Social acceptance of wind energy:
The case of Skyros, a Greek non-interconnected island in the Aegean Sea

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Abstract

Although many regions enjoy an optimal wind potential, the expansion of wind farms is not universally accepted. Fierce local opposition, such as the opposition met by Skyrian people to a wind energy project that was proposed in 2011, may be a constraining factor in achieving the transition to a low carbon energy mix. We use a choice experiment to determine the core drivers of public opposition to wind farms and provide insight into how to enhance local acceptability with an application to a Greek non-interconnected island. Unlike previous CE applications we suggest the use of a discount in house value that respondents would be willing to endure in order to obtain a project with more preferable characteristics. We suggest that the use of house discount value as payment vehicle possesses interesting characteristics for the analysis. 108 valid questionnaires were collected with face-to-face interviews. Results of the CE using a mixed-logit model indicate that among the non-monetary attributes, investments with respect to wildlife protection have the biggest impact on respondents' utility and consequently the highest implicit price. In addition, through a complementary questionnaire section, suspicion about the developers of a potential future wind energy project was apparent. Overall, results from this empirical study can constitute practical tools for future energy policies.

Keywords*:* Wind energy project, choice experiment, social acceptability

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1. Introduction

In recent years, there has been an increasing trend towards renewable energy for electricity generation. The main reason for this turnover, away from fossil fuels, is the great potential of renewable energy to reduce CO2 emissions and tackle climate change. On track with the 20-20-20 European energy targets, EU member countries should fulfil at least 20% of their energy consumption from renewable sources by the year 2020 (EU roadmap 2011). Although Greece is well on track[3] (European Commission report 2017) to reach its target of 18% renewable share by 2020, we should keep in mind that by promoting the production of renewable energy, Greece will be in position to reduce its dependency on imported oil and gas (44% of its energy consumption is covered by imported petroleum products and 13% from imported natural gas) and improve its security on energy supplies (national-level benefit), let alone the potential from employment stimulation through the creation of "green" jobs.

Petroleum products continue to be the main source of electricity mostly in non-interconnected Greek islands (local diesel generators). To subsidise the electricity tariffs, extra costs retrieved by a public service obligation reached the 720m€ in 2016. The indigenous lignite is another energy source, accounting for around a quarter of gross inland energy consumption through electricity generation. Environmental and economic organizations often underline the hazardous character of lignite power plants for Greece's economy, the environment and public health. Furthermore, lignite plants do not provide the flexibility to integrate renewable energy sources.

On the other hand, Greece enjoys a remarkable wind power potential with local average wind speeds often exceeding the 8-10 m/s, especially in the Aegean Sea islands. The total wind power capacity reached 2,374.3 MW at the end of 2016 (up 11% from 2015 despite the challenging macroeconomic situation) and according to the Hellenic Wind Energy Association (HWEA) only 321.2 MW are produced in the NII islands. Recently a framework was approved by the EBRD to help finance new wind power generation and electricity infrastructure projects. Based on this it is anticipated that Greece could add 2.4GW of new renewable capacity by 2020. However, even though Greek citizens are mostly in favour of wind energy (IEA, 2009), a very common phenomenon that is being observed is opposition to wind farm installations from local communities. In order to encourage wind energy diffusion, it is essential to take into

[3] 15.5% share of renewables in total gross final energy consumption in 2016

consideration the social aspects that influence the acceptance of climate-friendly technologies and understand the main reasons of public opposition at a regional level.

Despite the large local and national benefits[4] that arise from wind energy projects, wind turbines are often perceived to be sources of negative externalities. The most commonly reported externalities are the negative impacts on visual aesthetics (preferences of natural and untouched landscapes (Ulrich 1993)), noise pollution and threats to the local flora and fauna. Accordingly, even though high social support for wind energy has been empirically ascertained in Greece (Koundouri et al. 2009), there is a high level of local opposition to wind farm initiatives at the same time (Kontogianni et. al. 2013). This "social gap" (Bell et. al. 2005) between publicly declared support and individual acceptance of wind energy projects is generated due to the contrast between the locally incurred externalities and the universally harvested gains on the battle against climate change (Bell et. al. 2005). It is thus crucial to clarify the main drivers of public opposition in order to accelerate the diffusion of wind power technology and avoid likely delays and cancellations of forthcoming projects. Otherwise, the increasing levels of resistance might put regional and global future energy targets at risk.

This paper provides quantitative evidence about the local acceptability of wind farms in Skyros, a Greek non-interconnected island in the Aegean Sea. This island offers a very favourable environment for wind energy generation since it exhibits average wind speeds more than 10 m/s (Appendix 1.1). In 2011 a wind energy investment plan was submitted aiming at the installation of 9 wind parks, comprising 111 turbines[5], 60 of which were projected to be installed inside a protected area NATURA[6] 2000 (App.1.2, 1.3). Soon after, the project was cancelled due to strong opposition from the local community. Taking this fact as motivation, the main purpose of our study is to understand people's preferences towards wind farms in order to alleviate the obstacles to new installations in Greece.

Data for our research was collected with face-to-face distributed questionnaires and a number of interviews. The author was constantly present during the full length of all responses. A choice experiment was employed in order to capture individuals' willingness to trade-off between 5 different attributes of a hypothetical wind energy project. The conditional logit (CL)

[4] *Private*: discount in electricity bills, new job opportunities, *Public*: compensations, less air pollution,
[5] approx.125m tall each, 333 MW overall
[6] Greece has 1/4 of its land designated as Natura

model was initially utilised followed by the mixed logit (ML)[7] to account for unobserved variation in preferences. Additional interaction terms were included in two extended models. More sections were incorporated in the questionnaire to acquire general information about awareness on environmental and energy issues and to investigate if lack of trust has been a key driver of the expressed opposition. Survey information provided a broader picture about individuals' profile and revealed several critical behavioural drivers.

The fundamental difference of our CE analysis compared to earlier studies is the utilised payment vehicle. The WTP is measured by respondents' willingness to endure a fractional discount in their house value. The reduced value was assumed to express the amount that individuals would pay for a better level of a given attribute. The novel idea to employ this payment vehicle for our CE was inspired by empirical literature evidence. According to Gibbons (2014), a reduction in real estate prices (by roughly 1.5%) within 14km proximity to wind farms has been observed after new installations particularly due to the perceived visual intrusion and other sorts of externalities. Moreover, Sims and Dent (2005) suggest that both proximity and visual contact with tall power infrastructure have a significantly negative impact on house transaction prices.

Our results suggest that protection of local wildlife is the attribute with the biggest impact on social acceptance of wind farms (highest WTP). In addition, the lack of trust to potential developers of a future wind energy project is apparent. Overall, the results confirm the existence of considerable preference heterogeneity in our sample.

2. Literature review

2.1 The main drivers of social acceptance

Local resistance to wind power is often explained by the NIMBY (Not In My Backyard) behavioural phenomenon. However, according to modern literature (Wolsink 2007), the NIMBY hypothesis is a very simplistic explanation of social attitudes towards renewable technologies. Recent studies have revealed the relative weight of specific elements to the configuration of subjective perceptions about renewable installations. Krekel and Zerrahn (2016) argue that the main drivers of social acceptance for renewable energy projects are socio-psychological, contextual, socio-economic and spatial factors. More analytically, the broader

[7] Also known as random parameter logit (RPL)

international research community which studies the role of social acceptance for the acceleration of clean energy deployment decodes the former factors to awareness, perceived procedural justice, costs and benefits evaluation, and trust in stakeholders. According to POLIMP 1st policy brief (2014), the aforementioned factors influence the public stance towards wind energy projects considerably.

Several researchers have provided empirical evidence regarding the effect of wind farm characteristics on their endorsement from local communities. Jan Zoellner et al. (2008) for example have emphasized the importance of the location choice for a successful wind energy project. The site selection is a determining driver of social acceptance since strong opposition due to place attachment and anticipated ecosystem degradation has been repeatedly reported in past projects (Firestone et al. 2009). Furthermore, a recent empirical study by Steve Gibbons (2014) shows that visibility of wind turbines can affect local house prices negatively. If real estate buyers and sellers perceive wind turbines to be a source of visual disamenity that could potentially affect well-being negatively, it is anticipated that houses will become undervalued soon after the installation of the wind-farm. Inappropriate location choice can thus enhance negative attitudes towards wind farms.

It is also very common for governments to suspend or fully cancel wind energy initiatives when locals argue that there is no procedural or distributional justice. Zoellner et al. (2008) strongly argue that involving local residents into the planning and installation processes is necessary in order to increase support at a local level. This is also supported by Dimitropoulos and Kontoleon (2009) who suggest that community co-management schemes can potentially increase the odds for a fruitful agreement that would benefit both sides. Furthermore, empirical evidence suggests that public and private community benefits can often transform initial opposition into acceptance (Dutschke and Wesche 2015). On the other hand, leaving the local community aside the planning process and without any compensatory benefits is anticipated to increase the potential for misunderstanding and create negative stances towards wind farms.

2.2 Earlier CE studies

Bergmann et. al. (2007) explore the perceived environmental impacts of future renewable energy constructions by applying a CE in several districts of Scotland. In their study they utilize a ML model with five attributes (impact on air pollution, wildlife impact, landscape impact, number of created jobs and annual increase in electricity bill). All parameter estimates appear to be significant and signs are in accordance with expectations. Although preferences are different between urban and rural households, reduction in air pollution and reduced impacts on wildlife are the most valuable attributes for the whole sample. As a last step in their analysis, they include interactions of the constant term with socio-economic variables and show that both education and age affect respondents' choices.

Dimitropoulos and Kontoleon (2009) investigate the local acceptance of wind power in two Greek Aegean islands (Naxos and Skyros) employing a choice experiment based approach. By revealing the attributes of a wind energy project that are relatively more important in each island, the authors attempt to detect similarities and disparities between preferences in these two communities. The attributes entered in their study are the location choice (Out of/ In a Natura protected area), the institutional structure of the project (planning with/without the cooperation of local representatives), the turbines height (50/90m), the wind farm size (2-6, 7-13, 14-20, 21-40 turbines), and the annual subsidy received by local residents as compensation (50/100/200/300€). Willingness-to-accept welfare measures are estimated for each attribute. Results from the pooled sample indicate that locals are more averse to projects that involve the installation of turbines in wildlife conservation areas. Moreover, a collaborative planning process is valued more than the number or height of the turbines. It is noteworthy that a higher MWTA was stated in Skyros, which is probably explained by the fact that locals knew that a wind energy project was planned to be implemented soon in their island (2011).

Aravena et. al. (2008) utilize a ML model to account for unobserved heterogeneity in preferences towards wind farms in Chile. They include 4 attributes in their choice cards (Location choice; Percent of birds that could die each year from the turbines; Total area covered in football pitches; Price) and taste parameters (β_i) for all attributes besides from price are assumed to be random and follow a normal distribution. Using 500 Halton draws, their results indicate that mean parameter estimates and standard deviations of all three random parameters are significant at the 1% level and with the expected sign. Mountainous and coastal areas seem to be the most disliked locations compared to offshore and inland infrastructures, while on average, respondents prefer projects that diminish the impacts on wildlife (birds).

Finally, in a national survey in Sweden, Ek (2002) asked 1000 electricity consumers to evaluate the environmental attributes associated with wind power generation. She includes five attributes in her analysis labelled as: noise level, location, height, number and price. Results from the CE suggest that the most influential attribute was the location of the turbines. More succinctly, installations in mountainous areas are perceived to be sources of ecosystem degradation when compared to coastal areas.

3. Case study

3.1 Questionnaire design

Our questionnaire was comprised of 5 sections. An overview of the wind energy project that was proposed to Skyros back in 2011 and a short description of the island's natural environment were followed by the first group of questions that aimed to capture attitudes towards the local environment. Responses to some of those questions are presented in table 2. Sections 2 and 3 include questions related to attitudes towards climate change, wind energy and the level of awareness about the current energy regime in the island. Section 4 includes five choice experiment dilemmas. In section 5 interviewees were inquired to evaluate the costs and benefits that a realistic wind power project, with similar characteristics to that proposed in 2011, would imply for the local community. Section 6 includes a few questions regarding trust towards hypothetical cooperation schemes for future wind energy initiatives in the island. In the last part of the questionnaire socio-economic information was collected.

3.2 Choice experiment design

According to Holmes et. al (2017), the selected attributes and their levels included in choice experiments should be realistic for respondents, easy to understand and relevant to the respective research question. For this reason, we give a short justification for the inclusion of each attribute clarifying why it is relevant to our case study.

- "Natura" attribute was deemed relevant because in 2011 the majority of turbines were planned to be installed inside Natura, a protected area which is house to many rare animal and plant species. The location choice is thus believed to be a significant driver of public opposition in our case study.

- The motivation behind the inclusion of "Wildlife" attribute was that the population of the Skyrian pony, one of the rarest horse breeds in the world and a protected species has recently declined to only about 200 ponies on Earth (National Geographic 2016), most of which live in Skyros. Empirical evidence (Bergmann et al. 2006) suggests a significant negative impact of renewable energy projects on wildlife as perceived by local populations. We thus anticipated wildlife protection to be a priority for locals as they seem quite attached to the pony and other features of the local ecosystem.

- According to Gibbons (2014), visibility of wind turbines can have a negative impact on the value of neighbouring houses. In our CE we assumed that by accepting a larger decrease in their house value respondents reveal their willingness-to-pay for the project with the most preferred characteristics. Negative WTP values denote the compensation required through an increase in respondents' house value so that their utility will remain constant. Using the decrease in house value as a payment vehicle is a new and original approach. The main innovation arises from the fact that this variable is not bounded by current income. One thought is that the use of this payment vehicle could be perceived as an "indirect hedonic pricing model" since participants are implicitly asked to state how much they would be willing to buy their house in the future. WTP results could be interpreted in this way for instance; if WTP for the Wildlife attribute equals €6000, this would mean that the respondent, if he was to buy the same house in the future, he would be prepared to pay €6000 more if the wind energy project included wildlife protection measures.

- In 2016, the head of the only local hospital in Skyros was prosecuted for using a fake university degree. Hired in 2000, he deceived the local population for as many as 16 years implying that local health services are not credible. We therefore assumed that an upgrade of the local health system would be an indispensable compensatory benefit.

- Since the project in 2011 included 111 turbines and was cancelled due to local resistance, levels for "Number" attribute were chosen on the basis that less turbines (max. 90) would be proposed in a potential future project. This assumption was confirmed at a later stage by talking to citizens that were more involved with the issue back at the time. They openly admitted that the number of turbines was a critical driver of the expressed opposition.

All attributes with their respective levels can be found in table 1 here below.

Table 1. Attributes and their levels

Attribute	Description	Coding	Levels
Natura	Installation of the turbines outside/inside Natura 2000	OUTSIDE=0 INSIDE=1	2
Wildlife	Investments in wildlife protection as a compensatory public benefit	NO=0 YES=1	2
House value	Fractional discount in house value as a WTP welfare measure	NO discount=0 1% discount=1 3% discount=2 5% discount=3	4
Health	Upgrade of local health services securing all the necessary medical specializations	NO=0 YES=1	2
Number	Number of wind turbines for installation	10 turbines=0 30 turbines=1 60 turbines=2 90 turbines=3	4

Pictures of each attribute were shown to participants before filling out the CE to make the scenario more realistic and eliminate hypothetical bias.

Figure 1. Pictures of the attributes

From figure 2 it is noted that no status quo option is included in our CE. Arguments supporting this decision are discussed below.

Figure 2. Choice card example

Attributes \ Project	A	B
Inside or outside Natura 2000	Outside	Inside
Investments with respect to wildlife protection	Yes	Yes
House value reduction	3%	1%
Upgrade of local health services	No	Yes
Number of wind turbines	10	60
Please select A or B	◯	◯

First of all, as the wind energy project in 2011 was blocked due to extreme local opposition, we expected that some respondents with positive implicit prices would select the status quo option as an expression of protesting. Moreover, those with positive implicit prices could have chosen the status quo alternative to hide their preferences and free-ride on other people's WTP. A second argument is that respondents sometimes simply stay with the status quo option as the easy way that demands less cognitive effort. Generally, had the status quo alternative been the most preferred for the majority of our sample, it would have been extremely hard to identify attitudes with respect to wind-farm characteristics. Yet we ought to acknowledge that by not including this option, our welfare measures are hypothetical. However, this is a minor issue since the aim of this study is to understand the relative importance of the factors influencing the social acceptance of wind farms.

One step before the final format of our CE, a fractional factorial design was undertaken to eliminate correlation between attribute levels so that the independent effect of each attribute on individual's utility could be estimated. According to Holmes (2017), a good experimental design must contain adequate independent variation among attribute levels within and across alternatives so that the effect of each preference parameter can be identified. Out of 128 possible choice sets[8], the orthogonal design returned a subset of 32 cards. After deleting the cards where choices do not add relevant information, 26 pairs deemed appropriate to include in the final survey. Following the orthogonal design process, the order of the choice cards was randomized and 5 cards were presented to each respondent.

3.3 Sample and data collection

The sample frame was the adult population of the island (over 18). 118 responses[9] were initially recorded with face-to-face digital questionnaires and the response rate was over 90%. Our final sample comprised 108 valid responses (4.3% of total population) which is highly representative. Complementary qualitative data was collected during interviews with key agents (e.g. the Mayor of the island, members of the local government and its opposition parties) who were well-informed about local issues. Data was collected in two different time periods. The first research trip took place by the end of March 2017 and the second in the beginnings of June 2017. Responses were also collected during weekends in order to include the workforce into the survey. Questionnaires were distributed using a probability sampling method to assure that different units in our population have equal probabilities of being chosen. Each day was divided in four parts (morning, noon, afternoon, evening) and the most densely inhabited area was divided in four segments according to google maps. We stayed 4 days in the island and followed the below analytical arrangement. The first morning we collected data from houses located in district 1, we spent the noon in district 2, afternoon in district 3 and finally district 4 during the evening. The second day we followed the sequence
2-1-4-3 and so on (3-4-1-2, 4-3-2-1).

Since it is widely suggested that a pilot study should precede the main survey, we gave out 12 questionnaires randomly through email and came in touch with respondents (phone) upon completion to discuss whether they faced any problems while filling it out. The pilot questionnaire was also asking respondents how interesting and relevant they found it. Feedback on those concerns helped us proceed further and adjust our survey in order to minimize cognitive problems and make it as interesting as possible for participants. In addition, telephone communication with a few locals provided a more spherical picture about the current circumstances and helped us adjust the questionnaire up-to-date before visiting the island. Throughout these talks it emerged that locals have very divergent preferences over the attributes of wind energy projects suggesting that the RPL would probably be the most suitable model for our study.

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[8] The maximum number of possible combinations is the product of all attribute levels: 2*2*4*2*4 = 128

[9] protesting behaviour or too much missing data made 10 responses invalid

Lastly, in order to diminish selection bias, participants were requested to fill out the questionnaire even if they claimed to be unfamiliar with energy issues and the particular wind energy project that was proposed in 2011. This was a strategy to bring together independent opinions and not only those that were strongly in favour or against wind farms. Descriptive statistics of selected demographic variables are presented in Table 2.

Table 2. Descriptive statistics

Sample size	108
Variable	
Gender (%)	
male	57.5%
female	42.5%
Age (average in years)	44
Education (%)	
Primary	3.7%
Secondary	3.7%
High school	40%
Technological educational institute (TEI)	12%
University (AEI)	32%
Master/Ph.D.	9%
Full-time employment (%)	68.5%
Average number of people in the house	3.3
Household monthly income before tax (%)	
<1000€	34.2%
1000-2000€	34.3%
2000-3000€	10.0%
3000-4000€	2.8%
4000-5000€	3.8%
5000-6000€	6.5%
>6000	8.4%
Average estimated house value (€)	125000
Heard about renewable energy sources (%)	95%
Know that Skyros is a NII (%)	85%
Know that 100% of the energy demand for electricity is produced locally by a diesel generator (%)	78%
Know that the wind energy project in 2011 involved the installation of 60 turbines inside Natura (%)	87%
Mount Kochilas plays a significant role in their personal well-being	65%
Member of environmental organisation (%)	11%
Proportion that recycle always or sometimes (%)	92%

Table 2 illustrates that the average age of the sample is 45 years while 57.5% of respondents are males. Over 68.5% of participants reported a monthly family income of less than 2000€ before tax. Average household size is 3.3 people, while the estimated house value for an average respondent is 125000€. More than 50% of respondents hold higher education diplomas, whereas 40% have only completed secondary studies. In addition, 68.5% of respondents are full-time employed.

Although only 11% of the participants are members of environmental organizations, yet 92% recycle always or sometimes and 95% have heard about renewables. Moreover, approximately 90% of the sample were informed that 60 turbines would have been installed inside Natura area had there been no resistance from locals in 2011. Finally, regarding the existing energy regime in the island, the vast majority (85%) are informed that Skyros is a NII, while roughly 80% of respondents know that the energy demand for electricity in the island is covered exclusively by a local diesel generator.

4. The choice experiment methodology

4.1 Lancastrian approach to consumer theory

The choice experiment methodology is based on the Lancastrian approach and assumes that individual *n* gains utility from the attributes or characteristics of a good, and not directly from the good itself (Lancaster, 1966). Following the Random utility theory (McFadden, 1974), we assume that individual's n utility function for alternative i, denoted U_{ni}, is composed of two elements; the first of which V_{ni} is observable by the analyst, while the second ε_{ni} is unobservable and is assumed to be independently and identically distributed with an extreme-value distribution (IID or Gumbel).

$$U_{ni} = V_{ni}(X_{ni}) + \varepsilon_{ni} = \beta X_{ni} + \varepsilon_{ni} \qquad (1)$$

Assuming a linear in parameter utility function, the *deterministic part* can be expressed as:

$$V_{ni}(X_{ni}) = \beta_n * X_{ni} + \gamma_n * c_{ni}, \qquad (2)$$

where β_n is the parameter vector corresponding to the non-monetary attributes for the individual *n*; X_{ni} is a vector representing the nonmonetary attributes, γ_n is the parameter corresponding to the monetary attribute ("House value" attribute) and c_{ni} represents the price attribute of alternative i as faced by individual *n*.

In our study, choice sets were composed of two generic alternative wind power projects and individuals were asked to choose the most preferred one. Utility maximization assumes that respondent *n* will choose alternative *i* over alternative *j* if it generates a higher utility compared to any other alternative in each choice set: $U_{ni} > U_{nj}$, $\forall j \neq i$.

The probability of individual n choosing alternative *i* is:

$$P_{ni} = P\ (V_{ni} + \varepsilon_{ni} > V_{nj} + \varepsilon_{nj}), \qquad (3)$$

more specifically: $$P(U_{ni} > U_{nj}) = \exp(\mu V_{ni}) \Big/ \sum_j \exp(\mu V_{nj}) \quad \forall j \neq i, \qquad (4)$$

where μ is a scale parameter that is inversely proportional to the standard deviation of the error term. If there are only two alternatives, the observed choice can be viewed as drawing from a binomial distribution.

Once the coefficient estimates are computed, it is possible to obtain the marginal rate of substitution (MRS) between attributes. Theoretically, it is calculated as:

$$\text{MRS} = -\left(\beta_{\text{attribute X}} / \beta_{\text{attribute Y}}\right) \qquad (5)$$

Provided the inclusion of a welfare valuation measure in the choice model, it is possible to estimate the marginal WTP (or WTA) and acquire a range of information on trade-offs among the attributes of the project.

4.2 Limitations of the CL model

The first model we employed in our study was the conditional logit. At this point we provide a short explanation of the three limiting assumptions which characterize this model.

A first limiting property of this model is how it handles unobserved heterogeneity. Heterogeneity arises for example from different values being held by respondents about the potential impacts of wind farms. The CL model assumes that preferences are homogenous across respondents, a strong assumption that might not always be satisfied (Train, 2009). Second, project choices exhibit the Independence from Irrelevant Alternatives (IIA) property (Luce, 1959). If adding (or removing) an alternative project affects unequally the probability of selecting the initial alternatives such that the ratio of choice probabilities changes, then a violation of the IIA property occurs. Third, the CL model assumes that the unobserved factors that influence choice are uncorrelated over a repeated number of choices made by the same respondent (Train, 2009). However, in real life a respondent who dislikes a project inside Natura because s/he is extremely attached to the site will probably not consider "Inside Natura" level option in any of the choice sets provided. In this case, the unobserved characteristics of the respondent will lead to correlation rather than independence between the choices made.

4.3 The RPL model

Given the CL limitations, a RPL model was employed. To start with, the RPL model provides a great width within which individual unobserved heterogeneity can be specified. It allows for both taste variation across respondents and error correlation across choices made by each respondent (Train 2009). Moreover, the restrictive IIA property no longer holds. Application of the RPL requires selecting which parameters to include as random and how to set their distribution. Random parameter selection can be done by starting with all parameters as random and then working backwards by identifying those with statistically insignificant standard deviations (when the s.d of an attribute is insignificant, all behavioural information about it is captured by its fixed mean (Hensher and Green, 2003)).

Under the RPL, the deterministic component of utility V_{ni} in the random utility model takes the form of:

$$V_{ni}(X_{ni}) = \beta_n{}' X_{ni} + \varepsilon_{ni} \tag{6}$$

where $\beta_n{}'$ is a vector of random utility coefficients which has its own mean and variance and X_{ni} is the vector of attributes found in the i_{th} alternative. The errors are IID extreme value distributed. The probability that individual n will choose alternative i from the choice set C is now:

$$P_{ni} = \int [({\exp(V_{ni})} / {\sum_j \exp(V_{nj})}) * f(\beta) d\beta], \tag{7}$$

where f(.) is the distribution of the random parameter. If the parameters are fixed (non-random), the distribution collapses.

4.4 RPL model specifications

The RPL model includes random parameters to reflect a range of preferences. Our basic RPL model includes the same parameters as the CL model but it treats all of them as random. From the early stages of our survey, it was believed that most attributes incorporate a large degree of unobserved heterogeneity and this expectation was confirmed by several discussions and interviews in the research field. It turned out that some respondents had stronger opinions than others regarding the attributes of wind farms and that each respondent was influenced by different aspects of these features (e.g. women appeared to be more concerned about health care compensatory benefits than men).

The extended RPL model includes additional explanatory variables in the form of interaction terms. All models were estimated over a range of draws since confirmation of stability for a model is crucial (Hensher 2001). Results stabilised after 500 draws and therefore the distribution simulations were based on 500 Halton draws (the accuracy of the results increases with the number of draws, Bhat 2001). In addition, the standard errors were clustered by respondent in both models to account for correlation between the choices made by the same respondent.

5. Empirical results and interpretation

5.1 CL model

Table 3 shows that all coefficients are significant at the 1% conventional level and take the expected sign. Results indicate that on average respondents prefer a smaller decrease in the value of their house, installation of the wind farm outside Natura, a smaller number of wind turbines, investments in wildlife protection and an upgrade of the local health services. The price attribute which has a negative coefficient, as anticipated, implies that the probability of selecting an improvement in another attribute decreases as the necessary discount in respondents' house value increases. Remarkably, "Wildlife" has the largest parameter estimate indicating that respondents have a very strong preference towards investments with respect to wildlife protection compared to the baseline of no investments at all. The number of the turbines and an upgrade in local health services seem to be the least relevant attributes.

Table 3. Results

	CL	RPL	
Variable	(Coeff.)	(Coeff.)	(S.d)
Natura	-0.585***	-1.051***	2.022***
	(0.175)	(0.329)	(0.494)
Wildlife	0.637***	1.115***	1.459***
	(0.169)	(0.291)	(0.419)
Housevalue_m	-9.71e-05***	-0.000189***	
	(3.39e-05)	(5.21e-05)	
Health	0.484***	0.916***	0.655
	(0.152)	(0.248)	(0.558)
Number	-0.448***	-0.790***	0.758***
	(0.0880)	(0.165)	(0.210)
Pseudo R2	0.1383		
Log-likelihood	-323.11693	-306.72589	
Observations	1,080	1,080	1,080

Note. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

5.2 Why is the RPL model more suitable in our case study?

First of all, the increase of log-likelihood[10] indicates an improved overall fit of the RPL model compared to the CL. Moreover, the RPL provides more information than the CL as it estimates the extent to which respondents differ in their preferences towards project attributes. The standard deviations of all coefficients besides from "Health" are significant, indicating that this model provides a better representation of the choice situation than the CL which assumes same coefficients for all respondents. Mobile communication with locals at an early stage and qualitative information from the news suggested that Skyrians have quite divergent opinions about wind energy. Consequently, we thought that allowing the coefficients to vary across decision makers would be vital for our analysis. Another option would have been to allocate individuals in different classes depending on socio-economic variables (and attitudes) and undertake a latent class analysis. However, more observations would be necessary for this method to be efficient and meaningful.

[10] The RPL model maximizes the likelihood that coefficients are closest to the real population.

5.3 RPL Results

As already noted, in this model the coefficient of the price attribute is fixed and the other attributes are assumed to be random and normally distributed. Also, coefficients represent the mean of the random parameters' distribution. All parameter estimates are strongly significant at the 1% conventional level. The log-likelihood ratio (LLR) test for the joint significance of the standard deviations rejected[11] the null hypothesis that all standard deviations are equal to zero. In addition, table 3 shows that the s.d for all attributes (besides from Health[12]) are significant at the 1% level which confirms our expectation that most parameters vary across respondents. This result demonstrates the structural advantage of the RPL model. Finally, from table 3, "Wildlife" and "Natura" seem to be the most influential project characteristics. Remarkably, a study in Scotland by Bergmann et. al. (2006) concludes that reducing the impacts on wildlife is amongst the two most preferred attributes of a wind energy project.

A first remark from the results is that the standard deviation estimates are large relative to the mean effects, indicating that respondents have reverse preferences (opposite signs) for some attributes (Train 2009). For instance, respondents on average dislike the idea of installing the turbines inside Natura (coefficient's mean= -1,051) but a fraction of them has a positive preference for that attribute since the standard deviation (2,022) is greater than the mean. The same applies to the "Wildlife" attribute (β=1,115 and s.d=1,459). On average, respondents are positively motivated by the idea of investments with respect to wildlife protection whereas a proportion of them is not sensitive to this attribute.

The estimated average preferences and standard deviations of the RPL coefficients provide information on the share of the sample that places a positive value on an attribute and the share that places a negative one (Hole 2007). There is significant preference heterogeneity for all attributes besides from health. The probability at 0 of Natura variable (normally distributed) with a mean value of -1.051 and standard deviation 2.022 is roughly 70%[13]. This implies that installing the wind turbines outside of Natura protected area is a positive incentive for more than 2/3 of respondents and a disincentive for the other third. Moreover, the overwhelming majority of respondents (80%) prefer a project that will entail investments in wildlife

[11] LLR=32,78, thus P-value=0

[12] The insignificant s.d indicates that the dispersion around the mean is stat. equal to zero. All information in the distribution is captured within the mean which is enough to represent the whole sample.

[13] Formula: 100*φ(-bk/sk), where φ is the cumulative normal distribution, b it the mean and s the standard deviation of the kth coefficient.

protection. Only a few people (1/4 of our sample) prefer a larger number of turbines to be installed.

MRS values between the non-monetary attributes and the monetary attribute, holding all else constant, are displayed in table 4. The MRS is interpreted as the amount that individuals would be willing to pay (through a discount in their house value) for a better level of a given attribute, or as the amount that they would be willing to sacrifice to avoid a worse level of this attribute.

The ultimate goal pursued in most stated preference studies is to estimate the WTP and confidence intervals. In our study, the Krinsky and Robb (95%) CI for welfare estimates are approximated (Hole 2007). In the following table we apply the MRS to the average discount in house value and obtain the individuals' strength of preferences for each attribute. To recap, in the last section of our questionnaire we asked participants to give an estimate of their house value[14] and the average price in our sample appeared to be 125000€. The WTP was therefore computed as the MRS x Average house value.

Table 4. Average marginal WTP

Attribute	**MRS**	**WTP (CL)**	**WTP (RPL)**	**RPL** [95% Conf. Interval]
Natura	-2.800246***	-6023.4925***	-5556.362*** (2018.216)	[-9511.993 -1600.731]
Wildlife	3.01718***	6555.6783***	5894.573*** (1819.998)	[2327.443 9461.702]
Health	2.436429***	4978.944***	4845.028*** (1515.101)	[1875.485 7814.571]
Number	-2.159644***	-4614.975***	-4176.252*** (1176.217)	[-6481.596 -1870.909]

Note: ***1% significance level. SE in parenthesis

Since all coefficients used in the willingness-to-pay estimations were statistically significant, it is clear that all WTP estimates are highly significant and meaningful too. We can infer that the average respondent would be WTP 5900€ (through a discount in his/her house value) if the project involved investments with respect to wildlife protection whereas s/he is WTP roughly 4800€ to obtain an upgrade of local health services. This implies that it is way more preferable to compensate Skyrians by taking protective measures for local wildlife, rather than offering them better-quality health services. In addition, the WTP to install the turbines inside Natura

[14] Only if they own the property

2000 is -5500€ and reflects the compensation that respondents require through an increase in their house value so that their utility will remain constant. The size of this result suggests that "Natura" is ranked second most significant driver of local preferences towards wind-farms after "Wildlife". Lastly, the "Number" attribute seems to be less relevant compared to other attributes since the MWTA compensation for 10 turbines (base level scenario) is roughly 4200€ less than the MWTA for 30. However, locals are willing to accept 8400€ and 12600€ to install 60 and 90 turbines respectively.

All in all, our CE results suggest that the impact on wildlife and the location choice seem to noticeably affect the acceptance of wind farms in Skyros. As a last remark, when the WTP is estimated with the RPL model, point estimates for all attributes apart from health are approximately 500€ less. Allowing for taste variation results in lower and probably more representative welfare estimates compared to the primary CL model.

5.4 Extended models

Two extended models with four interaction terms each were estimated.

Interaction variables (question number in Appendix 4)

- "Health" attribute with gender. (Q27)
- "Number" with the anticipated benefits from a wind project. (Q20)
- "Natura" with importance of Mount Kochilas for tourists. (Q5)
- "Number" with awareness about renewables. (Q11)
- "Natura" with level of psychological satisfaction received from the Skyrian pony. (Q3)
- "Wildlife" with age. (Q30)
- "Number" with awareness of specific species living in M.Kochilas. (Q1)
- "Natura" with agreement with the notion that diesel energy production increases CO_2 concentration in the atmosphere and consequently deteriorates climate change. (Q16)

According to table 5, both extended models result in statistically significant interactions terms (95% level) that are in line with a priori expectations about their signs. Moreover, the increased log-likelihood values imply that both extended models fit better than the basic RPL.

Table 5. Results of RPL extended models

Variables	**(1)**	**(2)**
house value	-0.452***	-0.412***
	(0.121)	(0.124)
Natura	-2.772***	3.936**
	(0.891)	(1.817)
wildlife	1.151***	2.522***
	(0.313)	(0.780)
health	0.420	0.940***
	(0.310)	(0.272)
number	-1.300*	0.306
	(0.687)	(0.481)
health_gender	1.115**	-
	(0.472)	
number_benefits	0.587***	-
	(0.123)	
natura_tourists	0.903**	-
	(0.416)	
number_heard	-1.152*	-
	(0.616)	
natura_pony	-	-0.577**
		(0.287)
wildlife_age	-	-0.414**
		(0.192)
number_knew	-	-0.139**
		(0.0576)
natura_diesel	-	-0.659*
		(0.356)
Log-likelihood	-254.39632	-281.1024
Observations	1,080	1,080

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regarding the interaction of health attribute with gender variable, we assumed that the effect of an improvement in locally provided health services would affect men and women differently. The positive coefficient indicates that the probability of selecting an option with better-quality health is increased for female respondents compared to men. This result was anticipated as it makes absolute sense for women living permanently on an island to be more concerned about their own (gynaecological check-ups) and their kids' health[15]. The next interaction term of model 1 is positive suggesting that people who anticipate larger benefits prefer a larger number of turbines. Furthermore, respondents who believe that Mount Kochilas is not an important touristic attraction express a more positive attitude towards the installation of the turbines inside Natura. Finally, the negative sign of the last interaction indicates that the probability of choosing a project with less turbines is higher for those who have never heard of renewable energy, a pretty reasonable finding.

The second model comes up with four different interactions. The negative sign of the first term implies that locals who are more attached with the Skyrian pony are less likely to accept a wind farm installation inside Natura. Furthermore, elderly people appear to put less weight on wildlife protection than younger ones. It is reasonable to assume that they might prefer other compensation measures (e.g. better-quality health services) even if this anticipation is not confirmed in our study. Another interesting finding is that respondents who are more familiar with the species living in Mount Kochilas gain higher utility from the installation of the turbines outside Natura. In economic terms this translates in a higher[16] WTA compensation if the turbines are installed inside Natura. Lastly, respondents who recognize the negative impact that diesel energy production can ultimately have on climate change, they appear to be more negative towards the installation of a wind farm inside Natura. This result, although strange at first sight, it was predictable. Repeated discussions combined with formal interviews revealed that people who are aware of the implications that diesel energy production has on climate change, they have generally cultivated a more ecological conscience and are thus more attached to the local ecosystem. Consequently, due to exceptional place attachment, this proportion of locals is reluctant to compromise on the installation of a wind farm inside Natura.

6. Limitations

Although the size of the questionnaire was reduced after the pilot survey, it is still believed that the final version was quite lengthy (20-25mins on average) which might have led some respondents to answer a few questions heuristically. Moreover, in our CE we assumed that all random variables follow a normal distribution. According to Fosgerau and Bierlaire's (2007), inappropriate choice of distribution type can bias the mean value of random parameter

[15] Several women confessed how worried they are about the health of their children, especially during winters, since local health services are of poor quality.
[16] The WTP for the number_knew interaction is not presented here but was estimated to be -647.8431**.

estimates. A semi-parametric test can indicate if a random parameter follows an a priori distribution in order to diminish this type of bias. However, we did not possess the appropriate software to run this test. Finally, a serious implication of using the real estate value as a payment vehicle is that respondents might not have a clear picture of what this discounted value would exactly mean. Future research that will employ this particular variable as payment vehicle is urged to demonstrate to participants the exact amount of money, instead of percentages, that they agree to trade off when choosing a bundle. This can be simply done by showing the exact lost/gained house value (e.g. €400) next to each bundle.

7. Discussion and policy implications

Empirical results point towards four key drivers of local opposition where future energy policies for Skyros and perhaps other non-interconnected islands should focus on. According to WTP estimates in table 4, the installation of the turbines outside Natura is valued highly suggesting that the location choice has been a principal driver of resistance. Degradation of the local ecosystem means a great deal to Skyrians and this can be concluded by the considerable significance they attach to the protection of wildlife as a compensation measure in case of a wind-farm project. Moreover, the lack of trust to competent authorities is of prominent importance. As the biggest part of land in M.Kochilas was property of the Megisti Lavra Monastery (located in Halkidiki, Northern Greece), the monks were willing to undertake 95% of the renewable investment back in 2011. According to qualitative information, Skyrians felt deprived as this regime was expected to generate moderate benefits for them (App.3, table 1) and enormous profits for the monastery. Furthermore, the relatively high anticipated costs (App.3, table 1) influenced public opinion negatively. In particular, locals expressed concerns about the decommissioning cost fearing it would fall on them at the end of the wind farm's life (25-30 years). No guarantee was provided (e.g. letter of credit), nor any plans for reusing or recycling the materials. On top of that, Skyrians claim that the monks did not take local opinions into account during the planning process. As a result, the negative attitudes towards the project increased. Lastly, another crucial driver of the negative perceptions regarding wind farms in Skyros is the anticipated visual externality. Visual intrusion was ranked first among eight likely negative features of wind turbines (Appendix 2, table 2) and it was also the most popular response when participants were asked to write down what they consider as the major negative feature of wind turbines.

According to the aforementioned results, a future wind energy policy for Skyros should involve the installation of a wind farm somewhere outside Natura and guarantee for wildlife protection regardless of location choice. Regarding the anticipated visual externalities, one idea would be to find a location where the turbines are not visible from densely inhabited areas (Chora, Magazia, Molos). Alternatively, larger private compensations (e.g. electricity bill discounts) could be offered to households that have visual contact with the turbines. Furthermore, due to the "imbalanced" administration of the past project, it would be very hard to earn the trust of the local community in the future. A future collaborative and transparent ownership regime would be an indispensable characteristic of a prosperous wind energy initiative in the island, no matter the size of the project. Finally, since the anticipated negative impacts on the local community are relatively large (App.3, table 1), policymakers would have to offer compensatory benefits especially to people who do not have the resources to invest in the project. Nevertheless, if compensations are not accompanied with a cooperative administration scheme between the developers and local representatives, people might perceive them as bribing. Such thing would be an additional obstacle to a successful agreement and subsequently to the diffusion of green energy.

8. Conclusion and future research

In order to improve the social acceptance of wind farms it is very important to examine in detail the drivers of positive and negative attitudes and to estimate the relative weight that local communities place on each aspect of a potential project. This research, is focused on the social acceptance of wind power in Skyros, a Greek non-interconnected island in the Aegean Sea. Motivated by the fact that a project was cancelled one step before pushing off due to extreme opposition from the local community, we were interested to detect the main drivers of this outcome and reach to conclusions about how to improve the local acceptance of wind farms.

A CE was designed and together with complementary questions about attitudes towards environmental and energy issues we shaped a broader picture about our sample's perceptions. Five CE attributes were expected to affect how locals evaluate a wind energy project. We presented four models that deemed most relevant to our research goal; an initial CL model, a basic RPL model accounting for unobserved heterogeneity in respondents' preferences and two extended RPL models with four additional interactions each. Results showed that locals are willing to endure a fall in the value of their house provided they will enjoy some benefits from the renewable energy development. On average, respondents are WTP 5900€ to obtain a project bundle that includes investments in wildlife protection. This attribute appeared to be the most attractive and highly valued and it was followed by the location choice (outside Natura). The number of turbines and the upgrade in health services as a compensatory benefit deemed less relevant in the respondents' decisions. Remarkably, the influence of the attributes on respondents' choices is aligned with the existing literature and earlier CE studies. All interaction terms in our study are significant and with the anticipated sign. Lastly, WTP values obtained in this paper could be used as input in future CBA studies.

In conclusion, our study indicates that the NIMBY explanation might be too simplistic to characterize the public resistance towards wind farms in Skyros. We provide evidence that recommend other factors such as concern about the local environment, perceived visual impacts and institutional trust deficiency as the core drivers of opposition. Securing the protection of local wildlife by the assistance of non-profit organizations and other conservation societies could help to preserve the local ecosystem in case of a wind-farm installation in a mountainous area. At the same time, involving the community in the designing process and committing on sustainable decommissioning solutions would undoubtedly mitigate public opposition accelerating the social acceptance of wind farms.

One idea for future research would be a comparative study between Skyros and Paros, another Greek NII in the Aegean Sea. In Paros, the license for the construction of a wind energy park comprised of 8 wind-farms and 100 turbines in total was recently (2014) approved by the Greek Ministry of Environment. The strong local disapproval of this decision aims to cancel the planned project altogether. It would therefore be interesting to investigate whether the drivers of local opposition are similar with those recorded in Skyros, whether the NIMBY explanation is more relevant, or the factors that influence acceptance are considerably different in the case of Paros. In this case a choice experiment combined with a latent class analysis (psychometric scales) would probably be a more suitable approach since the sample will ideally be larger than 200 individuals, making good sense to divide them in 3 or 4 groups based on behavioural/psychological characteristics. Subsequently, it would be interesting to expand the geographical datasets and explore the differences in drivers of wind energy local acceptance between the Ionian Islands (such as Kefalonia and Zante) and islands of the Aegean Sea (Skyros and Paros). This project would be particularly interesting since distinct historical and cultural differentiations probably influence opinions and behavioural attitudes of local communities regarding the environment and green energy projects. Since hydrocarbon exploration licenses have recently been issued for the Ionian Sea, the local opinions towards green energy projects in Ionian islands are anticipated to be influenced by this decision as well.

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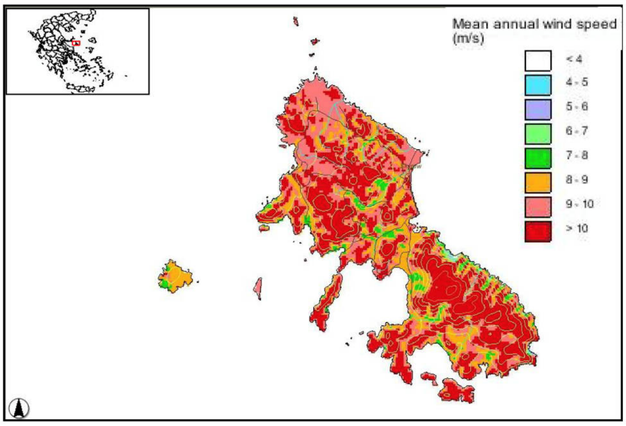
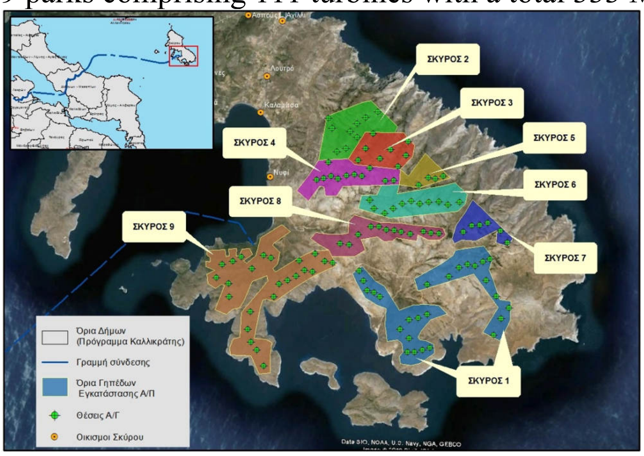
Appendix 1: Photos

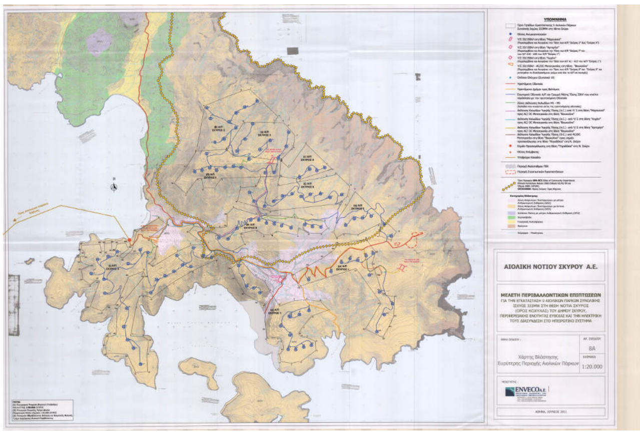
Appendix 1.1: Mean annual wind speed in Skyros island.



Appendix 1.2: Set-up of the under study wind farms in the south part of Skyros.
9 parks comprising 111 turbines with a total 333 MW power.

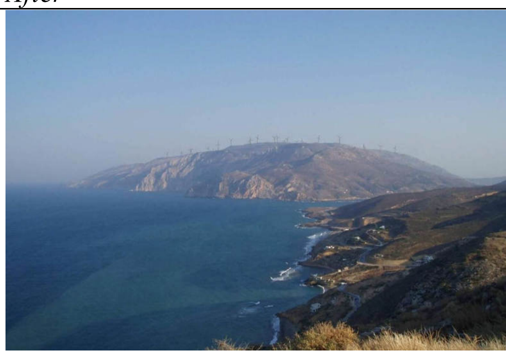


Appendix 1.3: Segregation of Natura 2000 protected area (inside the yellow dotted area) from the rest of Mount Kochilas.



Appendix 1.4: Electricity grid projected to connect Skyros with mainland Greece.
The grid was projected to go underwater till Evia island, then move through the island and back in the sea again till the mainland. Larymna city would be the final destination where the power cable coming from Skyros would meet the mainland grid.

Appendix 1.5: The following pictures show a projection of Mount Kochilas before and after the installation of the 9 wind parks.
This was expected to be the view of the mountain from the northeast side of the island.
The first picture was captured by the author of this paper during the first research trip to the island, while the second was a projection from the company that undertook the environmental impact assessment (EIA) in 2011.

Before	*After*
	

Appendix 1.6: View of Mount Kochilas from Magazia region after the installation of the 9 wind parks. (projection by the IEA)

Appendix 2: Energy

Table 1
What comes into your mind when you think of wind energy? (max 3 words)

Comment	*No of respondents*
Positive comments	
Green-clean energy / Good / Sustainable development /Less pollution /Health/ Environmentally friendly / Hope / Power / Ecology	**31**
Low cost energy / Local benefits (e.g. electricity)	7
Neutral comments	
Wind turbine-s / Wind farms / Wind / Electricity / Energy	**44**
Renewable-alternative energy sources	4
God Aeolus / Sea-island	2
Negative comments	
Companies / Interests / Cheat / Money	4
Big roads / Giant ugly constructions	5
Inefficiency / Uncertain productivity / Difficult to manage	3

Table 2
Major negative characteristic of wind turbines? (max 3 words)

Comment	*No. of respondents*
Visual intrusion / Aesthetics / Ugly / Unattractive Landscape degradation / Deformity / Too much cement	**36**
Environmental degradation	21
Size (height) / Large number / Massive installations	15
Noise pollution	13
Nothing	9
Obsolete technology / Economically inefficient / Life expectancy	5
Badly installed (densely distributed or at the wrong site)	5

Appendix 3: Costs-Benefits

Table 1
Question 20, Appendix 4.

	Table 1: Anticipated Costs and benefits.	Mean	s.d
Costs	1=Too little; 5=too many	**3.56**	1.27
Benefits	1=Too little; 5=too many	2.58	1.26

APPENDIX 4: QUESTIONNAIRE IN ENGLISH

SURVEY ON THE SOCIAL ACCEPTANCE OF WIND-ENERGY

WIND-FARMS PROJECT IN MOUNT KOCHILAS

Relevant background

In year 2011 a wind energy project including the construction of 9 wind parks and 111 wind turbines in total, was approved to be installed in Skyros Island, Greece. Due to extreme opposition from local citizens, the project was cancelled.

Environment of the island

Mount Kochilas, a Natura 2000 site in the southern part of the Aegean island of Skyros, is considered an area particularly rich in biodiversity. It hosts a number of endemic plants mainly related to rocky and coastal habitats, the world's biggest colony of Eleonora's falcons nesting on the rocky coastline, upland pasturelands supporting passerine birds, the endemic lizard of Skyros, the unique local horse race, the Skyrian horse, and clusters of maples (Acer sempervirens) found mainly in the mountain's numerous ravines.

Section 1: The local natural environment

1)To what extent are you aware of the existence of those species?
From 0 [ ] (no familiar); to 10 [ ] (extremely familiar)

2)Please indicate the approximate number of days that you have visited Mount Kochilas within the last 12 months.
6+ times [ ]
3-5 times [ ]
1-2 times [ ]
zero [ ]

3)On a scale of 1 to 5, what level of psychological satisfaction do you receive from each element of the NATURA 2000 site?
Endemic plants: choose from 1 [ ] to 5 [ ]
Picnicking: choose from 1 [ ] to 5 [ ]
Falcons and other birds: choose from 1 [ ] to 5 [ ]
The Skyrian pony: choose from 1 [ ] to 5 [ ]
The view from the top of the hill: choose from 1 [ ] to 5 [ ]
The fresh air: choose from 1 [ ] to 5 [ ]

4)Would you say that Mount Kochilas plays a significant role in your well-being?
Yes [ ] No [ ]

5)How important is the site of Mount Kochilas for people that visit the island (tourists)?
Very important [ ] important [ ] of small importance [ ] Not at all important [ ]

6)Did you know that the proposed wind-energy project earmarked 60 wind turbines to be built inside the Natura 2000 area? I knew it [ ] I didn't know [ ]

Section 2: Climate change

7)Very concerned [ ] Indifferent [ ] little concerned (or 0-10)

8)Do you believe that environmental problems such as global warming and air pollution have been over exaggerated?
YES [ ] I don't know [ ] NO [ ]

9)Are you a member of any environmental, conservation or wildlife organization?
Yes [ ] No [ ]

10)Do you recycle regularly?
Always [ ] Sometimes [ ] Rarely [ ] Never [ ]

Section 3: Energy

11)Have you ever heard of renewable energy before?
Yes [ ] NO [ ]
If no,
The renewable energy sources are forms of energy that come various natural procedures such as the wind (wind power), the sun (solar power), geothermia (geothermal power and other.

12) What comes to your mind when you think of wind-energy?
Please answer with maximum three words

13) What is the major negative characteristic of wind turbines?
Please answer with maximum three words

14) Did you know that Skyros is a non-interconnected island, which means that it is not connected with the electricity grid of the mainland?
Yes [ ] NO [ ]

15) Did you know that energy supply in the island is produced exclusively by the local diesel-fueled power plant?
Yes [ ] NO [ ]

16) Diesel energy production increases perceivably the CO_2 concentrations in the atmosphere and therefore deteriorates the problem of climate change.
Strongly disagree [ ] disagree [ ] I don't know [ ] agree [ ] absolutely agree [ ]

17) In your opinion, which energy policy should be implemented in the island?
-Investments in fossil fuels (natural gas, oil, coal, diesel) [ ]
-Gradual shift to renewable energy sources (wind power, solar PV's) [ ]
-Gradual removal of renewable energy sources [ ]
-I don't know [ ]
-Other [ ]

18) Renewable energy sources are more environmentally friendly compared with diesel produced energy.
Agree [ ] I don't know [ ] Disagree [ ]

19) What would be the *main reason to support* a wind-energy project?
Air pollution [ ]
Climate change [ ]
Fewer imports and higher national independence [ ]
Discount in monthly electricity bills [ ]
Investments in the local health system [ ]
Job creation [ ]

Section 4: The choice experiment

Imagine you have the chance to vote for some projects concerning wind energy for electricity production in Skyros.
You are going to be given some pairs of projects (Project A against Project B).
You need to compare Project A with Project B, choosing which one you prefer overall.
There is no such thing as a right or wrong answer.

The five project attribute are:
1) The location where the wind park is installed (Installation inside or outside NATURA 2000)
2) Investments in regional wildlife protection (Yes/No)
3) Percent of discount in house value (0%, 1%, 3%, 5%)
4) Improved health services in the island (Yes/No)
5) Number of wind turbines to be installed (10, 30, 60, 90)

Figure 1: Example of a choice card

Attributes \ Project	A	B
Inside or outside Natura 2000	Outside	Inside
Investments with respect to wildlife protection	Yes	Yes
House value reduction	3%	1%
Upgrade of local health services	No	Yes
Number of wind turbines	10	60

Please select one of the above projects	○	○

Section 5: Costs-Benefits

Imagine a wind power project with these characteristics.

1) 60 windmills inside Natura 2000
2) 95% of the project is owned by the monks and 5% by a private company
3) Immediate upgrading of the primary health system with all the necessary medical specialties
4) There will be a wildlife conservation project financed by the government. WWF or other International non-profit organisations will take action immediately after the project approval
5) 1% reduction in your house value

20) How you evaluate the anticipated costs and benefits of this particular wind project for the local community?

very few [ ] few [ ] moderate [ ] many [ ] too many [ ]

Costs:

Benefits:

21) Now, supposing that the described wind energy project was one among many in Greek islands of the Aegean Sea, would this change your willingness to accept the project?
Yes [ ] No [ ]

Section 6: Trust

Would you trust a wind project under the co-operative administration of government, local society, monks and private companies?

22) In this case, the local community would have the opportunity to participate in the joint venture of the project.
YES [ ] MAYBE [ ] NO [ ]

23) Do you think that some parts of this partnership scheme would have large benefits by ignoring local peoples' voice?
YES [ ] NO [ ]
24) Do you actually think they would deceive you?
Yes [ ] No [ ]

25) To what extent do you agree with the following notion?
In general, most people can be trusted.
Choose from 0 to 10.
0---1----2----3----4----5----6---7----8----9----10

Section 7: Socio-economic characteristics

This section asks a few questions about you.
All answers are anonymous, strictly confidential and will be used for statistical purposes only. Your response is voluntary but your answers are really important to my research and for the completion of my studies.
It will be greatly appreciated.
Thank you in anticipation.

26) Gender: male [ ] female [ ]

27) Job status
Employed full-time [ ]
Employed part-time [ ]
Retired [ ]
Housekeeping [ ]
Student [ ]
Unemployed [ ]

28) Relationship status
Married with kids [ ]
Married no kids [ ]
Single [ ]
Divorced [ ]
Engaged [ ]
Widowed [ ]

29) Age: 18-24 [ ] 25-35 [ ] 36-45 [ ] 46-55 [ ] 56-65 [ ] 66-75[ ] 75+ [ ]

30) Highest level of education (Please do not exaggerate):
No education [ ]
Primary school [ ]
Gymnasium [ ]
High school [ ]
Undergraduate degree [ ]
TEI [ ]
AEI [ ]
Master/PhD [ ]

31) Number of people in the household: [ ]

32) Monthly household income before-tax
1000€ or less [ ]
1-2K [ ]
2-3K [ ]
3-4K [ ],
4-5K [ ]
5-6K [ ]
more than 6000€ [ ]

33) Do you own your house or rent it?
We own it [ ] We rent it [ ]

34) Would you give an estimation for your house value?
0-50000€ [ ]
50-100 [ ]
100-150 [ ]
150-200 [ ]
200-250 [ ]
250-300 [ ]
300000€ + [ ]

35) Favourite political party
Pasok[ ]
Nea Dimokratia[ ]
Syriza [ ]
ANEL [ ]
Oikologoi prasinoi [ ]
Antarsia [ ]
Laos [ ]
KKE[ ]
Potami [ ]
Enosi kedroon [ ]
Other [ ].

This is the end of the questionnaire.