Offshore wind farms in the Mediterranean Seascape
- A tourist appeal or a tourist repellent?

Vanja Westerberg, Jette Bredahl Jacobsen, Robert Lifran

Abstract
In the run-up to a governmental invitation to tender for the construction offshore wind farms in the Languedoc Rousillon, coastal municipalities have been voicing fear about their potential impact on the tourist industry. To understand how offshore wind farms may affect tourism, we conducted a choice experiment with coastal tourists in Languedoc Rousillon. We elicited willingness to pay and willingness to accept compensation for wind turbines at different distances from the shore and examined whether potential visual nuisances may be compensated by associating the wind farm with recreational opportunities (observational boating, diving at artificial reefs and turbine foundations) or by adopting a coherent environmental policy. We show that the compensation required for the visual nuisance depends on the age segment of the tourists, their nationality, their vacation activities and their degree of loyalty to Languedoc Rousillon coastal community resorts. Our policy recommendation is two-fold: Everything else equals, wind farm implantation 12 km offshore is preferable from the viewpoint of favouring the tourist industry. With simultaneous application of a coherent environmental policy and wind farm associated recreational activities, a wind farm can be conceived from 5 km and outwards without a loss in tourist revenues.
1. Introduction

In an attempt to catch up on its delay in regard to offshore wind power and meet its 2020 renewable energy (RnE) target, the French government has been preparing a national invitation to tender for the building of offshore wind turbines. Identified as holding ten suitable sectors, the Mediterranean Languedoc Rousillon was amongst the ten due to its high wind speeds and its relatively slowly descending sea-floor. As a consequence, coastal municipalities mobilised and voiced their opposition to the French government, evoking that an offshore wind turbines would disfigure the landscape and hereby destroy the attractiveness of their coastal tourist resorts. Their protests were heard and the tender process for the construction of offshore wind farms in the Languedoc Rousillon has been withdrawn from the 2011 tender (Guipponi 2011, Government portal 2011). While no study confirms the fears of the roaring tourist industry, it is of pertinence for policy makers, tourist industry and wind farm developers to be informed about the economic cost or benefit to the tourist industry resulting from the implantation of an offshore wind farms in the French Mediterranean. To do such an investigation, we conducted a choice experiment valuation survey with tourists on the coast of Languedoc Rousillon and elicited willingness to pay / willingness to accept compensation for wind turbines at different distances from the shore.

At present there is limited empirical evidence of offshore wind farm post-construction effect on tourism, especially in regard to destinations characterised by high-density sun and beach tourism, where turbine visibility is significant. In response to this, Lilley et al. (2010) use the “contingent behaviour” technique to examine ex-ante how tourist beach choice is affected by the presence of wind turbines at US, Delaware beaches. Rather than surveying potential changes in “visiting numbers” as a consequence of installations, this study departs from the consideration that there may be scope for maintaining or increasing “visiting numbers” either by lowering accommodation costs or compensating through beach resort initiatives. More particularly, we are interested in investigating the following issues: First, if and by how much tourists should be compensated to be willing to undertake their coastal vacation at a tourist destination with a wind farm at either 5,8 or 12 km distance from the coast, relative to no wind farm? Second, whether wind farms can serve to give a “green image” of coastal tourist resorts, and permit to gain market share, especially among the desired more wealthy northern European tourists known to be particularly “green”? Thirdly, given that turbine foundations provide substrate suitable for the settlement of benthic organisms and lead to the emergence of artificial reef-like ecosystems (Wilhelmssson et al., 2006), another question (posed by wind farm developers and the tourist industry) is whether the implantation of additional artificial reefs in proximity to the turbines can foster eco-tourism” opportunities such as observational boating, diving at or around artificial reefs and turbine foundations can serve to offset the visual nuisances associated with the wind farm (Cabanis and Lourie, 2010). Fourthly and finally, how may the traits of visiting tourist be affected by wind farm installation and will tourists with desired characteristics (returning tourists with high purchasing power) be appealed or repelled by the presence of an offshore wind farm? As will be made clear in chapter 2, these research questions are all novel contributions to the existing literature. Before presenting the methodology and our results, the French stance on wind energy and the geographical context of Languedoc Rousillon will briefly be described.

1.1 Wind energy in France

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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 (4Cofshore.com)
France boasts the second largest wind power potential in Europe after the United Kingdom (EWEA 2010). By 2020, the French objective is to cover 23% of final energy demand from renewable sources, hereby meeting 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. With 5.6 GW installed at end of 2010 and about 1 GW of wind capacity added per year, the current installation pace would need to be doubled if France is to reach its target. The French delay has been explained by an institutional lock-in into nuclear energy (Nadai and Labussière 2009) – The BBC recently called France, Europe’s most enthusiastic devotee of nuclear power (Pottinger 2011) with part of the French establishment is said to be very hostile to wind power (Agasse 2010). According to the French environmental ministry, the French offshore capacity delay is in part due to the depth of the sea much greater in the Atlantic Ocean or the Mediterranean than the North Sea. As a consequence, wind farm construction is more prone to be in conflict with tourist activities and the fishing industry as they have to be located closer to the coast (Agasse 2010). Certainly in Languedoc Rousillon – the atmosphere has been tense. In the “run-up” to a national invitation in 2011 to tender for the construction of 3000 MW offshore capacity offshore wind farms in French waters, Languedoc politicians announced unanimously to be opposed to the two potential project (proposed by EDF and Enertrag). Subsequent pressure on the French government led to the exclusion of the Languedoc Rousillon from the 2011 tender, which is now limited to five zones in the Atlantic Ocean. The opposition by Languedoc politician was grounded principally on the wind farms potential nuisance on tourism and the absence of sufficient elements to judge the incidence of the projects on this factor (Conseil Municipal Portiragnes 2010).

1.2 Languedoc Rousillon and its tourist industry

The LR stretch from the Rhone delta to the Pyrenees (Fig 1). It is situated at a natural crossroads, of the historic north-south route to Spain and the east-west route from the Atlantic to the Mediterranean. With an annual average of seven hours’ sunshine per day and 200 km of sandy beaches, a hinterland of unspoilt and varied countryside, and distinctive cultural and architectural monuments (Klem 1992) – the 1960s witnessed the construction of what is today the major tourist resorts of the Languedoc Rousillon (such as La Grande-Motte, Le Cap d’Agde, Gruissan, and Port Barcarès). With visitor numbers increasing from 30’000 in the 1960s to close to 15 million on an annual basis today, the Languedoc Rousillon is now the fourth most important tourist region in France, placed behind L’île de France (Paris), Rhone Alpes and Cote d’Azur (Klem 1992, Lecolle, 2008). One third of all the nights slept is occupied by international tourists, and constitute principally Germans, English and Dutch. The regional tourist industry accounts for 15% of the regional GDP and thus constitutes the most important economic activity of the region (Lecolle 2008). It is furthermore a major pillar on which regional politicians rely for future employment and growth (Raynauld 2010). Today, the coastal Languedoc Rousillon is characterised by the spatial concentration of tourist community resorts, leaving kilometre wide fine sand beaches and less densely occupied than those of Côte d’Azur. On the whole, the coastal tourist resorts remain rather family oriented, with campings accounting for 65% of the total “overnight” capacity– in contrast to 10% for hotels (INSEE 2008).

\(^2\) 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.
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. Subsequently, 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.

![Map of the Languedoc Rousillon and its coastal community resorts](image)

**2. Evidence of attitudes and preferences towards wind farms**

**2.1 General attitudes towards wind farms**

Whereas onshore wind power is reproached for their negative visual impact on the landscape, generating noise from the rotation of blades and shadow and lights effects from the windturbines (Warren et al 2005) offshore wind farms are primarily approached for their negative landscape externalities. These however decline with increasing distance from the shore (Ladenburg and Dubgaard, 2007, Krueger et al 2010, Bishop and Miller 2007, NFO 2003) and the disamenity cost may even tend to zero at large distances (Krueger et al., 2010). Bishop and Miller 2007 also find that clearer air and sunny sky results in greater visual disamenities relative to hazy air. There is evidence that offshore is preferred to onshore everything else constant (NFO 2003, Aravena et al. 2006, Ek 2006), but according to a wind energy case study from Northern Wales, offshore wind farms may be just as controversial as onshore projects, since the places affected by change do not cease at the waters edge but include the view of a horizon (Dewine-Wright and Howes, 2010).
In regard to the influence of socio-demographic factors on preferences and attitudes of offshore wind farms, an opposing attitude or preference is often found to covariate positively with age (Bishop and Miller 2007, Frantal and Kunc, 2011, Lilley et al., 2010, Ladenburg 2010) and income (Firestone and Kempton 2007, Lilley et al. 2009, Ladenburg 2010). There is also evidence that citizens’ use of the coastal zone has a role to play (Ladenburg and 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 compared to people who do not use the coastal area for those purposes (Ladenburg and 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 suggested loss of attractiveness of the “visually polluted” landscape (Gordon 2001). In the following, we first review actual evidence of observed 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

In regard to changes in tourism behaviour following wind farm construction, there is little evidence of negative consequences for tourism. 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 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). The first large-scale wind power project in Southeast Asia, operational from 2005, figures 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 and brought a revival to the community (Jimeno 2007, Linao 2007). Similarly on the breaking edge between onshore and offshore, SAE wind Power Company 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 from 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 bicycling lanes for tourists going on excursion to the wind farm and the surrounding nature (Gaudestad, 2010).

2.2.2 Stated preference studies of tourist attitudes and preferences

In a Scottish study with tourists visiting Argyll & Bute, 43% 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). In the NFO WorldGroup’s interviews of visitors to Wales, some 21% reported that wind facilities would be “an added attraction…in popular tourist areas” while the largest proportion of respondents (68%) claimed that it did not influence their choice of holiday site (BWEA 2006).3 In the Chezh republic, the majority (84%) of tourists of a

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3 It should be borne in mind however, that there is doubt in regard to the subjectivity of the results of BWEA (2006) and MORI (2002) due to use of non-random sampling (Lilley et al 2010) and because wind developers were behind the commissioning of the studies.
popular recreational area stated that the prospective construction of wind turbines would not influence their destination choice. However, respondents visiting regularly the same familiar destination were found more likely to oppose (Frantal and Kunc, 2011). A survey commissioned by the Languedoc Rousillon regional authorities with 1033 tourists asked 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 et al., (2010) use a contingent behaviour study, to examine beach visitation in response to a hypothetical wind farm on Delaware beaches (US) - sites that may be comparable to the Mediterranean in that they experience high levels of recreational and tourism use. Similarly to the studies of citizen preferences, they found decreasing disamenity costs with increasing distance to the coast. In the presence of a wind farm 1.5 km offshore, 55% of the respondents indicated that they would continue to visit the affected beach. A figure which rises to 73% if the wind farm was 10 km offshore and 93% if the wind farm was 22 km offshore.

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. Open coast are shown to have a positive incidence on the accommodation price, while dike share and absolute dike length (to limit sea level rise) have a negative effect. More precisely, the hedonic price of 1 km increase in open coast is estimated to be worth 0.56€, whereas the hedonic price of a 1 km increase in dikes leads to a fall in 0.52€ in the hedonic price per night in a hotel whose accommodation costs is 62€ per night (Hamilton 2007). In Scotland, Riddington et al., (2010), use an internet survey with potential tourists to elicit how much they would be willing to pay per night to upgrade the view from a hotel room to one without 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%).

Conclusively, the above-mentioned studies provide evidence that wind turbines can have an appeal to tourists (Frantal and Kunc, 2011, Mori 2002, Linao 2007, Gaudestad 2010), especially when a visiting centre is involved (BWEA 2006). However, there is fraction of tourists (less than 10%) who display significant negative attitudes or preferences towards wind turbines in the landscape (CSA 2003, Lilley et al 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 an incidence on accommodation prices similar or worse than that of wind turbines (Riddington et al., 2010).

2.3 Tourist demand for sustainability and recreation

In regard to tourist demand for sustainable or green destinations and eco-tourism, there is broad evidence that consumers are becoming more aware of sustainability issues and knowledgeable about measures of energy and waste conservation (Bachis et al., 2009). However, the evidence of whether tourists are actually willingness to pay more for environmental initiatives, is mixed. Kasim (2004) found that the majority of tourists in a Malaysian hotel were not in favour of resource reduction and favoured the use of air-conditioning over natural ventilation. The study furthermore showed a clear indication that tourists were not willing to pay more money for a hotel that showed responsible behaviour, with 38% undecided and 37% stating they would never pay more (Kasim, 2004). Likewise, Dalton et al (2008) and Tearfund (2002), show that only about half of all sampled tourists are willing to pay more to support sustainable initiatives – with a WTP less than or equal to 10% of
accommodation cost or travel expenses (Dalton et al., 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 by local and international divers for dive trips to three different protected coral reef areas in the Philippines, where fishing – one of the major threats to coral reefs – is prohibited. The mean per person daily WTP to enter a Philippines marine sanctuary range from US $3.7 to $5.3 depending on the marine reserve. Seenprachawong (2003) use the contingent valuation method and the Travel Cost Method to estimate the willingness-to-pay (WTP) for improved coral reef abundance for visits to Phi Phi Marine National Park, in Thailand. His estimates for mean WTP were US$17.15 for overseas tourists and US$7.17 for Thai tourists. Other studies confirm that a thriving tourist industry may be built around a marketed perception of a healthy marine and coastal environment (Williams and Polunin 2000, Dharmanratne et al 2000, Dixon et al., 1993). These findings are congruent with other non-valuation studies - In responsibletravel.com (2004) 70% are interested in taking trips to local wildlife conservations and social projects, while the Mintel survey (2007) of the UK population, found that only 23% of consumers just wanted to relax whilst on holiday and not be bothered with ethical issues.

In the light of previous studies, this paper contributes with several novelties. On the one hand, it is the first valuation study of tourist preferences for the siting of offshore wind farms at their tourist 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 preferences of wind farms have focused on their disamenity costs through the vehicle of paying or visiting more or less, we equally propose to weight disamenity costs against other potential compensatory undertakings at tourist resort. In particular, the presence of a coherent environmental policy at the tourist destination and recreational activities associated with the wind farm.

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 that they may require from being willing to face 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 option from a range of potential management alternatives, usually including a status quo alternative. 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 situation. 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 levels that these attributes might take, and including a monetary attribute, the CE will facilitate an estimation of the welfare economic value of the changes in a given coastal tourist community, under various future management options... By furthermore accounting for the fact that tourist preferences are heterogeneous in the model estimation, enables unbiased estimation of individual preferences, while enhancing the accuracy and reliability when estimating demand, participation, marginal welfare and total welfare (Greene 1997). There are reasons to believe that preferences for wind farms in the view shed are heterogeneous. In the words of 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 (Stephenson 2008). In regard to the latter element, researchers have suggested that there are personality, habitual, sexual, and cultural differences in the perception and appreciation of landscapes (Macia 1979, Gee and 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 the Languedoc Rousillon. We take account of this by using a latent class model approach in which tourist specific characteristics give rise to a finite number of preference groups, each characterised by relatively homogenous preferences. Belonging to a segment with specific preferences is probabilistic and depends on the characteristics hypothesized to influence choice. 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 varies amongst tourist population segments and thus how the tourist clientele may change following wind farm construction in proximity to popular beach resorts. 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

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

$$U_{ij} = V_{ij} + \varepsilon_{ij}$$

where $V_{ij}$ is the systematic and observable component of the latent utility and $\varepsilon$ is a random or “unexplained” component assumed IID and extreme value distributed (Louviere et al., 2000). To account for unobserved preference heterogeneity we employ the LCM. The latent class model assumes 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 thus done simultaneously (Train, 2003). Formally described, the utility that tourist $i$, who belongs to a particular segment $m$, derives from choosing tourist destination alternative $j \in C$, can then be written as:

$$U_{ij|m} = \beta_m x_{ij} + \varepsilon_{ij|m}$$

where $x_{ij}$ is a vector of attributes associated with the tourist destination alternative $j$, and $\beta_m$ is a segment specific vector of taste parameters. Heterogeneity in attribute preferences across segments is captured in differences in $\beta_m$ 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:

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

(1)

where $\beta$ 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:
$$s_m = \frac{\exp(\lambda_s Z_i)}{\sum_{i=1}^{n} \exp(\lambda_s Z_i)} \quad (2)$$

where $Z_i$ is a vector of psychometric constructs and socioeconomic characteristics (Boxall & Adamowicz, 2002). This formulation 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, 2003, 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.

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

$$MRS = \frac{\beta_k}{\beta_p} \quad (3)$$

where $\beta_k$ refers to the parameter of interest and $\beta_p$ 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

Proposed or previously proposed offshore projects in the Languedoc Rousillon range from 5 km to 10 km. Beyond 10 km it is prohibitively expensive to construct a seafloor mounted wind farm, as the seafloor is at more than 30 meters of depth. In the Atlantic however, several project are proposed at 12 km or further from the shore. This is also a feasible prospect in the Languedoc Rousillon with the use of floating turbines. Legally there is no minimal binding distance from the shore, but the high sea commission has advised that no offshore wind farm should be implanted less than 5 km from the coast due to the high density of activities taking place within this zone (in particular sea sports, and artisanal fisheries (Cabanis and 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 each (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 meters between each turbine - a configuration typically seen in above-mentioned proposals. Photo simulations were made using a professional photo simulation program - WINDPRO version 2.7 using typical August lighting conditions at midday. 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 as 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 implantation of further artificial reefs could add real recreational value to a coastal community resort, permitting
observational boating during educational excursions, scuba and skin diving. Angling may also be envisaged under certain circumstances. The question is then if this added recreational value can justify implanting the wind farm closer to the shore, that is, can visual nuisances at 5 km and 8 km be outweighed? Wind farm 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, the Spaniards manage to earn significantly more per tourist head than their Languedoc counterpart (Knibiehly 2010). In an increasingly competitive environment, marked by fierce price competition and low-cost airlines to an increasing number of coastal destinations, several strategies are contemplated on to permit added value - amongst these, an effort to reduce the carbon footprint and pressure on the local ecosystems in an obviously visible manner to the tourist (Knibiehly 2010). To some, the feeling is that they would need to be another 10 years 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 want water, sun and sand with which their kid can play” (Pioch 2010). It is thus of interest to verify this hypothesis or investigate whether among the current population there is a demand potential for sustainable tourism. What is the share of this population, and what are their characteristics? Furthermore, a focus group with Scandinavian tourists revealed not only a real demand for greater environmental effort at beach resorts, but also that the perception of a wind farm would is highly dependent on whether it is integrated within a larger “eco-beach community” concept. In the survey, it was explained that the municipality (in which the tourist was 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.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Level</th>
<th>Attribute</th>
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<tbody>
<tr>
<td>Wind farm</td>
<td>No</td>
<td>Wind farm and artificial reef</td>
<td>No</td>
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<tr>
<td></td>
<td>Yes 5, 8, 12 km</td>
<td>associated recreational activities</td>
<td>Yes</td>
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<td>Coherent environmental policy</td>
<td>No</td>
<td></td>
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<td></td>
<td>Yes</td>
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<tr>
<td>Change in weekly</td>
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<td></td>
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<tr>
<td>accommodation price</td>
<td>+50, +200] EUR</td>
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Table 1: Attributes and attribute levels used in the full-scale survey

4.4 The payment vehicle

Focus groups showed that a change in accommodation price was easy for tourists to relate to and perceived to be a realistic and credible given 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, campings) gave guidance to reasonable levels of the monetary attribute. The pilot study showed that tourists were more at ease with reference to changes in weekly accommodation prices rather than daily accommodation prices. In the execution of the full-scale study, those tourists, who were living for free with family and friends, were told to imagine that the price change related to a bonus or a surcharge on their overall spending in the beach community resort.
Finally, interviewers demanded that the tourists took into account their actual travel budget constraint when making a destination choice.

5. Questionnaire construction and execution
5.1 Survey development
The CE survey design commenced early 2010 with a reunion hosted by the environmental ministry and with the purpose of designating zones in the French Mediterranean for potential wind farm developments and a series of meetings with chambers of commerce and industry, regional and departmental committees for tourism and with professionals in the wind power and tourist industry. This background provided a good basis for understanding the situational context in the Languedoc Rousillon and sketched a series of pertinent attributes to be valued. These were narrowed down and further defined in three focus groups held with both international and French national tourists. Different choice set outlays ranging from the “tourist brochure look” to simple photos and short descriptions were tested. 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. A pilot study proved critical for improving the length, the wording and the order of the sections – so as to maximise the respondent’s engagement.

The final survey instrument had 6 sections – and began with eliciting respondents perceived aesthetic and environmental risk of the wind farms; concern about climate change, feelings of personal responsibility, perceived efficiency of wind power compared to other energy sources, offshore versus onshore, etc. These questions permit to evaluate the relative strength of physical, symbolic and political aspects in visual judgement. The second section constituted a couple of simple questions regarding the mode of the vacation of the respondent – the length, with whom he/she travelled, accommodation type and price. Subsequently, 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 vacation destination (which has neither a coherent environmental policy, offshore wind farm or associated recreational activities). The fourth section followed up on the choice-set questions, so as to identify protest bidders and lexicographic preferences. The fifth section asked about respondents’ motivation for visiting to the Languedoc Rousillon and their overall satisfaction (or dissatisfaction) with the tourist resort. The final section elicited respondents’ social, economic and attitudinal characteristics (table 2).

5.2 Choice experimental design
With 8 payment levels and three policy attributes two with two levels, and a third with four, 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-error

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4 While the status quo levels were included in the design for all other attributes, the was not the case for the monetary attribute. Hence, the “no change in price relative to today” was not included in the design.
minimised by Ngene (ChoiceMetrics 2010), assuming an 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 Rousillon. We used personal interviews in which the interviewer guided the respondent through the survey. 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 on the beach resort or on the neighbouring beach resort at which they were interviewed. The interviews were conducted by approaching respondents on 9 different beach resorts along the coastline of the departments of L’aude and L’herault – the two departments in Languedoc Roussillon with 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 5 interviewers (including the corresponding author). Upon arrival on the beach, each interviewer went to a separate point where they began sampling. They walked in one direction, stopping at every individual or group of friends and family on their way. While a tourist was being interviewed – we explicitly demanded the accompanying friends or family not to interfere during the interview. This process continued till the interviewer reached the end of the beach, or the zone in which another interviewed 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 much detail on their opinions. In total we interviewed 370 respondents of which 15 only completed the questionnaire partly and 16 were considered as invalid. These were left out from the final estimation, because they either did not make trade-offs (in the choice sets) or refused to consider the price attribute. The interviewer noted this. Questionnaires were similarly excluded in the further analysis, if respondents chose the same alternative (status quo) in all choice sets, when A or B were dominating by being cheaper than today and with utility enhancing environmental policy. This resulted in a total of 339 individuals and 2712 choice set observations.

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 his socio-demographic characteristics were likely to affect the latent preference segment that the tourists belonged to. In particular, we found that the age of the tourists, their nationality, their degree of loyalty to the tourist resort, and their motivations for visiting the beach resort where they were interviewed were significant determinants of latent membership.
Finally, it should be stressed, that being French, or elderly, etc. does not determine whether any one individual belongs to segment, but merely increases the probability that any one individual with such a characteristic is 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.

<table>
<thead>
<tr>
<th>Individual tourist respondent characteristics</th>
<th>In LC model</th>
<th>MEAN</th>
<th>S.D</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net household income (€) 1-14 category value from zero to more than EUR 7000 net per month.</td>
<td>6.3 (€2500-3500)</td>
<td>3.7</td>
<td>1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Income (1,2,3 coded dummy variable)</td>
<td>1.92</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) &lt;2001</td>
<td>0.31</td>
<td>0.83</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>(2) 2000-3500</td>
<td>0.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) &gt;3501</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher education</td>
<td>0.51</td>
<td>0.5</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Has done at least 2 years of university studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.59</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>French tourists</td>
<td>0.73</td>
<td>0.44</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>International tourists</td>
<td>0.27</td>
<td>0.44</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Of any origin other than French</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern European</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of either Scandinavian, English, Belgian, German, Suisse Luxembourg or Dutch origin.</td>
<td>0.26</td>
<td>0.43</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>37</td>
<td>14.6</td>
<td>17</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>The tourist is on retirement</td>
<td></td>
<td>0.08</td>
<td>0.26</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Trip Characteristics**

| Accommodation price (€/adult /week)                                               | 202         | 151 | 17 | 1125 |
| Accommodation price (€/adult /week) Including those living for free with friends or family | 158         | 157 | 40 | 1125 |
| Residing in:                                                                       |             |     |     |     |
| Camping                                                                           | 0.42        | 0.42 | 0 | 1   |
| Hotel and B&B                                                                     | 0.08        | 0.27 | 0 | 1   |
| Friends and family                                                                | 0.17        | 0.41 | 0 | 1   |
| Rented house or apartment                                                         | 0.26        | 0.43 | 0 | 1   |
| Other (boat, car)                                                                 | 0.07        | 0.22 | 0 | 1   |
| Loyal LR tourists                                                                 |             | 0.52 | 0.50 | 0 | 1 |
| Those tourists who have spent their vacation several times at the coastal resort where they were interviewed, or a neighbouring one. |             |     |     |     |
| Visiting tourists                                                                  |             | 0.22 | 0.41 | 0 | 1 |
| "Visiting friends or family" was an important element during the tourist’s vacation. |             |     |     |     |
| Culture, history and patrimony enthusiasts                                         |             | 0.15 | 0.40 | 0 | 1 |
| "History, culture and patrimony" were important elements during the tourist’s vacation. |             |     |     |     |
| Landscape enthusiasts                                                              |             | 0.44 | 0.49 | 0 | 1 |
| "Landscape and nature appreciation” were important elements during the tourist’s vacation. |             |     |     |     |
| Sea and Sun                                                                       |             | 0.77 | 0.42 | 0 | 1 |
| Enjoying the “sun and the beach” were important elements during the tourist’s vacation. |             |     |     |     |

Table 2 : Socio-demographic and trip characteristics of the sample
Destination A: Coherent environmental policy and offshore wind farm at 5 km with associated recreational activities.

Destination B: Offshore wind farm at 8 km with associated recreational activities.
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 $\rho^2$ were consulted. Table 3 reports their values together with the number of parameters for the three models. The criteria used – Log likelihood, adjusted $\rho^2$, 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.

<table>
<thead>
<tr>
<th># of segments</th>
<th># of parameters</th>
<th>Distribution of segments</th>
<th>Log likelihood</th>
<th>Adj $\rho^2$</th>
<th>AIC</th>
<th>BIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>21</td>
<td>0.65;0.35</td>
<td>2193.73</td>
<td>0.260</td>
<td>1.633</td>
<td>1.679</td>
</tr>
<tr>
<td>3</td>
<td>35</td>
<td>0.23;0.42;0.35</td>
<td>-2125.06</td>
<td>0.283</td>
<td>1.591</td>
<td>1.667</td>
</tr>
<tr>
<td>4</td>
<td>49</td>
<td>0.26;0.39;0.11;0.24</td>
<td>-2194.38</td>
<td>0.256</td>
<td>1.654</td>
<td>1.765</td>
</tr>
</tbody>
</table>

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. Well in correspondence with other studies, the experienced visual disamenity costs decreases as the wind farm is further from the coast for all the segments. However, we observe a large difference in 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’s preferences are such that the presence of a wind farm is considered to be a nuisance to the eye at all distances. The presence of an offshore wind farm 12 km from the coast may however be compensated by a coherent environmental policy enacted at the tourist community resort. This segment of tourists corresponds to 35 % of the underlying sample and they are more likely to consist of retired, French tourists, whose vacation is particularly motivated by landscape and nature appreciation. Turning more specifically to segment one and two, the invigoration of an environmental effort at the tourist resort, can more than outweigh the view of a wind farm, whether it is at 5,8 or 12 km from the shore. 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. The parameter for the ASC is assumed to be equal to one for the status quo. It is negative and significant for segment one and three. This 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 corrected more than just following the marginal values, cf Table 5. However, since the ASC per construction is confounded with the dummy variables and therefore gives identification problems (Bech and Gyrd-Hansen, 2005) we have not included the ASC in final WTP/WTA scenario estimates.
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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard error</th>
<th>Parameter</th>
<th>Standard error</th>
<th>Parameter</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-1.4</td>
<td>-0.01</td>
<td>0.15</td>
<td>-0.79</td>
<td>0.1</td>
</tr>
<tr>
<td>Environmental policy</td>
<td>2.5</td>
<td>2.46</td>
<td>0.12</td>
<td>1.07</td>
<td>0.11</td>
</tr>
<tr>
<td>WF recreational activities</td>
<td>1.39</td>
<td>0.87</td>
<td>0.09</td>
<td>0.46</td>
<td>0.11</td>
</tr>
<tr>
<td>WF 5 km</td>
<td>-1.87</td>
<td>-0.60</td>
<td>0.14</td>
<td>-3.84</td>
<td>0.18</td>
</tr>
<tr>
<td>WF 8 km</td>
<td>1.53</td>
<td>-0.31</td>
<td>0.12</td>
<td>-2.08</td>
<td>0.13</td>
</tr>
<tr>
<td>WF 12 km</td>
<td>0.09</td>
<td>0.66</td>
<td>0.13</td>
<td>-0.57</td>
<td>0.12</td>
</tr>
<tr>
<td>Price</td>
<td>-0.06</td>
<td>-0.02</td>
<td>0.00</td>
<td>-0.01</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Segment membership function: Respondents social and trip characteristics

Constant                                | -1.07          | -0.10     | 0.32           | 0         |
Retired                                 | -0.94          | -1.01     | 0.59           | 0         |
Northern European                       | 0.44           | 1.10      | 0.38           | 0         |
Loyal LR tourist                         | 0.71           | 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

<table>
<thead>
<tr>
<th>SEGMENT 1</th>
<th>SEGMENT 2</th>
<th>SEGMENT 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTP / WTA in EUR</td>
<td>WTP / WTA in EUR</td>
<td>WTP / WTA in EUR</td>
</tr>
<tr>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASC</td>
<td>-21.9 [8.2]**</td>
<td>-0.3 [9.6]</td>
</tr>
<tr>
<td>Environmental policy</td>
<td>39.2 [2.7]**</td>
<td>158.7 [6.1]**</td>
</tr>
<tr>
<td>WF recreational activities</td>
<td>21.9 [4.5]**</td>
<td>56.5 [4.9]**</td>
</tr>
<tr>
<td>WF 5 km</td>
<td>-29.3 [8.8]**</td>
<td>-38.9 [7.7]**</td>
</tr>
<tr>
<td>WF 8 km</td>
<td>24.1 [10.1]**</td>
<td>-20.3 [7.4]**</td>
</tr>
<tr>
<td>WF 12 km</td>
<td>1.4 [4.2]</td>
<td>42.8 [9.4]**</td>
</tr>
</tbody>
</table>

WTP / WTA standard errors approximated using the Delta method [squared brackets]

Table 5: Latent class model estimates and marginal WTP / WTA

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), this segment corresponding to 23% of the sample would demand an accommodation price or vacation rebate 6 22€ cheaper 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. Only 8 km further offshore, this group no longer perceive any visual nuisance from the wind farm, and is willing to pay 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, 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 43€ in accommodation price, for facing 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 159€ more per week in accommodation price to be lodging at a “green” beach resort. Equally noteworthy, the possibility of doing recreational activities in proximity to the wind farm is valued more than the visual nuisance perceived from the wind farm when only 5 km offshore. Finally, the last segment who is likely to consist of French, retired respondents, 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 265€ (week/adult) when the wind farm is 5 km from the shore implies that even if their accommodations were offered for free, they would most likely choose another tourist resort without a wind farm 7. However, with rather pronounced preferences for a coherent environmental policy (WTP 74€ more per week), even this segment of tourists can be induced not to switch destination and enjoy a welfare benefit of 35€ (74€-39€), if the wind farm is implanted 12 km from the shore or further out.

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 hereof on 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 decreases as the distance from the coast of the offshore wind farm increases (table 5 and table 6 column 1). This is well in accordance with findings from other studies (Ladenburg and Dufvaard 2007, Krueger et al 2010, Miller and Bishop 2007, NFO 2003). But 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 segment one and segment 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 occupied by the relational aspect of the holiday may have other landscape criteria than those coming principally for sea, sand, sun, patrimony, culture and Languedoc landscapes. Their demand for an offshore wind farm, appear to be stimulated by a certain curiosity, demanding the presence of a wind farm not too far from the shore (12 km) where its visibility is minimised, but nor too close (5 km) where its infringement may be excessive. For those of Northern European origin and for whom the cultural, historical and patrimonial offer in Languedoc Rousillon 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 on their holiday. This is

6 For those who were living for free during their vacation.
7 The average accommodation price is 202 EUR/week per adult
supported by the fact that they are in high demand for environmental effort. The presence of a North-South European preference divide, was expected prior to the valuation survey, as focus groups and an interview with the head of a camping association\(^8\), gave evidence that Northern Europeans were in greater demand for green initiatives (Pioch 2010). This is well in accordance with other studies demonstrating differences in preference structures with respect to vacation places among tourists with diverse nationalities (Eleftheriadis, et al., 1999, Kozak 2002, Lee and Lee 2009). Conclusively, 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 and belief system\(^9\) and style of living, as suggested by Gee and Burkhard, 2010.

### 7.2 Policy management scenarios

In order to look at the economic impact for the tourism industry as a consequence of the presence of an offshore wind farm at different distances, 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 point to an increase in tourist revenues of about 28 EUR/week/adult if the offshore wind farm is 12 km offshore, everything else equals (column 1). As the wind farm approaches the coast – the average tourist is rather in demand for a compensation to be equally well off during his vacation as without its presence. If the wind farm is only 5 km away from the coast this amounts to compensation as high as 91 EUR. With the average tourist paying 202 EUR per week per adult in accommodation price, 91 EUR implies that the coastal community resort would need to cut accommodation prices by about 50% – if it wants to maintain the exact same “customer” composition as today (without an offshore 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 even at 5 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 could even be economically beneficial for the tourist industry (column 4). A rise in tourist-associated revenues is even more conceivable when an offshore wind farm is 8 km offshore. Indeed, the statistical estimations suggest that beach communities with these features could attract more tourists than today. While no study till the authors’ awareness, have yet proven such pronounced willingness to pay for environmental initiatives at beach resorts, studies have shown significant WTP for onshore and offshore recreation that go hand in hand with conservation (Dharmanratne et al 2000, Seenprachawong 2003, responsibletravel.com 2004, Arin and Kramer 2002, Williams and Polunin 2000).

<table>
<thead>
<tr>
<th></th>
<th>No environmental policy, no wind farm activities</th>
<th>Coherent environmental policy at tourist resort</th>
<th>Reef and wind farm associated recreational activities</th>
<th>Coherent environmental policy &amp; wind farm associated recreational activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>No wind farm</td>
<td>0 €</td>
<td>125,6 €</td>
<td>63,9 €</td>
<td>165,4 €</td>
</tr>
<tr>
<td>Wind farm 5 km offshore</td>
<td>-91,4 €</td>
<td>10,1 €</td>
<td>-51,6 €</td>
<td>49,8 €</td>
</tr>
<tr>
<td>Wind farm 8 km offshore</td>
<td>-29,1 €</td>
<td>72,3 €</td>
<td>10,7 €</td>
<td>112,1 €</td>
</tr>
<tr>
<td>Wind farm 12 km offshore</td>
<td>28,4 €</td>
<td>129,9 €</td>
<td>68,2* €</td>
<td>169,6* €</td>
</tr>
</tbody>
</table>

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

---

8 Many campings have installed recycling infrastructure because it was demanded by their Northern European clientele.

9 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.
### 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 to a wind farm at 8 km or less from the shore, everything else equal. But by using a latent class model with segment membership, the picture is more refined. While the preferences of segment 3 “the “French, elderly, landscape enthusiasts” segment confirm the worst fears of any tourist industry, the fall in tourist revenues (from segment 3) in the presence of a wind farm 12 km from the coast, is compensated by the apparent tourist attraction that the wind farm provides (to segment 2). From the point of view of the tourist industry, segment two is a *highly demanded* clientele, of Northern European origin, with destination loyalty, enjoying (and spending on) the cultural and historical activities in the LR, whereas segments three are non-loyal tourists. Wind farm implantation at 12 km offshore thus indicates a change in tourist composition in the desired direction. According to the same logic we stipulate that the compensation requirements associated with a wind farm located at 8 km from the shore may be attenuated as the tourist composition changes. Segment three, will be refrained from the beach community, while segment one will be attracted. If a wind farm is conceived closer than 8 km from the shore, our policy recommendation is that the concerned municipalities endorse a series of efforts to render the tourist station more sustainable, while 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 different from that the neighbouring stations. 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 also the intention to revisit and willingness to recommend (Chen and Tsai 2007, Bigné Alcaniz et al., 2009, Bigné et al 2001).

### 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 and McConnell 2002). In particular, there is evidence of an “endowment effect” stipulating that individuals who are attached to a certain endowment, requires a higher level of compensation to part with something than they would 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 tourist resorts of the Languedoc Rousillon, which offers relatively homogenous “sun and sand” products, within a few km’s distance from each other. In this light we do not expect WTP-WTA discrepancy to cause systematic differences in the results, and correcting this effect was considered outside the scope of this paper. In regard to the payment attribute, there is some evidence that respondents have reflected in household terms (instead of per adult) whenever they were on vacation with their partner. The actual magnitudes of WTP and WTA may thus be lower than reported in this study. Finally, hypothetical bias that lead to overstatements of true WTP is well documented in stated preference methods (Harrison and Rutström 2008, List and Gallet 2001, Murphy et al. 2005). In this survey, two segments showed payment requirements or compensation demands corresponding to 100% of the actual 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 only accepting a 200€ compensation to be induced not to change destination whenever a wind farm could be seen, or in the other end, by being willing to pay 200€ more for the...
presence of a coherent environmental policy. Considering the actual market for environmentally labelled tourism, that seems unlikely. Nevertheless, while the level of WTP/WTA may be somewhat exaggerated that is unlikely to carry over to the main contributions of the paper: The relative values such as dependency on distance, environmental effort and wind farm recreational activities. Exaggeration as a result of strategic bidding or wrong payment unit is likely to affect these equally.

8 Conclusion

While transmission, construction, and maintenance costs typically rise with distance, the economics of offshore wind power is such that disamenity costs decline with increased distance from the coast in the near-shore environment (Krueger et al., 2010). 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 has also showed that there is large heterogeneity in the tourist’s preferences. While most respondents express wind farm induced visual nuisances, the degree, and thus their compensation requirements decreases when they are; Younger or mature, of Northern European origin, returning frequently to the Languedoc Roussillon, and 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, let alone due to its signalling effect. A green image may in term further facilitate loyal visitors revisiting or recommending behaviours (Chen and Tsai, 2007). Those tourists that experience the smallest visual nuisances from wind farms are either those motivated by the prospect of visiting friends and family or of northern European nationality – the latter, a clientele much sought by the tourist industry. All segments are WTP a significant amount for a coherent environmental policy. Ultimately, this implies that a wind farm 5 or 8 km from the shore could be “compensated for” through the simultaneous “greening” of the tourist resort. Indeed our results tend to point to an actual rise in tourist related revenues, with simultaneous greening. This gain is further accentuated if in addition a wind farm was associated with artificial reefs and recreational user access. The policy recommendation is thus two fold: Everything else equals, 12 km offshore is preferable from the point of view of favouring the tourist industry. At this distance our results predict a positive effect on tourist visitation numbers, in addition a change in the “composition of tourist characteristics” in the desired direction. With simultaneous application of a coherent environmental policy and wind farm associated recreational activities, a wind farm implantation can be conceived from 5 km and outwards.

Role of the Funding Source

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