offshore. Second, and alternatively, a wind farm can be located from 5 km and outwards without a loss in tourism revenues if accompanied by a coherent environmental policy and wind farm associated recreational activities.

1. Introduction

The French government launched a national invitation to tender for the construction of offshore wind turbines in 2011. The Mediterranean region of the Languedoc Roussillon, with its high wind speeds and relatively gentle sea-floor[1] descent, was identified as one of ten suitable areas. Coastal municipalities mobilised in response, voicing their opposition to the French government. They argued that offshore wind turbines would disfigure the landscape and destroy the allure of their coastal community resorts. These protests were heard and the proposition for the construction of offshore wind farms in Languedoc Roussillon was withdrawn from the 2011 tender (Guipponi, 2011; Government portal, 2011). There are no studies to either confirm or rebut the fears of the roaring tourism industry, and it would be pertinent for policy makers, the tourist industry and wind farm developers alike to be informed about the economic implications of offshore wind farms for the tourist industry in the French Mediterranean. To investigate this issue, we conducted a choice experiment valuation survey with tourists on the coast of Languedoc Roussillon and assessed their willingness to pay / willingness to accept compensation for wind turbines placed at different distances from the shore.

France boasts the second largest wind power potential in Europe after the United Kingdom, but its installed capacity is amongst the smallest in Europe (EWEA, 2010). By 2020, the French government aims to cover 23% of final energy demand from renewable sources, in order to meet its obligation under the EU Climate and Energy package and the Grenelle Forum[2] (Enerzine, 2011; GWEC, 2011). This translates into the installation of 25 GW of wind power, including 6 GW offshore. However, with only 1 GW of additional wind power capacity being installed each year since 2007, the current pace of installations would need to double for France to meet its target (Nadai & Labussière, 2009). France's delay in expanding this capacity has been explained by an institutional lock-in into nuclear energy, with part of the French establishment apparently being very hostile to wind power (Agasse, 2010; Nadai & Labussière 2009). Specifically regarding offshore wind farms, the French environmental ministry has attributed the delay to the depth of the sea floor, which is much greater in the Atlantic Ocean and the Mediterranean Sea than in the North Sea. Consequently, wind farms have to be located closer to the coast and are hence more prone to coming into conflict with the fishing industry and tourism (Agasse, 2010). Indeed in Languedoc Roussillon, recent opposition by local politicians to wind farm installations were principally grounded on concerns over the potential impact on tourism (Conseil Municipal Portiragnes, 2010).

The Languedoc Roussillon (LR) stretches from the Rhone delta to the Pyrenees (Fig 1), and benefits from an annual average of seven hours sunshine per day, 200 km of sandy beaches, a hinterland of unspoilt and varied countryside, and distinctive cultural and architectural monuments (Klem, 1992). It is hardly surprising therefore that the 1960s witnessed the construction of major tourist resorts in the Languedoc Roussillon (such as La Grande-Motte, Le Cap d'Agde, Gruissan, and Port Barcarès). With annual visitor numbers increasing from 30,000 in the 1960s to close to 15 million today, the Languedoc Roussillon is now the fourth most important tourist region in France (Klem, 1992; Lecolle,

[1] With average wind-speeds around 9,9 – 10,1 m/s and water depths between 20 and 30 meters within 3,5 and 10 km from the coast, the Languedoc has great potential for near shore wind power development (4Coffshore.com)

[2] The Grenelle de l'environnement was started in 2007 as an open multi-party National consultation process that brought together representatives of national and local government and organizations (industry, labour, professional associations, non-governmental organizations) on an equal footing, with the aim defining the key points of public policy to achieve sustainable development.

2008). International tourists account for one third of all the nights slept in LR, principally composed of Germans, English and Dutch visitors. The tourist industry accounts for 15% of the regional GDP and thus constitutes the single most important economic activity of the region (Lecolle, 2008). Regional politicians also rely on tourism as a major pillar for generating future employment and growth (Raynauld, 2010). Today, the coastal Languedoc Roussillon is characterised by the spatial concentration of tourist community resorts, leaving long stretches of kilometre wide ‘untouched’ fine sand beaches. On the whole, the coastal resorts remain rather family oriented, with camping sites accounting for 65% of the total “overnight” capacity, in contrast to 10% for hotels (INSEE 2008).

At present there is limited empirical evidence of post-construction effect of offshore wind farms on tourism, especially in regard to destinations characterised by high-density sun and beach tourism, where turbine visibility is significant. In this study, we take as our starting point the possibility that there may be scope for maintaining or increasing “visiting numbers” either by lowering accommodation costs or compensating visitors through community resort initiatives. In particular, we are interested in investigating the following four questions: First, how much compensation, if any, would induce a tourist to take a coastal vacation at a destination with a wind farm 5, 8 or 12km offshore? Second, how might the installation of a wind farm affect the demographics of visitors, and would an offshore wind farm attract or repel the most desirable tourists (repeat visitors with high purchasing power)? Third, can wind farms help give a coastal tourist resort a “green image”, thus allowing it to gain a market share amongst the desirable wealthy Northern European tourists who are known to be particularly “green”? Fourth and finally, can creating additional artificial reefs in proximity to the turbines foster eco-tourism opportunities such as observational boating and diving at or around artificial reefs and turbine foundations (Cabanis & Lourie, 2010)? This hypothesis is based on the fact that turbine foundations provide substrate suitable for the settlement of benthic organisms, and leads to the emergence of artificial reef-like ecosystems (Wilhelmsson, Malm & Ohman, 2006).

Consequently, we can investigate whether adopting a coherent environmental policy, or associating wind farms with recreational opportunities, can serve to compensate for potential visual nuisances associated with wind farms. As will be made clear in chapter 2, these research questions are all novel contributions to the existing literature. In the next chapter we consider previous literature on tourist attitudes and preferences towards wind farms, recreational activities and sustainable tourism. In chapter 3 we explain the CE survey and specify the statistical model used in our case study. Following on from this, in chapter 4 we discuss how the choice experiment attributes were defined and in chapter 5 how the questionnaire was constructed and data collected. In chapter 6 the survey results are presented, followed by a discussion in chapter 7. Chapter 8 concludes.

2. Literature review: Evidence of attitudes towards wind farms and green tourism.

2.1 General attitudes towards wind farms

Whereas onshore wind power is criticized for its negative visual impact on the landscape, noise generated from the rotation of blades and shadow and lights effects from the turbines (Warren, et al., 2005), offshore wind farms are primarily reproached for their negative landscape externalities. These however decline with increasing distance from the shore (Ladenburg & Dubgaard, 2007; Krueger, Parsons, & Firestone, 2011; Bishop & Miller, 2007; NFO 2003) and the disamenity cost may even tend to zero at large distances (Krueger, Parsons, & Firestone, 2011). Bishop and Miller (2007) also find that clearer air and sunshine result in greater visual disamenities relative to hazy air. There is evidence that offshore wind farms are preferred to onshore, all else being equal (NFO, 2003; Ek, 2006), but a wind energy case study from Northern Wales suggests that offshore wind farms may be just as controversial as their onshore counterparts, as the negative landscape externalities extend beyond the shore to various land areas as an undesirable visual feature on the horizon (Dewine-Wright & Howes, 2010).

In regard to the influence of socio-demographic factors on preference and attitudes to offshore wind farms, an opposing attitude is often found to covariate positively with age (Bishop & Miller, 2007; Frantal & Kunc, 2011; Lilley, Firestone, & Kempton, 2010; Ladenburg, 2010) and income (Firestone & Kempton 2007; Lilley, Firestone, & Kempton, 2010; Ladenburg, 2010). There is also evidence that citizens' use of the coastal zone has a role to play (Ladenburg & Dubgaard, 2009; Ladenburg, 2010). More precisely, anglers and recreational boaters have been found in one study to perceive the visual impacts to be more negative than people who do not use the coastal area for those purposes (Ladenburg & Dubgaard, 2009)

2.2 Evidence on the impact of wind turbines on tourism

Tourism operators often rely on a specific image of the sea, while visitors and residents of coastal communities enjoy the shoreline for the amenity and recreational value (Gee and Burkhard, 2010). Opposition to wind farms often relates to the expected impact on business interests and tourism (BRL, 2003; Dimitropoulos & Kontoleon, 2009; Wolsink, 2010), owing to a perception that the 'visually polluted' landscape will be less attractive (Gordon, 2001). In the following paragraphs, we first review empirical evidence of changes in tourism behaviour following onshore and offshore wind power development. Secondly, we examine stated preference studies on tourist attitudes to wind power developments.

2.2.1 Observed changes in tourist behaviour

There is little evidence of negative consequences for tourism following wind farm construction. One year following construction of one of the world's largest offshore wind farms – Denmark's Horns Rev, Kuehn (2005) found neither a decrease in the community's tourism levels nor any reduction in the price of summerhouse rentals. Svendsen (2010) draws a similar conclusion from the offshore wind farm, Nysted in Denmark. In the UK, the visitor centre of one of the first utility-scale offshore wind farms, at Scroby Sands, welcomed 30,000 visitors within its first six months of opening (BWEA, 2006). As such, regardless of changes in the annual tourist flux, the visitor centre has served to provide an additional attraction for tourists.

The first large-scale wind power project in Southeast Asia, operational from 2005, comprises 20 turbines implanted directly on the Bangui Bay in the Philippines. This wind farm is said to have revitalised the province's local tourism industry by drawing a steady stream of curious visitors to the bay (Jimeno, 2007; Linao, 2007). Similarly SAE wind Power Company, on the cutting edge of onshore and offshore industries, argues that wind farms can perfectly co-exist with sustainable tourism activities. In Smøla in Norway, a 68-turbine wind farm, located within a few hundred meters of the coast has resulted in 35 new indirect jobs in commerce and service, and an increase in tourist accommodation capacity from 50 to 600 beds. The roads connecting the wind turbines are now used as cycle lanes for tourists going on excursions to the wind farm and the surrounding nature (Statkraft, 2010).

2.2.2 Stated preference studies of tourist attitudes and preferences

In a Scottish study with tourists visiting the area of Argyll & Bute, 43% of respondents maintained that the presence of (onshore) wind farms had a positive effect, while a similar proportion felt it was neither positive nor negative. 8% felt that it had a negative effect (MORI Scotland 2002)[3]. In the Czech Republic, the majority (84%) of tourists at a popular recreational area stated that the prospective construction of wind turbines would not influence their destination choice. However, respondents who regularly visited the same destination were found more likely to oppose (Frantal & Kunc, 2011). A survey commissioned by the Languedoc Roussillon regional authorities asked 1033 tourists how they would react if they learned that there were wind turbines 10 km from their accommodation. The results show that 37% would go and see them, 6% would try to avoid them and for 55% it would change nothing (CSA, 2003). Finally, Lilley, Firestone & Kempton (2010) used a contingent behaviour study to examine beach visitation in response to a hypothetical wind farm on Delaware beaches (US), sites which may be comparable to the Mediterranean in that they experience high levels of recreational and touristic use. Similarly to the studies of citizen preferences, they found wind farms attained decreasing disamenity costs with an increasing distance from the coast. 55% of respondents indicated that they would continue to visit a beach in the presence of a wind farm 1.5 km offshore. The figure rises to 73% if the turbines are 10 km offshore, and 93% would continue to visit if the distance was 22 km..

In regard to the general role of man-made structures in the landscape, Hamilton (2007) uses the hedonic pricing method to link tourist accommodation price with sea-cliffs, dykes and open coast in the region of Schleswig-Holstein in Germany. He finds an increase in the length of 'open coast' to have a positive incidence on the accommodation price, worth EUR 0.56 per night per 1 km increase in open coast. In contrast, the hedonic price of a 1 km increase in dikes leads to a fall in EUR 0.52 per night in a hotel whose usual price is EUR 62 per night (Hamilton, 2007). In Scotland, Riddington et al. (2010) use an internet survey with potential tourists to learn how much they would be willing to pay per night to upgrade the view from a hotel room to one without any man-made structures. The estimated scenic cost was highest for grid lines (29% of basic room price) followed by a wind farm (21 %) and waterfall development (19 %).

To conclude, the above-mentioned studies provide evidence that wind turbines can be appealing to tourists (Frantal & Kunc, 2011; Linao 2007; MORI, 2002), especially when a visiting centre is

[3] It should be borne in mind however, that there is doubt regarding the subjectivity of the results of MORI (2002) due to the use of non-random sampling (Lilley et al 2010), and because wind power developers were behind the commissioning of the studies.

involved (BWEA 2006). However, a fraction of tourists (less than 10%) display significant negative attitudes or preferences against wind turbines in the landscape (CSA 2003; Lilley, Firestone & Kempton, 2010; MORI, 2002). But wind turbines are not unique in this regard; man-made infrastructure, whether it be dikes, grid lines, hydro-power or wind turbines, are all subject to visual nuisances (Hamilton, 2007; Riddington et al., 2010) with a corresponding influence on accommodation prices similar to or worse than that of wind turbines (Riddington et al., 2010).

2.3 Tourist demand for sustainability and recreation

There is broad evidence that consumers are becoming more aware of sustainability issues and knowledgeable about measures of energy and waste conservation (Bachis, Foster & McCabe, 2009). However, the evidence of whether tourists are actually willing to pay more for environmental initiatives is mixed. Surveying tourists in a Malaysian hotel, Kasim (2004) found that the majority of tourists were not in favour of resource reduction and favoured the use of air-conditioning over natural ventilation. The study also showed that most tourists were not willing to pay more money for a hotel that engaged in environmentally responsible initiatives, with 38% undecided and 37% stating they would never pay more (Kasim, 2004). Likewise Dalton, Lockington & Baldock (2008), and Tearfund (2002) demonstrate that only about half of all sampled tourists are willing to pay more to support sustainable initiatives, with a willingness-to-pay (WTP) less than or equal to 10% of accommodation cost or travel expenses (Dalton, Lockington & Baldock, 2008; TNS, 2008).

When recreation and conservation go hand-in-hand, WTP is more pronounced. Considering the value to tourism of coral reef conservation, Arin and Kramer (2002) explore the demand from local and international divers for dive trips to three different protected coral reef areas in the Philippines, where fishing is prohibited. The mean per person daily WTP to enter a Philippines marine sanctuary ranges from USD 3.7 to USD 5.3 depending on the marine reserve. Seenprachawong (2003) uses the Contingent Valuation method and the Travel Cost Method to estimate the WTP for improved coral reef abundance for visits to Phi Phi Marine National Park, in Thailand. His estimates for mean WTP were USD 17.2 for overseas tourists and USD 7.2 for Thai tourists. Other studies confirm that a thriving tourist industry may be built around marketing the perception of a healthy marine and coastal environment (Williams & Polunin, 2000; Dharmanratne et al., 2000; Sobhee 2006). These findings are congruent with other non-valuation studies. In responsibletravel.com (2004) 70% of respondents were interested in taking trips to local wildlife conservation areas and social projects, while the Mintel survey (2007) of the UK population found that consumers who simply wanted to relax, and not concern themselves at all with ethical issues, made up just 23% of the total.

In the light of these previous studies, this paper contributes with several novelties. On the one hand, this is the first valuation study of tourist preferences for the position of offshore wind farms at their holiday destination. In contrast to the increasing number of studies focused on the North Sea, this survey is concerned with a different geographical setting, one characterised by the high-density beach tourism of the Mediterranean Sea. While previous valuation studies on tourist wind farm preferences have focused on evaluating disamenity costs according to willingness to pay or visit more or less, we also propose to weight disamenity costs against other potential compensatory undertakings at a coastal resort community. In particular, the presence of a coherent environmental policy for the holiday destination, and the introduction of recreational activities associated with the wind farm.

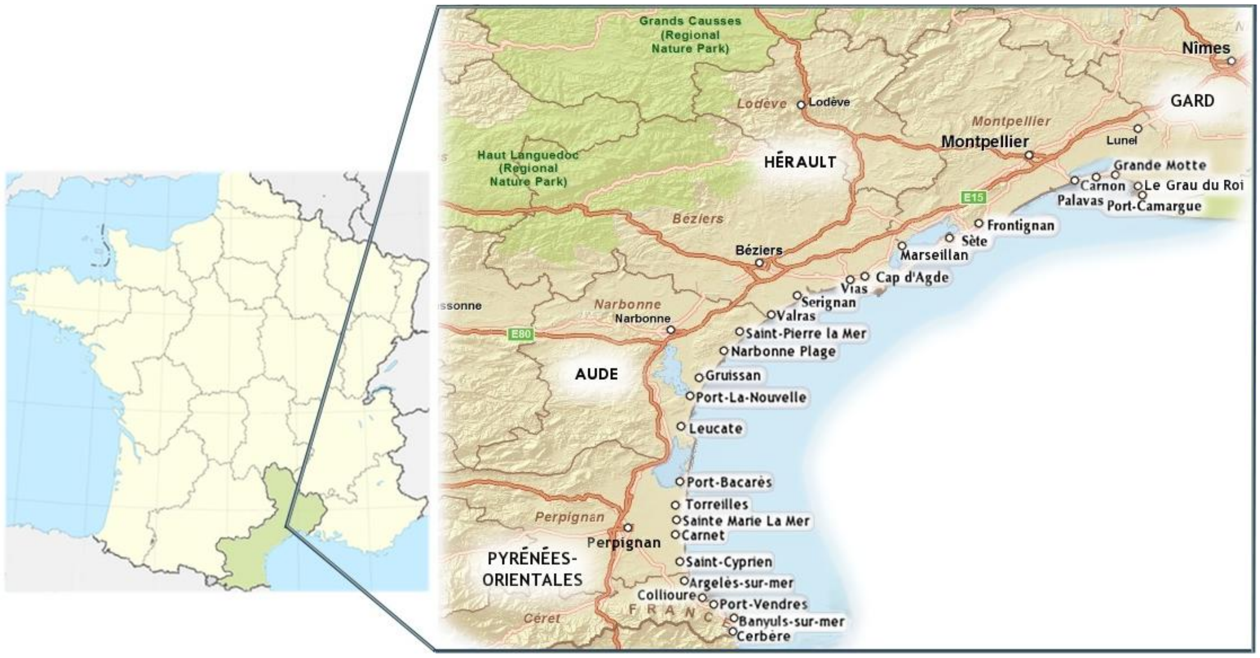

Figure 1: Map of the coastal resort communities in the Languedoc Rousillon

3. The Choice Experiment and the econometric model

3.1 The Choice Experiment

To answer questions such as how much tourists are willing to pay for a coherent environmental policy relative to the compensation they demand for enduring the sight of an offshore wind farm, we employ the choice experiment (CE) method. In CEs, a number of respondents are asked in a questionnaire to select their preferred alternative from a range of potential management alternatives in a choice set. The status quo or "do nothing" situation is usually included in each choice set. Discrete choices are described in a utility maximising framework and are determined by the utility that is derived from the attributes of a particular good or scenario. It is based on the behavioural framework of the random utility theory (McFadden, 1974) and Lancaster's theory of demand (Lancaster, 1966). By describing a potential wind farm at a tourist destination in terms of a number of policy relevant attributes and the different potential levels of these attributes, and by including a monetary attribute, the CE allows us to estimate the economic value of the changes in a given coastal tourist community under various future management options. The accuracy and reliability of estimations of demand, participation, social and marginal welfare is enhanced by specifying a model that can account for both observed and unobserved preference heterogeneity (Greene, 2002).

There is evidence to suggest that landscape preferences in regard to renewable energy constructs are highly heterogeneous. According to Stephenson (2008), landscape significance may be clustered around the physical and tangible aspects of a landscape, the activities associated with the landscape and the meanings generated between people and their surroundings. In regard to the latter element, researchers have suggested that the perception and appreciation of landscapes is influenced by observers' personality, habits, and sexual and cultural differences (Macia, 1979; Gee & Burkhard, 2010; Dharmaratne 2000). As such, we expect tourist preferences to differ according to their characteristics and their motivation for embarking on a coastal holiday in Languedoc Roussillon. We considered it appropriate to take account of this by using a latent class model, as tourist specific characteristics were expected to give rise to distinct preference groups, each characterised by relatively homogenous preferences. As such, the latent class analysis facilitates the interpretation of preference heterogeneity in consumer demand analysis, that is, how the order of compensation or payment demand varies amongst tourist population sectors, and thus how the tourist clientele may change following wind farm construction in proximity to popular coastal resort communities. This is particularly pertinent in a market context, where the characteristics of the tourist clientele are determinants of the wealth of the tourist resort. For a greater in-depth description of the CE method, the reader is referred to Bateman et al., 2002.

3.2 The latent class model in theory

The behavioural framework of random utility theory (RUT) is employed to describe discrete choices in a utility maximising framework. Following RUT, the individual i's utility U from alternative j may be specified as:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \qquad (1)$$

where V_{ij} is the systematic and observable component of the latent utility and ε is a random or "unexplained" component assumed IID and extreme value distributed (Louviere et al., 2000). By employing the Latent Class model to account for unobserved preference heterogeneity, we assume that the population consists of a finite number of segments with different preference structures. Classification into segments and utility parameter estimation contingent upon segment is done simultaneously (Train, 2009). Formally described, the utility that tourist *i*, who belongs to a particular segment *m*, derives from choosing tourist destination alternative *j*, can then be written as:

$$U_{ij|m} = \beta_m x_{ij} + \varepsilon_{ij|m} \qquad (2)$$

where x_{ij} is a vector of attributes associated with the tourist destination alternative *j*, and β_m is a segment specific vector of taste parameters. Heterogeneity in attribute preferences across segments is captured in differences in β_m vectors. Assuming that the error terms are identically and independently distributed and follow a Type I (or Gumbel) distribution, the probability of tourist *i* choosing alternative *j* becomes:

$$\Pr(ij) = \sum_{m=1}^{M} s_m \left(\frac{\exp(\beta_m x_{ij})}{\sum_j \exp(\beta_m x_{ij})} \right) \qquad (3)$$

where β with probability s_m takes the values $\beta_1 \ldots \beta_M$.
s_m is thus the probability of membership to segment *m* and can be written as:

$$s_m = \frac{\exp(\lambda_s Z_i)}{\sum_{s=1}^{S} \exp(\lambda_s Z_i)} \qquad (4)$$

where Z_i is a vector of psychometric constructs and socioeconomic characteristics (Boxall & Adamowicz, 2002). As such, belonging to a segment with specific preferences is probabilistic and depends on the characteristics hypothesized to influence choice. Formulation 4 can be expanded to take into account a panel structure to reflect differences in utility coefficients over people, but constant over choice situations.

In the above form we have assumed that the scale parameter is equal to one. The scale parameter takes into account the variance of the unobserved part of utility (Train, 2009, p. 45). Due to this scale parameter, estimates from different samples cannot be compared if they have different variance, but it does not affect the ratio of any two parameters. For a further insight to the latent class model, we refer to Train (2009).

The Willingness to Pay (WTP) or Willingness to Accept compensation (WTA) for each segment is estimated by the marginal rate of substitution (MRS):

$$MRS = -\frac{\beta_k}{\beta_P} \tag{5}$$

where β_k refers to the parameter of interest and β_P to the parameter for price. In order to calculate standard errors for the WTP, the Delta method (Greene, 2002) is used.

4. Attribute specification used in the CE

4.1 Distance from the shore to the offshore wind farms

Previously proposed offshore wind farm projects in Languedoc Roussillon are located within 3 km to 10 km of the coast. Beyond 10 km it is prohibitively expensive to construct a seafloor mounted wind farm, as the sea-floor is more than 30 metres deep. In the Atlantic however, several projects are proposed at 12 km or further from the shore. This is also a feasible prospect in the Languedoc Roussillon region, if floating turbines were to be used. There has been no legal minimum set for turbine distance from shore, but the High Sea Commission has advised that wind farms should not be placed closer than 5 km due to the high density of activities taking place within this coastal zone - in particular sea sports and artisanal fisheries (Cabanis & Lourie, 2010). On this basis, the feasible attribute levels for an offshore wind farm were defined at 5, 8 and 12 km from the coast relative to the status quo “no wind farm” level. The wind farm was designed with 30 turbines of 3.6 MW (the type GE 3.6 offshore with a hub height of 75m and a rotor diameter of 104 m) in 3 rows of 10, with 900 metres between each turbine. This is a configuration typically seen in above-mentioned proposals. Photo simulations were made using a professional photo simulation program, WINDPRO version 2.7, using typical midday August lighting conditions. Fig. 3 depicts an example of a choice set with the wind farm simulation at 5 and 8 kilometres.

4.2 Wind farm associated recreational activities

In the same way that offshore wind turbines have become an attractive fishing ground for anglers in the North sea, it is stipulated that turbine foundations in conjunction with the creation of further artificial reefs could add real recreational value to a coastal community resort. It woul enable observational boating during educational excursions, scuba and skin diving. Angling may also be envisaged under certain circumstances. The question then is whether this added recreational value can justify installing the wind farm closer to the shore, that is, can visual nuisances at 5 km and 8 km be outweighed? Wind farm associated recreational activities at 12 km from the shore were considered infeasible, and were hence not included in the choice sets.

4.3 Sustainable tourism and coherent environmental policy

Comparing the Spanish Mediterranean coast with the Languedoc Roussillon coastline, the Spaniards manage to earn significantly more per tourist head than their Languedoc counterpart (Knibiehly, 2010). In an increasingly competitive environment, characterised by fierce price competition and low-cost airlines travelling to an increasing number of coastal destinations, several strategies have been contemplated to create added value. These include efforts to very visibly reduce pressure on the local ecosystems and to reduce the carbon footprint of a holiday in a manner that is obvious to the potential tourist (Knibiehly, 2010). To some tourism operatives, the feeling is that they would need to be another 10 years 'down the road' before this is realisable. In the words of the head of the camping association in the department of Aude, "The typical French beach tourist just wants water, sun and sand for their kid to play with" (Pioch, 2010). We are thus interested in investigating this hypothesis, and establishing whether there is a demand for sustainable tourism amongst the current population. If there is such a demand, from what proportion of the tourist population is it coming and what are their characteristics? Furthermore, a focus group comprised of Scandinavian tourists revealed not only a real demand for greater environmental effort at coastal resort communities, but also that the perception of a wind farm is highly dependent upon whether it is integrated within a larger "eco-beach community" concept. In the survey, it was explained that the municipality (in which the tourists were interviewed) could minimise their impact on the environment by adopting a coherent environmental policy which favours an extended network of bicycle lanes, public transport, solar and PV panels, energy and water saving devices and the use of local and organic produce.

Attribute	Level		Attribute	Level
Wind farm	No Yes 5, 8, 12 km	→	Wind farm and artificial reef associated recreational activities	No Yes
Coherent environmental policy	No Yes			
Change in weekly accommodation price	[- 200, -50, -25, -10, +10, +25, +50, +200] EUR			

Table 1: Attributes and attribute levels used in the full-scale survey

4.4 The payment vehicle

Focus groups showed that tourists found it easy to relate to a change in accommodation price and perceived as realistic and credible the argument that an increase in tourist frequentation will put pressure on accommodation prices and vice-versa. Focus groups, pre-testing and a review of accommodation prices (for rentals, hotels, camp sites) gave guidance on reasonable levels of the monetary attribute. The pilot study showed that tourists were more at ease with reference to changes in weekly accommodation prices than daily accommodation prices. During the survey execution of the full-scale study, tourists who were living for free with family and friends were asked to imagine that the price change related to a bonus or a surcharge on their overall spending at the community resort.

Finally, tourists were asked to take into account their actual travel budget constraints when making a destination choice.

5. Questionnaire construction and execution

5.1 Survey development

The CE survey design commenced early 2010 with a meeting hosted by the environment ministry with the goal of designating zones in the French Mediterranean for potential wind farm developments. Together with a series of meetings with chambers of commerce, regional and departmental committees for tourism and wind energy and tourism professionals, this background enabled us to sketch a series of pertinent policy attributes. These were narrowed down and further defined in three focus groups held with both international and French national tourists. Different choice-set layouts were tested, ranging from the 'tourist brochure look' to simple photos and short descriptions. The challenge of using a payment vehicle that could cover utility increasing and utility decreasing attributes and a wide range of purchasing power was also addressed. Three focus groups were held with Swedish, Danish and French nationals. A pilot study proved critical for improving the length, the wording and the order of the sections to maximise the respondent's engagement.

The final survey instrument had 6 sections and began by addressing respondents' aesthetic and environmental perceptions about wind farms (onshore and offshore), concern about climate change and perceived efficiency of wind power compared to other energy sources. These questions allowed us to evaluate the relative strength of physical, symbolic and political aspects of visual judgement. The second section constituted a couple of simple questions regarding the respondent's vacation, in particular the length of stay, his/her travelling company and accommodation type and price. Following this, we presented the respondents with an A3 info-sheet with photos and explanations of the policy relevant attributes. These served to familiarise the respondents with the subsequent 8 choice set questions. In each choice set the respondent was asked to elicit his preferred destination between A and B, or "none of them" if neither destination A or B was preferred relative to his current community resort (which has neither a coherent environmental policy, offshore wind farm or associated recreational activities). The fourth section followed up on the choice-set questions to identify protest bidders and lexicographic preferences. The fifth section asked about respondents' motivation for visiting Languedoc Roussillon and their overall satisfaction (or dissatisfaction) with the coastal resort community. The final section elicited respondents' degree of environmental consciousness and their socio-demographic characteristics (table 2). The questionnaire and the accompanying info-sheet were edited in English, French and German.

5.2 Choice experimental design

With 8 payment levels[4] and three policy attributes - two with two levels, and a third with four levels - a full factorial design would have resulted in a total of 256 alternative management combinations. As this would constitute an unreasonably large design in practice, we used a fractional factorial design. Since the model form of our prior parameter utility specification assumed random parameters and an error component, the degrees of freedom demanded a minimum of 16 choice situations. These choice sets were blocked into two, so that each respondent had to evaluate 8 choice sets. The design was d-

[4] While the status quo levels were included in the design for all other attributes, this was not the case for the monetary attribute. Hence, the "no change in price relative to today" was not included in the design.

error minimised by Ngene (ChoiceMetrics, 2010)[5], assuming a MNL model with priors ($\beta \neq 0$) obtained from a pilot study and with interaction effects between wind farms and the coherent environmental policy. The resulting MNL d-error was 0.1085.

5.3 Data collection

Data collection took place during the summer of 2010 from late July to late September on the beaches in Languedoc Roussillon. We used personal interviews in which the interviewer guided the respondent through the survey. Interviews took place in English and French. Germans were provided with a questionnaire and info-sheet in German to facilitate their understanding. In general, those sections demanding more explanation were explained and filled in by the interviewer, while the tourist himself handled simple socio-demographic and attitudinal questions. The population from which the sample was chosen was defined as those of 17 years and upwards, sleeping at least one night either in the resort community at which they were interviewed, or in the neighbouring coastal resort community. The interviews were conducted by approaching respondents on 9 different coastal resort communities along the coastline of the districts of Aude and Herault, the two areas in Languedoc Roussillon with the most significant offshore wind power potential. Interviews for the full-scale study took place from 1st of August to the 30th of September by a group of 4 interviewers (including the author of this paper). Each interviewer began sampling at a different point along the beach. They walked in one direction, stopping at every individual or grouping of friends and family on their way. While a tourist was being interviewed, we explicitly asked accompanying friends or family to not interfere with the interview.

This process continued till the interviewer reached the end of the beach, or the zone in which another interviewer had commenced interviewing. On average, one in two tourists were willing to take part in the survey. The socio-demographic characteristics of the tourists are specified in table 2 together with their trip characteristics. Each interview lasted between 25 minutes and one hour. In the presence of open-ended questions some respondents did not hesitate to provide considerable detail in their answers. In total we interviewed 370 respondents of which 15 questionnaires were not fully completed, and therefore not used for final analysis. An additional 16 questionnaires were excluded from the final estimate because the respondents did not consider any potential trade-offs in their answers. This was identified when respondents had either made clear that they refused to consider the price attribute or chose the status quo option in all choice sets even though options A or B were utility dominating[6]. This resulted in a total of 339 individuals and 2712 choice set observations being used.

[5] The syntax used to create our design:

```
;alts = alt1, alt2,alt3 ; rows=16 ;block=2 ;eff = (MNL,d)
;cond:   if(alt1.A = [0,1], alt1.B = [0]) , if(alt2.A = [0,1], alt2.B = [0]) ;rep = 400
;model: U(alt1) = b0[0] + WF.effect [n,-0.7,0.7|n,-0.3,0.4|n,0.2,0.5] * A[3,2,1,0] + Act[n,0.2,0.3] * B[0,1] + Env[n,1.1,0.5] * C[0,1] +
                  Cost[-0.015] * D[-200,-50,-20,-5,5,+20,+50,+200] + s1 [ec,0.2] + b5 * WF * Env /
        U(alt2) = WF.effect * A + Act*B + Env*C + Cost*D + s1 + b5 * WF * Env
```

[6] By for example offering a refund of EUR 50 everything else equals status quo.

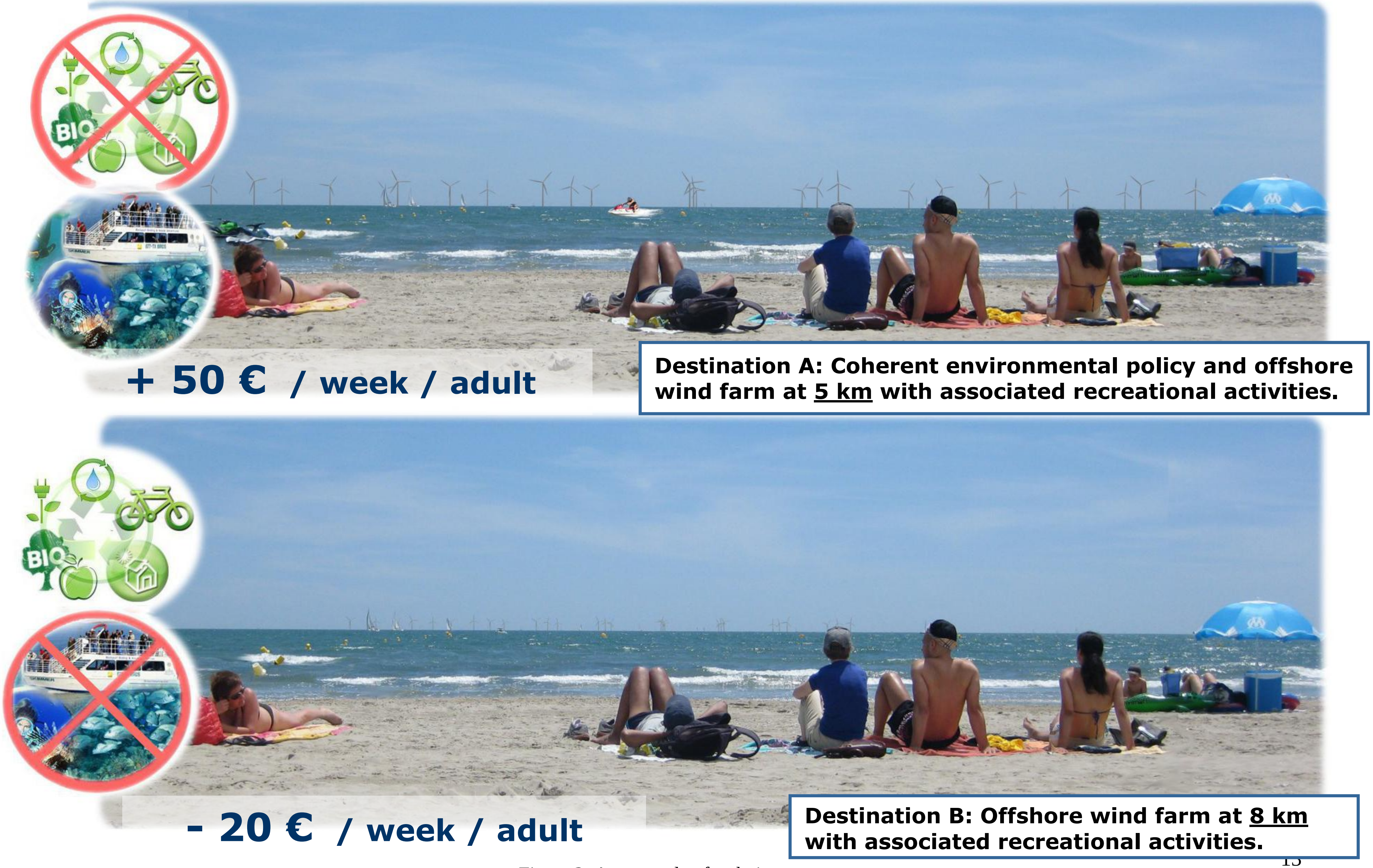

Figure 2: An example of a choice set

Individual tourist respondent characteristics	In LC model	MEAN (Std dev)
Net household income In intervals of € 500 per month (min €0, max €>7000)		€ 2500-3500
Higher education Has done at least 2 years of university studies		51 %
Female		59 %
French tourists		73 %
International tourists Of any origin other than French		27 %
Northern European Of Scandinavian, English, Belgian, German, Swiss, Luxembourgian or Dutch origin.	x	26
Age (min 17 yrs, max 81 yrs)		37 years (14.6 years)
Retired The tourist is retired	x	8
Trip Characteristics		
Accommodation price in EUR per adult per week (min €17, max €1125)		€ 202 (€151)
Accommodation price in EUR per adult per week (min €40, max €1125) Including those living for free with friends or family		€ 158 (€157)
Residing in: Camp sites		42 %
Hotel and B&B		8 %
Friends and family		17 %
Rented house or apartment		26 %
Other (boat, car)		7 %
Loyal LR tourists Those tourists who have spent their vacation several times at the coastal resort where they were interviewed, or a neighbouring one.	x	52 %
Visiting tourists "Visiting friends or family" was an important element of the tourist's vacation.	x	22 %
Culture, history and patrimony enthusiasts "History, culture and heritage" were important elements during the tourist's vacation.	x	15 %
Landscape enthusiasts "Landscape and nature appreciation" were important elements during the tourist's vacation.	x	44 %
Sea and Sun Enjoying the "sun and the beach" were important elements during the tourist's vacation.		77 %

Table 2: Socio-demographic and trip characteristics of the sample

6. Results

6.1 Latent class covariates

Upon testing of the characteristics of the respondents on the preferences for the attributes in a conditional logit model and subsequently in a latent class model, we found that the motivations behind a tourist's destination choice, as well as their socio-demographic characteristics, were likely to affect the latent preference segment that the tourist belonged to. In particular, we found that the age of the tourists, their nationality, their degree of loyalty to the coastal resort community, and their motivations for visiting the particular resort community where they were interviewed, were significant determinants of latent membership. Finally, it should be stressed that demographic attributes, like being French, elderly, etc, does not determine in which segment an individual is situated, but merely increases the probably that any individual would be found in the segment determined by the statistical membership function. Table 2 describes the socio-demographic characteristics of the sample and table 4 describes the membership function.

6.2 Optimal number of segments

The latent class was estimated using NLOGIT version 4.0 and models with 2,3,4 segments were run. In order to determine the optimal number of segments, the BIC, AIC, the log likelihood and adj ρ^2 were consulted. Table 3 reports their values together with the number of parameters for the three models. The criteria used – Log likelihood, adjusted ρ2, AIC and BIC indicates best performance for 3 segments. Furthermore, with less degrees of freedom, some parameters lost statistical significance when specified in a model with more than three segments. Thus, also from the perspective of providing clear policy advice, the 3-segment solution was chosen. In each, parameters for the 3rd segment are normalised to zero during estimation. Thus the other two segments must be described relative to this last segment.

# of segments	# of parameters	Distribution of segments	Log likelihood	Adj ρ^2	AIC	BIC
2	21	0.65;0.35	2193.73	0.260	1.633	1.679
3	35	0.23;0.42;0.35	-2125.06	0.283	1.591	1.667
4	49	0.26;0.39;0.11;0.24	-2194.38	0.256	1.654	1.765

Table 3: Goodness of fit criteria for 2-4 segment models

6.3 Estimated parameter results

Table 4 shows the class probabilities and the coefficients of the attributes. In clear correspondence with other studies, the experienced visual disamenity costs for all sample segments decreases, as the wind farm is located further from the coast. However, we observe a large difference in overall preference structure between the three tourist population segments. Broadly speaking, segment one (most likely of French origin, visitors and loyal tourists) and two (most likely of Northern European origin, loyal tourists, culturally motivated), experience little or no visual nuisance related to the presence of an offshore wind farm, when for example comparing with the values they attribute to wind farm associated recreational activities. Together, these two segments correspond to 65% of the tourist population. On the other hand, the third segment considered the presence of a wind farm to be a visual nuisance at all distances, although they did consider that a wind farm located 12 km offshore could be compensated by a coherent environmental policy enacted at the coastal resort community. This segment of tourists corresponds to 35 % of the underlying sample and they are more likely to consist of retired French tourists, whose vacation choice is particularly motivated by landscape and nature appreciation.

Turning more specifically to segment one and two, respondents considered that the invigoration of an environmental effort at the tourist resort could more than outweigh the visual presence of a wind farm, whether at 5, 8 or 12 km from the shore. Members of segment two; consisting with greater probability of younger or mature, Northern European, Loyal LR tourists - are particularly appreciative of a green policy. This segment furthermore experiences a slight positive utility from the presence of an offshore wind farm at 12 km from the coast, while segment one enjoys a positive utility when the wind farm is implanted 8 km from the shore. In regard to deriving welfare scenario estimates, it is debated how to interpret and use the alternative specific constant (Boxall et al., 2009). Since the parameter for the alternative specific constant (ASC) is equal to the one for the status quo, and is both negative and significant for segments one and three, it either means that the segments have a negative utility associated with the current situation, or that the WTA/WTP-measure for specific alternatives has to be upwardly adjusted beyond marginal values, cf. Table 5. In this study we have preferred to solely consider marginal changes when estimating the value of possible resort community management scenarios, so as to yield lower bound, conservative estimates.

	SEGMENT 1			SEGMENT 2			SEGMENT 3		
	French, Visitors of family or friends, Loyal LR tourists.			Northern European, Cultured, Loyal LR tourists, Younger and mature			French, retired, landscape enthusiast, non historically and culturally interested		
Average class probability	22.7%			42.1%			35.2%		
Utility function									
	Parameter	**Std error**		**Parameter**	**Std error**		**Parameter**	**Std error**	
ASC	-1.4	0.35	***	-0.01	0.15		-0.79	0.1	***
Environmental policy	2.5	0.63	***	2.46	0.12	***	1.07	0.11	***
WF recreational activities	1.39	0.24	***	0.87	0.09	***	0.46	0.11	***
WF 5 km	-1.87	0.40	***	-0.60	0.14	***	-3.84	0.18	***
WF 8 km	1.53	0.95		-0.31	0.12	***	-2.08	0.13	**
WF 12 km	0.09	0.27		0.66	0.13	***	-0.57	0.12	***
Price	-0.06	0.02	***	-0.02	0.00	***	-0.01	0.00	***
Segment membership function									
ASC	-1.07	0.40	**	-0.10	0.32		0		***
Retired	-0.94	0.73		-1.01	0.59	*	0		***
Northern European	0.44	0.48		1.10	0.38	***	0		***
'Culture, history and patrimony' motivated holiday	0.18	0.66		1.11	0.5	**	0		***
'Landscape enjoyment' motivated holiday	-0.27	0.37		-0.97	0.34	***	0		***
'Visiting friends and family' motivated holiday	0.86	0.37	**	-0.03	0.33		0		***
Loyal LR tourist	0.71	0.36	**	0.73	0.31	**	0		***

Number of observations: 2712

Number of individuals: 339

*Denotes significance at 10% level. **Denotes significance at 5% level. ***Denotes significance at 1% level.

Table 4: Three segment LCM estimates

6.4 Willingness to Accept Compensation and Willingness to Pay

In table 5, the parameter estimates are converted into marginal rates of substitution (WTP or WTA) according to Eq.3. It is on the basis of these that we will discuss the results. Consulting the model, it is immediately remarkable that the WTP and WTA vary significantly across the segments. Taking the example of segment one (visitors and loyal LR tourists), which corresponds to 23% of the sample, would demand an accommodation price reduction or vacation rebate[7] of EUR 29 per week per adult in order to be induced to go on vacation to a destination with a wind farm 5 km from the coast. If the wind farm was constructed just 3 km further offshore, at 8 km, this group no longer perceive any visual nuisance and is willing to pay EUR 24 more per week to see the wind farm at this distance. When it is 12 km offshore they are indifferent to its presence. Turning to segment two (Cultured,

[7] For those who were living for free during their vacation.

Northern Europeans, Loyal tourists), the zero visual-nuisance breaking point apparently lies somewhere between 8 km and 12 km from the shore. That they are willing to pay an additional EUR 43 in accommodation price to face a wind farm 12 km from the shore may potentially be explained by a significant environmental consciousness amongst these tourists. Remarkably, this segment is willing to pay up to EUR 159 more per week for accommodation at a "green" resort community. Equally noteworthy is that the potential for doing recreational activities in proximity to the wind farm is more highly valued than the visual nuisance perceived from positioning the turbines just 5 km offshore. Finally the last segment, which is likely to consist of French, retired, non-loyal tourists, is rather hostile to wind farm implantation especially when situated 5 or 8 km from the shore. Demanding a compensation of up to EUR 265 (week/adult) when the wind farm is 5 km from the shore implies that even if their accommodation was offered for free, they would most likely choose another tourist resort without a wind farm[8]. However, with rather pronounced preferences for a coherent environmental policy (WTP EUR 74 more per week), even this segment of tourists can be induced not to switch destination and actually enjoy a welfare benefit of EUR 35 (EUR 74-39) if the wind farm is installed 12 km from the shore or further.

	SEGMENT 1 Visitors, Loyal LR tourists	SEGMENT 2 Cultured, Northern European, Loyal LR tourists	SEGMENT 3 Retired, French, Landscape enthusiasts
	WTP / WTA in EUR	WTP / WTA in EUR	WTP / WTA in EUR
%	**22.7%**	**42.1%**	**35.2%**
ASC	-21.9 [8.2]***	-0.3 [9.6]	-54.6 [7.5]***
Environmental policy	39.2 [2.7]***	158.7 [6.1]***	73.6 [5.5]***
WF recreational activities	21.9 [4.5]***	56.5 [4.9]***	31.9 [7.6]***
WF 5 km	-29.3 [8.8]***	-38.9 [7.7]***	-264.7 [13.2]***
WF 8 km	24.1 [10.1]***	-20.3 [7.4]**	-143.1 [9.2]***
WF 12 km	1.4 [4.2]	42.8 [9.4]***	-39.1 [7.8]***

WTA / WTP standard errors approximated using the Delta method [squared brackets]
*Denotes significance at 10% level. **Denotes significance at 5% level. ***Denotes significance at 1% level.

Table 5: Latent class marginal WTP / WTA for seaside resort attributes

7. Discussion

Having presented the welfare estimates of the latent class model and the three segments, in the following discussion we emphasise the role of visual disamenities, the results that arise as a consequence of specified tourist characteristics, and the implications for the tourist industry. Finally we discuss some potential caveat of the results.

7.1 Disamenity costs and offshore distance

The general pattern across segments and models is that the requirement for compensation for an offshore wind farm decreases as its distance from the coast increases (table 5 and table 6 column 1). This accords well with findings from other studies (Ladenburg & Dubgaard 2007; Krueger, Parsons, & Firestone, 2011; Miller & Bishop 2007; NFO 2003). However the interesting observation when using a latent class approach is that the simple "nuisance distance-decay" logic does not hold for all tourist segments. Notice that for segments one and two the presence of a wind farm is positively appreciated at 8 and 12 km, respectively. Regarding the visitors (segment one), it may be postulated that tourists who are more likely to be occupied by the relational aspect of the holiday have different

[8] The average accommodation price is 202 EUR/week per adult

landscape criteria from those coming principally for sea, sand, sun, heritage, culture and Languedoc landscapes. Their demand for an offshore wind farm appears to be stimulated by a certain curiosity, demanding that the wind farm is neither too far offshore (12 km) where its visibility would be minimised, nor too close to the coast to cause potentially excessive infringement (5 km). For those more likely to be of Northern European origin and for whom the culture, history and heritage on offer in Languedoc Roussillon is important (segment two), one may postulate that a general positive attitude towards wind farms, or more generally renewable energies, is being weighted against the aesthetic disutility from seeing them while holidaying. This position is supported by the fact that there is a high demand from this segment for environmental endeavours. The presence of a North-South European preference divide was expected prior to the valuation survey, as evidence from focus groups and an interview with the head of a camping association[9] suggested that Northern Europeans had a greater enthusiasm for green initiatives (Pioch, 2010). This again accords well with other studies demonstrating differences in preference structures regarding vacation places among tourists with diverse nationalities (Eleftheriadis, et al., 1999; Kozak 2002; Lee & Lee, 2009). To conclude, the above-mentioned results highlight the subjective nature of landscape preferences, and the extent to which they are related to the observer's social and cultural experience, habit, belief system[10] and lifestyle, as suggested by Gee and Burkhard (2010).

7.2 Policy management scenarios

In order to look at the economic impact for the tourism industry of having an offshore wind farm at different distances from the shore, we have calculated the average WTP / WTA weighted against the percentage of tourists in each segment. The results are displayed in table 6. The LC model points to a slight increase in tourist revenues of about EUR 4 per week per adult if the offshore wind farm is located 12 km offshore, everything else being equal (column 1). As the wind farm approaches the coast however, the average tourist begins to demand compensation to completely offset the wind farm presence. If the turbines are only 5 km away from the coast this amounts to a desired compensation as high as EUR 116. With the average tourist paying EUR 202 per week per adult in accommodation price, EUR 116 implies that the coastal resort community would need to cut accommodation prices by more than 50%, if it wants to maintain the exact same "customer" composition as it enjoys today, while there is no wind farm. A general trend across the three models is that the presence of a coherent environmental policy can more than compensate for the visual nuisances caused by the wind farm at 8 km from the coast (column 2). With the simultaneous employment of a coherent environmental policy and wind farm associated recreational activities, the presence of a wind farm 5 km offshore will not harm the tourist industry. Furthermore, when located at 8 km, a rise in tourist-associated revenues is highly conceivable (column 4). Indeed, the statistical estimations suggest that coastal communities with these features could attract more tourists than the community resorts attract today. While the authors are not aware of any other study to date that has shown such pronounced willingness to pay for environmental initiatives at coastal resort communities, studies have shown significant WTP for onshore and offshore recreation that goes hand in hand with conservation (Dharmanratne et al., 2000; Seenprachawong, 2003; responsibletravel.com 2004; Sobhee, 2006; Arin & Kramer, 2002; Williams & Polunin, 2000). Lastly, our results on preferences for wind farms within close view are noteworthy

[9] Many campsites have installed recycling infrastructure because their Northern European clientele demands it.
[10] In an upcoming paper we look closer at how respondents' energy policy opinion, concern about climate change and confidence in wind power technology influences their landscape preferences.

when comparing them with previous studies. For example, Ladenburg & Dubgaard (2007) show that disamenity costs can persist at distances beyond 18 km from the shore, while an accumulating body of research suggests that they tend to zero at large distances (Ladenburg & Dubgaard 2007; Krueger, Parsons, & Firestone; Bishop & Miller 2007, Landry et al., 2012). In comparison, our results show that for some individuals there is an amenity value associated with wind farms (provided they are located at least 8 km from the shore), but it cannot be generalised across the entire population.

	No environmental policy, no wind farm recreational activities	Coherent environmental policy at tourist resort	Reef and wind farm associated recreational activities	Coherent environmental policy & wind farm associated recreational activities
No wind farm	0 €	101.6 €	39.6 €	141.2 €
Wind farm 5 km offshore	-115.8 €	-14.2 €	-76.1 €	25.4 €
Wind farm 8 km offshore	-52.9 €	48.6 €	-13.3 €	88.3 €
Wind farm 12 km offshore	4.3 €	105.9* €	43.9 €	145.5* €

*Further out than 8 km it is practically difficult to envisage recreational activities

Table 6: Welfare estimates (per week per tourist) for every possible destination management scenario

7.3 Implications for the tourist and wind energy industry

At first glimpse, the results point to a potential loss for the tourist industry in the municipalities with a view of a wind farm at 8 km or less from the shore, everything else being equal. But by using a latent class model with segment membership, we develop a more refined picture. While the preferences of segment 3 - more likely to be French, elderly, and/or landscape enthusiasts - confirm the worst fears of any tourist industry, the fall in tourist revenues from this segment is offset by the apparent attraction that the wind farm provides to tourists in segment two, when the turbines are installed 12 km from the coast. From the point of view of the tourist industry, segment two is seemingly a highly desirable clientele, likely to be of Northern European origin with destination loyalty, enjoying and spending money on the cultural and historical activities in LR. Placing a wind farm 12 km offshore could thus precipitate a change in tourist composition in a desirable direction. According to the same logic we stipulate that the compensation requirements associated with a wind farm located 8 km from the shore may be attenuated as the tourist composition changes. Segment three tourists will refrain from visiting the resort community, while segment one will be further enticed. If a wind farm is proposed closer than 8 km from the shore, our policy recommendation is that the concerned municipalities endorse a series of efforts to improve the sustainability of the tourist destination, using the wind farm to signal this effort (column 2 and 4 table 6). This strategy will also favour the creation of a destination image in significant contrast to that of the neighbouring community resorts. Studies show that endeavours to build or improve the image of a destination may be a good investment, because the influence of destination image is not limited to the stage of selecting a destination, but is also linked to the likelihood of repeat visitation and willingness to recommend it to others (Chen & Tsai 2007; Enrique Bigné, Sanchez Garcia, & Sanchez, 2001; Bigné Alcañiz, Sanchez Garcia, & Sanz Blas, 2009).

7.4 Caveats of the study

In the current study we have used both WTP and WTA within the same choice sets. A substantial body of evidence suggests that WTA responses may be several times larger than WTP responses for the same change (Freeman, 1993; Horowitz & McConnell 2002). In particular, there is evidence of an "endowment effect" stipulating that individuals who are attached to a certain endowment require a higher level of compensation to part with something than they would be willing to pay to obtain it

(Knetsch, 1995). Other authors suggest that the WTP-WTA disparity is more pronounced or likely to persist only for goods that have few if any substitutes (Hanemann 1991; Shrogren et al., 1994), unlike the coastal resort communities of Languedoc Roussillon, which all offer relatively homogenous "sun and sand" products within a few kilometres of each other. In this light we do not expect the WTP-WTA discrepancy to cause systematic differences in the results, and correcting for this effect was considered outside the scope of this paper. Finally, hypothetical bias that lead to overstatements of true WTP is well documented in stated preference methods (Harrison & Rutström 2008; List & Gallet 2001; Murphy et al., 2005). In this survey, two segments showed payment requirements or compensation demands corresponding to about 100% of the weekly accommodation price they were paying during their stay. We stipulate that this may indicate that some tourists have responded strategically so as to influence management policies, either by demanding EUR 200 compensation for remaining at a destination with a wind farm in view or, at the other end, by expressing willingness to pay an extra EUR 200 for a resort with a coherent environmental policy. Considering the actual market for 'green' tourism, that seems unlikely. Nevertheless, since the ASC is negative for two tourist segments and dummy coded for the status quo scenario, it is likely to have captured part of the strategic bidding bias. By evaluating scenarios on the basis of marginal changes alone (i.e. not taking the ASC into account), our estimates may be considered lower bound, counteracting the strategic bias. Furthermore, strategic responses and the choice of how to treat the ASC are unlikely to carry over to the main contributions of the paper: The relative values with respect to the siting of the wind farm, environmental policy and recreational activities are likely to be affected equally by the use of strategic bidding.

8 Conclusion

While transmission, construction, and maintenance costs typically rise with increased distance, the economics of offshore wind power in the near-shore environment is such that disamenity costs decline as distance from coast increases (Krueger, Parsons, & Firestone, 2011). Our results indicate that the impact of wind farm disamenity costs on tourism revenues tends to zero, somewhere between 8 and 12 km. The study also showed that there is large heterogeneity in the tourists' preferences. While most respondents experience some visual nuisance associated with wind farms, the degree and thus their corresponding compensation requirements decrease when they are; younger or mature, of Northern European origin, frequent visitors to the Languedoc Roussillon, and when their vacation is partly motivated by the objective of visiting friends and family or enjoying cultural and historical experiences, aside from 'sun and sand' tourism. We also showed that there is considerable scope for 'greening' the tourist communities, a strategy which could be boosted in the presence of a wind farm particularly given its significant signalling effect. A green image may, in turn, further facilitate increased destination loyalty or recommending behaviour (Chen & Tsai, 2007). Our results suggest that those tourists who experience the smallest visual nuisance from wind farms are either motivated by the prospect of visiting friends and family or are of Northern European nationality, the latter being a much sought after clientele within the tourist industry. All segments are WTP a significant amount for a coherent environmental policy. Ultimately, this implies that a wind farm 8 km from the shore could be more than compensated for through the simultaneous 'greening' of the tourist resort. A rise in tourist related revenues is further conceivable if the wind farm is associated with artificial reefs and recreational user access. Ideally the results from a stated preference study, like this one, should be compared to revealed observations from other locations. The current study however has the advantage of investigating a specific case of considerable interest. It helps to indicate the potential implications for tourism of installing a wind farm in close proximity to 'sun & sand' community resorts. Overall, we make two policy recommendations. First, everything else being equal, it is in the interests of the tourist industry that wind farms are installed 12 km offshore in the Languedoc Roussillon. At this distance our results predict a slight rise in tourist visitation numbers, but also a change in the composition of the tourist clientele in the desired direction. Secondly, and alternatively, wind farms can be located as close as 5 km from the shore, if they are accompanied by wind farm associated recreational activities and a coherent environmental policy at the coastal community resort.

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