

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

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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.

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-floor¹. 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were heard and the tender process for the construction of offshore wind farms in the Languedoc Rousillon has been withdrawn from the 2011 tender (Guipponi 2011, Government portal 2011).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.

Although there is limited empirical evidence on offshore post-construction tourism effects, the Horns Rev (DK) and Scroby Sands (UK) case studies, demonstrates no negative incidence on tourism (Kuhn 2005, BWEA 2006). But the applicability of tourist sites in northern Europe to those of the crowded Mediterranean resorts may be questioned. A faster descending seafloor than that of the North sea,

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)

implies that economically feasible (seafloor mounted) wind turbine locations are closer to the shoreline. Coupled with the much higher frequency of clear sky sunny days turbine visibility is further enhanced. While high-density coastal resorts of the Mediterranean Sea have not yet been targeted for offshore wind farms, this is in contrast to the US (Lilley et al., 2010). In this light, Lilley et al. (2010) use the “contingent behaviour” technique to examine 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: If 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”? In response to this, focus groups suggested that their attitude was clearly dependent on whether any wind farm was part of an overall coherent environmental effort by the concerned coastal communities. Secondly, given that turbine foundations can provide a substrate suitable for the settlement of benthic organisms they might lead to the emergence of artificial reef-like ecosystems (Wilhelmsson et al., 2006). As such, “eco-tourism” opportunities such as observational boating, diving at or around artificial reefs and turbine foundations are promising. To further boost this prospect and increase wind farm acceptance amongst the tourist industry (and artisanal fishermen) wind farm developers have proposed to implant additional artificial reefs in proximity to the turbines (Cabanis and Lourie, 2010). Thus, our second research question is whether adopting a coherent environmental policy or associating the wind farm with recreational opportunities can compensate for potential visual nuisances. Finally, we use our data to examine how visiting tourist traits may be affected by wind farm installation and whether tourists with desired characteristics (loyal/ returning tourists and Northern European) will be appealed or repelled by the presence of an offshore wind farm.

In the remaining part of the paper, we present the case study area (remaining introduction). In chapter 2 we consider previous literature on tourist attitude 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.

1.1 Wind energy in France

France boasts the second largest wind power potential in Europe after the United Kingdom. With a wind energy capacity of 5,660 MW at end of 2010, the French wind power policy is characterised by growing and ambitious objectives while its installed capacity is amongst the smallest in Europe (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 Directive and the Grenelle Forum² (Enerzine 2011, GWEC 2011). This translates into the installation of 25 GW of wind power, including 6 GW offshore. With no offshore wind turbine yet installed and about 1 GW of wind capacity installed per year since 2007, 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

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.

(Agasse 2010). This is also seen in recent changes in legislation and regulation. Most recently, wind turbine installations have been submitted to regulation covering “dangerous and polluting installations” implying that wind farm developers need to obtain a higher number of authorizations than before, before being granted permits (GWEC 2011)

According to the French environmental ministry, the French offshore capacity delay is 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 to tender for the construction of 3000 MW offshore capacity offshore wind farms in French waters, two projects were presented (by EDF EnR and Enertrag) to the concerned municipalities of the department of Hérault in Languedoc Rousillon. The local politicians announced unanimously to be opposed to the two projects and subsequent pressure on the French government led to the exclusion of the Languedoc Rousillon from the offshore wind power zones included in a forth-coming invitation to tender for the construction 3000 MW offshore wind power capacity. Till date, the tender is limited to five areas 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). This is why the present study, investigating the impact of offshore wind farms on coastal tourism in the Languedoc Rousillon, was considered of pertinence. It also holds the perspective of being of use in the Atlantic context where the same questions are posed. Before presenting the methodology and results, the geographical and historical context of Languedoc Rousillon will briefly be described.

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. In the 1960s, the region was mainly agricultural, dependent upon fishing and the manufacture of low quality wine. Meanwhile, the French coastal tourist industry grew with only 2% compared to 25% in Italy and Spain in the same period. This was blamed on the lack of accommodation, with saturation and high prices in the Côte d’Azur. 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) - an inter-ministerial mission for the conversion of the Languedoc Rousillon coastline was conceived. This resulted in the creation of several coastal tourist resorts (such as La Grande-Motte, Port-Camargue, Le Cap d’Agde, Gruissan, Port Leucate, Port Barcarès et Saint Cyprien) in the early 1960s. The operation was accompanied by drainage of lagoons and a vast mosquito removal program. 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 (70 % of this figure is generated on the coast) 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. The back land is rich in cultural historical and natural patrimony, which permits a holiday with varied activities if that is so desired. 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 and 16% for collective residences (vacation centres, family houses, hostels, etc.) (INSEE 2008).



Fig 1: Map of the Languedoc Rousillon and its coastal community resorts (CRT 2011)

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 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 any 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 Czech republic, the majority (84%) of tourists of a 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

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.

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 different types of coastal landscape and morphology in the region of Schleswig-Holstein in Germany. In regard to sea-cliffs, dikes and open coast, the share of open coast and the absolute length of 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 small 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). The evidence however of positive tourist action or willingness to pay more, is mixed. In one survey conducted by responsibletravel.com (2004) and another on behalf of the Association for British Travel Agents (ABTA.com, 2008) the majority of holidaymakers stated that it was important that their holiday did not damage the environment. On the other hand, 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. In a CE study with tourists visiting Sardinia, Brau and Cao (2006) found that tourists were willing to pay 40€ (per person per night in a three star hotel) for lodging in proximity to the sea and 50€ for the option of existence of a marine park or local nature reserve within 30 minutes reach of their accommodation. Considering the tourism value 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 (CVM) and TCM to estimate the willingness-to-pay (WTP) for improved coral reef abundance and consumer surplus 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, Dharmaratne 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

In choice experiments (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 thus based on the behavioural framework of the random utility theory (McFadden, 1974) and Lancaster's theory of demand (Lancaster, 1966). The CE can be used ex-ante to estimate values for any environmental resource, and in particular the implicit value of its specific attributes and their internal ranking (Louviere et al., 2000). By describing 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. We may thus 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. For a greater in-depth description of the CE method, the reader is referred to Bateman et al. 2002.

3.2 Accounting for landscape preferences in the CE model specification

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 (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). Specifically for wind farms, an individual's evaluation of visual impact have been found not only to be based on wind turbines perceived intrusiveness in a specific landscape, but also the degree to which turbines are associated with wider environmental concerns and feelings of personal responsibility to address such issues (Devine-Wright, 2005). As such, we expect tourist preferences to differ according to their characteristics and their activities or motivations for their specific coastal holiday. In the latent class model approach – these 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 consideration 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.

3.3 The latent class model in theory

The latent class model is based on McFadden’s (1974) random utility model and takes preference heterogeneity into account by assuming 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). If x_j describes the attribute of the alternative j and β is a vector of parameters, the probability of individual i choosing alternative j become:

$$\Pr(ij) = \sum_{m=1}^M s_m \left(\frac{\exp(\beta'_m x_{ij})}{\sum_j \exp(\beta'_m x_{ij})} \right) \quad (1)$$

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

$$s_m = \frac{\exp(\lambda_s Z_i)}{\sum_{s=1}^S \exp(\lambda_s Z_i)} \quad (2)$$

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 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 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 projects 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 (the type GE 3,6s offshore) of 3,6 MW each 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

Just as offshore wind turbines have become an attractive fishing ground for anglers in the North sea, it is stipulated that the reefs installing on 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 Rousillon, it is a tough fact that the Spaniards 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'd 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. 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 be 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.

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, -20, -5, +5, +20, +50, +200] EUR		

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 full-scale study, whenever a tourist would be staying more or less than a week, the interviewer would calculate his weekly accommodation price, so that he could easily relate to the choice set prices. 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 to take 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. The purpose of these questions is to be able 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 questions they were presented with in the subsequent 8 choice sets. 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 choice experiment questions are discussed further below. The fourth section followed up on the choice-set questions, so as to identify protest bidders and lexico-graphic 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). In the following section, the choice experiment attributes are explained in detail.

5.2 Choice experimental design

With 8 payment levels⁴ 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 minimised by Ngene (ChoiceMetrics 2010)⁵, 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 Rousillon 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 grouping 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

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.

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

```

FIGURE 3: CHOICE SET EXAMPLE



+ 50 € / week / adult

Destination A: Coherent environmental policy and offshore wind farm at 5 km with associated recreational activities.



- 20 € / week / adult

Destination B: Offshore wind farm at 8 km with associated recreational activities.

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 enhancement. This resulted in a total of 339 individuals and 2712 choice set observations.

6. Results

6.1 Latent class covariates

Upon testing of the respondent 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 holiday destination choice as well as his socio-demographic characteristics were likely to affect the latent preference segment that the tourists belongs to. In particular, the age segment, their nationality, their degree of loyalty to the tourist resort, and their motivations for visiting (aside from profiting from the sun and the sea). Table 2 describes the socio-demographic characteristics of the sample and their trip characteristics and Table 4 shows the segment membership coefficients.

Individual tourist respondent characteristics		In LC model	MEAN	S.D	Min	Max
Mean household income (€)			6,3	3,7	1	14
Income (1,2,3 coded dummy variable)			1,92			
1 (%)	<2001		0,38			
2 (%)	2000-3500		0,31	0,83	1	3
3 (%)	>3501		0,31			
Higher education (%)	Has done at least 2 years of university studies		0,51	0,5	0	1
Female (%)			0,59	0,49	0	1
French tourists (%)			0,73	0,44	0	1
International tourists (%)	Of any origin other than French		0,27	0,44	0	1
Northern European (%)	The tourist is either of Scandinavian, English, Belgian, German, Suisse Luxembourg or Dutch origin (predominantly English and German)	x	0,26	0,43	0	1
Age (years)			37	14,6	17	81
Retired	The tourist is on retirement	x	0,08	0,26	0	1
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	Those tourists have spent their vacation several times at the coastal resort where they were interviewed, or a neighbouring one.	x	0,52	0,50	0	1
Visiting tourists	"Visiting friends or family" was an important or very important element during the tourist's vacation.	x	0,22	0,41	0	1
Culture, history and patrimony enthusiasts	"History, culture and patrimony" were very important elements during the tourist's vacation.	x	0,15	0,40	0	1
Landscape enthusiasts	"Landscape and nature appreciation" were very important elements during the tourist's vacation.	x	0,44	0,49	0	1
Sea and Sun	Enjoying the sun and the beach was a very important element during the tourist's vacation.		0,77	0,42	0	1

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

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 4 reports their values together with the number of parameters for the three models. The criteria used – Log likelihood, adjusted ρ^2 , AIC and BIC indicates better performance for 4 segments. However 4 segments result in some of the classes being very small and with small differences in preferences between these classes. Thus the 3-segment solution was chosen for all three models. 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	-2198,75	0,259	1,637	1,683
3	35	0,23;0,42;0,35	-2125,06	0,283	1,591	1,667
4	49	0.28;0.26 ;0.19;0.17	-2081,64	0,294	1.571	1,655

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

6.3 Estimated parameter results

By consulting the estimated parameters in table 5, one may observe a large difference in preference structure between the three tourist population segments. Broadly speaking, segment one (visitors and loyal tourists) and two (Northern European, 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 no matter whether it is 5, 8 or 12 km offshore. Well in correspondence with other studies, their experienced visual disamenity costs decrease as the wind farm is further from the coast. 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 three; 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.

	SEGMENT 1 French, Visitors of family or friends, Loyal LR tourists.		SEGMENT 2 Northern European, Cultured, Loyal LR tourists, Younger and mature.		SEGMENT 3 French, retired, landscape enthusiasts, non historically and culturally interested	
	Parameter	Std error	Parameter	Std error	Parameter	Std error
Alternative specific constant	-1,07	0,40**	-0,11	0,32	0,00***	
Retired	-0,94	0,73	-1,00	0,59*	0,00***	
Northern European	0,44	0,48	1,10	0,38***	0,00***	
Culture, history and patrimony motivated holiday	0,18	0,66	1,11	0,50**	0,00***	
Landscape enjoyment motivated holiday	-0,27	0,37	-0,97	0,34***	0,00***	
Visit of friends and family motivated holiday	0,86	0,37**	-0,03	0,33	0,00***	
Loyal LR tourist	0,71	0,36**	0,73	0,31**	0,00***	

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

Table 4: Segment membership coefficients

	SEGMENT 1 Visitors, Loyal LR tourists		SEGMENT 2 Cultured, Northern European, Loyal LR tourists		SEGMENT 3 Retired, French, Landscape enthusiasts	
	Parameter	Std error	Parameter	Std error	Parameter	Std error
%		22,7%		42,1%		35,2%
ASC	-1,40	0,35***	-0,01	0,15	-0,79	0,10***
Environmental policy	2,50	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***

Number of observations: 2712

Number of individuals: 339

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

Table 5: Latent class model estimates

	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]

Table 6: Latent class model estimates and marginal WTP / WTA

6.2 Willingness to Accept Compensation and Willingness to Pay

The parameter estimates presented in the result section are translated into marginal WTP/WTA according to Eq. 3 in table 6. 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 rebate⁶ 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 perceives 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 farm⁷. 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 7 column 1). This is well in accordance with findings from other studies (Ladenburg and Dubgaard 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 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 association⁸, gave evidence that Northern Europeans were in

⁶ For those who were living for free during their vacation.

⁷ The average accommodation price is 202 EUR/week per adult

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

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 system⁹ 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 7. The LC model point to a very slight increase in tourist revenues of about 6 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 116 EUR. With the average tourist paying 202 EUR per week per adult in accommodation price, 116 EUR implies that the coastal community resort would need to cut accommodation prices more than 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 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 (column 4). This 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, Dixon et al., 1993, Arin and Kramer 2002, Williams and Polunin 2000).

	No environmental policy, no wind farm 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 €	101,4 €	40,0 €	141,5 €
Wind farm 5 km offshore	-116,3 €	-14,9 €	-76,3 €	25,1 €
Wind farm 8 km offshore	-81,3 €	20,1 €	-41,3 €	60,1 €
Wind farm 12 km offshore	3,0 €	104,4 €	*42,9 €	*144,4 €

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

Table 7: Value per person of wind farm siting under different policy management scenario – weighted across LC segments.

7.3 Implications for the tourist and wind energy industry

At first glimpse, the results point to a revenue maintenance for the tourist industry in the municipalities with a view to a wind farm at 12 km from the shore, and a potential loss when the wind farm is 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,

⁹ In an upcoming paper look closer at how respondents’ energy policy opinion, concern about climate change and confidence in wind power technology influences their landscape preferences.

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 the most demanded clientele, of Northern European origin, with destination loyalty, enjoying (and spending on) the cultural and historical activities in the LR, whereas segment three are non-loyal tourists. Wind farm implantation at 12 km offshore thus indicates a change in tourist composition in the desired direction. Similarly, in the quest for more segment two tourists, our policy recommendation is that concerned municipalities should endorse efforts to render the tourist station more sustainable (whenever a wind farm is located at 8 km or less from the shore), while using the wind farm to signal this effort (column 2 and 4 table 7). 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 is 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

A large body of evidence suggests a large asymmetry between WTA and WTP format for hypothetical values, and that WTA responses may be several times larger than WTP responses for the same change (Freeman 1993). We attempt to correct for this asymmetry in upcoming work. There is also some reason to argue that the WTA / WTP welfare estimates provided are higher bound. 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) Indeed, in this survey some segments show surprisingly high payment or compensation quantities, of up to more than 100% of the actual weekly accommodation price they were paying. 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 Rousillon, 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 8 km from the shore could be “compensated for” through the simultaneous “greening” of the tourist resort. Finally, if in addition a wind farm was associated with artificial reefs and recreational user access, our results point to an actual rise in tourist related revenues, or revenue maintenance if the wind farm was as close as 5 km from the shore. 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 do only predict a slight rise in tourist demand, but also 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.

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