



# Wind energy and tourism: Industry impacts and opportunities for 'wind farm tourism'

Report compiled for C7EVEN Communications by:

Dr Barrie Shannon  
School of Humanities and Social Science  
[Barrie.Shannon@newcastle.edu.au](mailto:Barrie.Shannon@newcastle.edu.au)

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This research report is the result of work commissioned by C7EVEN to conduct a desk top study on the benefits and opportunities of wind farm tourism.

The work has been conducted by Dr Barrie Shannon from the School of Humanities and Social Science at The University of Newcastle.

The report has been reviewed and approved by Dr Hedda Haugen Askland, Senior Lecturer and Social Researcher in the School of Humanities and Social Science, The University of Newcastle.



Dr Hedda Haugen Askland

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**Communication details:**

[Barrie.Shannon@newcastle.edu.au](mailto:Barrie.Shannon@newcastle.edu.au) / [Hedda.Askland@newcastle.edu.au](mailto:Hedda.Askland@newcastle.edu.au)

**Table of contents**

Key take-aways.....4

Executive summary.....4

Methods .....5

Impacts on tourism.....5

'Wind farm tourism' .....8

Conclusions and Implications ..... 10

References..... 11

**Appendix: Annotated Bibliography** ..... 13

### **Key take-aways**

- Studies of stakeholder attitudes toward wind farms in rural areas often cite a 'fear' of negative tourism impacts.
- There is very little academic evidence that the presence of wind farms has a significant negative economic impact on the tourism industry in rural localities, but stakeholder concerns about turbine placement, visibility and noise must be taken seriously.
- Adventure tourism, eco-tourism and educational tourism incorporating wind farm infrastructure are emerging globally as key opportunities for rural localities.

### **Executive summary**

Wind energy and its associated infrastructure are subject to heated public debates. People who live or work in proximity to wind farms have expressed a number of concerns about wind farms having potentially negative impacts on their livelihood, particularly within communities that rely heavily on nature-based tourism to support their local economy. This brief report synthesises some of the global academic literature on the relationship between wind farm developments and the tourism industry in rural communities. The papers that have been compiled provide insight into various stakeholder attitudes toward wind farm projects, as well as studies on their (in)direct economic impacts. Broadly, while stakeholders in the tourism industry express fears of a downturn because of wind farms 'spoiling' their product – an untouched natural landscape clearly distinct from the lives of the urbanites they want to attract – these fears are not borne out in available empirical evidence. This review demonstrates that tourists are not deterred by the presence of wind turbines and wind farms, and in fact, are often drawn to them as points of interest. Opportunities for eco-tourism exist for communities in proximity to wind turbines, particularly if supporting infrastructure such as visitor centres, viewing platforms, hiking trails and other amenities are incorporated. There is informal evidence of the success of such activities already occurring in the Australian context.

## Methods

A systematic literature search was conducted within four major academic databases: EBSCO, ProQuest, ScienceDirect and Google Scholar. Three terms related to wind farms ('wind farms', 'wind turbines', and 'wind power') were combined with 'tourism' to appraise the social science literature on this topic in each of these databases. There is a small but well-developed body of literature on community perceptions of wind farms and their potential impacts on the tourism industry, focussed largely on Europe and the United States. None of the papers specifically focused on the Australian context. Studies that specifically examine the opportunities for 'wind farm tourism' are much less prevalent; the phrase 'wind farm tourism' yielded very few results. These searches yielded **thirty** relevant peer-reviewed, academic journal articles on the topic area. Of these, **nineteen** of the most relevant papers were chosen for this review. Criteria for relevance were recent, high-quality, qualitative or quantitative analysis that *specifically* engaged with the impact of wind farms on local rural tourism industries. Papers that were eliminated were older than ten years, or only loosely dealt with either wind farms or tourism, but not both. The chosen sources are considered alongside some selected non-academic resources from Australia.

## Impacts on tourism

A significant proportion of the available academic literature on wind farming and rural tourism identifies that stakeholders hold significant fears about potential negative impacts on their local tourism industry. These fears are significant predictors of non-support of wind farm projects (Fokaides, Miltiadous, Neophytou & Spyridou, 2014), and this phenomenon is particularly relevant in rural, agrarian localities where nature-based tourism constitutes a large part of the local economy (Sæþórsdóttir & Ólafsdóttir, 2020). Ólafsdóttir & Sæþórsdóttir (2019, 1) provide an explanation: their study on wind farms in the Icelandic Highlands note that tourism in this area is based on 'unspoilt nature and wilderness', and so the encroachment of wind turbines is seen as a negative among locals and tourists alike. These stakeholders have negative perceptions of wind farming because they see it as a threat to their core product; they are essentially selling a nostalgic, idyllic experience of untouched

natural landscapes to urbanites whose day-to-day environments are distinctly different (Sæþórsdóttir, Wendt & Tverijonaite, 2021; de Sousa & Kastenholz, 2015). Rudolph (2014) also discusses the tensions between tourism industry groups and wind farm development, but in the Scottish context. They find that fears of tourism impacts are most associated with tourism operators who fear a loss of income if natural sites are 'polluted' by industrial infrastructure such as turbines, buildings, fences, and powerlines.

Tourist attitude toward wind farms appears to be dependent on how those fears are managed, and how wind farms and wind power are perceived in a broader sense. Acceptance of wind turbines in areas of high tourism value depend on a range of factors. Stakeholders are perhaps concerned the most about the 'sensible' physical placement of wind turbines; they are more readily accepted when they are located away from areas of high aesthetic value, such as scenic lookouts (Sæþórsdóttir, Wendt & Tverijonaite, 2021; Sæþórsdóttir & Ólafsdóttir, 2020; Ólafsdóttir & Sæþórsdóttir, 2019; Beer, Rybár & Kaľavský, 2018; Silva & Delicado, 2017; Broekel & Alfken, 2015; Frantál & Kunc, 2011). Acceptance of wind turbines is also tied to local place attachment, where community identity and livelihoods are tied to the landscape. Mordue, Moss and Johnston (2020) analyse this sense of place attachment, explaining that 'place' is a social phenomenon that is created over time and mapped onto a geographic area, where the hobbies, livelihoods, memories, legacies, cultural meanings, and day-to-day activities of locals are figuratively etched into the landscape. To this end, those authors, and others including Warren and McFayden (2010), emphasise the importance of meaningful community involvement in the development of wind power projects. A sense of community ownership or control over what happens to their home can encourage locals to 'adopt' wind farms, accommodating it into the image or the character of their area. Stakeholder attitudes toward wind power and renewable energy more broadly also have an impact on acceptance of wind farms in areas of high tourism value. Brudermann, Zaman and Posch (2019) found that tourist support for wind farms in the Austrian Alps, a region prized for its pristine landscape, correlated with an understanding of the environmental benefits of wind farming, and faith its viability and reliability as a source of power. Importantly, those locals that are supportive of

wind farms are confident that they will *increase* tourism to their region, rather than to decrease it (Fokaides, Miltiadous, Neophytou & Spyridou, 2014).

An analysis of the academic literature did not find any evidence that the presence of wind farms has a measurable negative economic impact on the tourism industry in rural localities (Mordue, Moss & Johnston, 2020; de Sousa & Kastenholz, 2015; Rudolph, 2014; Frantál & Kunc, 2011; Warren & McFayden, 2010). In the Scottish context, Warren and McFayden (2010, 210) argue that the critics of wind farms frequently cite negative tourism impacts, but their study on local residents' feelings about wind farms 'lend no support to such claims', going so far as to say that, in their area of study, 'even in a worst-case scenario, wind farm development is likely to have minimal economic impacts on tourism.'

De Sousa and Kastenholz (2015) conducted a study on the rural tourism experience in Portugal, a country notable for its many wind farm projects. Their appraisal of the literature on the relationship between wind farms and rural tourism revealed three important findings: that impacts on the tourism industry were 'small and localised' (de Sousa & Kastenholz, 2015, 1242), that most visitors have positive feelings about wind farms and wind energy, and that the presence of wind farms does not deter tourists. These findings are concurrent with Silva and Delicado's (2017) similar study, also on Portugal.

While much of the literature focuses on the *fear* of negative tourism impacts, the empirical evidence that does exist on these impacts suggests the opposite is occurring. Smith et al. (2018, 307) have argued that 'although there is a presumption that wind energy projects threaten tourism... in fact, they may act as a minor attraction'. Indeed, despite the concerns of tourism industry stakeholders, wind farms tend to generate some level of tourist interest *because of* their physical appearance rather than despite it. This has been attributed to their 'modern design', 'eco-image' and 'uniqueness' (Beer, Rybár & Kal'ayský, 2018). These claims are borne out in case studies of major wind farm developments elsewhere, including the Block Island offshore wind farm in Rhode Island, USA. On this project, Smythe et al. (2020) found that while some tourists reported negative feelings about its visual impact, and expressed concerns about noise, those perceptions were not shared widely among locals or tourists. With this evidence, they claim that the Block Island wind farm is seen as an 'attractant', drawing tourists

specifically to view the turbines. Carr-Harris and Lang (2019) examined the economic impact on the Block Island farm by comparing reservations, occupancy, and revenues in the local vacation rental market, revealing a small but significant increase in peak seasons post-construction. Regarding onshore wind farms, Mordue, Moss and Johnston (2020) attempted to examine the differences in tourism turnover in the Northumberland as a result of new wind farm developments. Despite qualitative claims by tourism operators that business was trending down, there was no significant economic evidence of this.

### **'Wind farm tourism'**

There is evidence within the academic literature that renewable energy projects, including wind farms, can be actively incorporated into the rural tourism industry. Frantál and Urbánková (2017) discuss the phenomenon of 'energy tourism', the suite of tourist events and activities that are associated with power generation infrastructure. According to these authors, tourists that engage in energy tourism are attracted to renewable energy projects out of interest in industrial infrastructure ('industrial tourism'), adventure sports and physical experiences ('adventure tourism') and rural communities ('cultural/heritage tourism'). Similarly, Liu, Upchurch and Curtis (2016) identify a range of wind-farm-specific tourists, including those who are seeking educational experiences, those who are interested in industry and technology, those who are interested in environmentalism, and those who are interested in nature-based tourism generally. Frantál and Urbánková (2017) provide various examples of activities involving wind farms, including abseiling from turbines, parties, events and festivals in onshore facilities or boat tours to offshore facilities. What the insight from all of these authors suggests is that the active incorporation of tourist activities into renewable energy projects is potentially beneficial for rural tourist industries, and that tourists are attracted to wind farms for a wide range of reasons, beyond simply their visual aspects.

Research into the Chinese context provides valuable insight into the phenomenon of 'wind farm tourism', where there is a 'rising interest in wind farming as a leisure experience' (Liu & Upchurch, 2020, 241). Wind farm tourism in China is buoyed by government policies and marketing that caters to

the 'green', eco-friendly consumption desires of tourists (Liu, Upchurch & Curtis, 2016). Part of the story, according to Liu and Upchurch (2020) is the principle of *feng shui*, which is highly influential in China (Liu & Upchurch, 2020). As a result of government policy support, wind farms are perceived as environmentally friendly, signifying a healthier way of life. Therefore, for many people, visiting wind farms can bring good luck and influence future wellbeing. While the principles of *feng shui* may not be as widely applicable in Australia, these insights reveal that wind farm tourism is associated with people's personal views about environmentalism, ecology, and nature. If wind farms attract those who are interested in the environment, and who want to have a tourist experience that is eco-friendly and 'gives back' by supporting environmental initiatives, it stands to reason that these desires can be appealed to in Australia as well.

In general, however, the Australian context regarding wind farms and tourism impacts appears to be under researched; none of the academic literature compiled for this review focused specifically on Australian wind farms or Australian communities. However, evidence that wind farms draw tourist interest in the Australian context can be found in informal or non-academic sources. Indeed, a quick scan of the official websites for Australian wind farms suggests that they are offering the kinds of tourism experiences discussed above. A 2018 report by the Clean Energy Council states that Australian wind farms have an overall positive impact on local tourism, citing evidence that the Pacific Hydro Codrington Wind Farm in Victoria 'attracts 50,000 visitors each year' with an on-site tourism operator (Clean Energy Council. 2018, 25). An Iberdola Australia (n.d.) industry blog post claims that Australian wind farms are quite popular tourist attractions and provides a list of examples of active tourism opportunities at wind farms across the country. Typically, these include guided tours, viewing platforms, walking trails, visitor centres and organised events including Iberdola Australia's sponsored 'Run with the Wind' event, a fundraising run at the Woodlawn Wind Farm near Tarago NSW (Iberdola Australia, n.d.). In addition to these tourist experiences, it appears that a number of the wind farms listed on this website are attempting to fulfil their social license to operate by offering educational experiences onsite and partnering with schools and universities to attract visitors.

## **Conclusions and Implications**

A review of the global academic literature on wind farm developments and tourism reveals that, while stakeholders have significant fears of negative impacts, there is little evidence that they come to be. These anxieties are rooted in the assumption that the visual impact of wind turbines will undermine what the rural tourism industry 'sells' to tourists; idyllic, nostalgic experiences of natural scenery untouched and unspoiled by industrialisation. However, when wind turbines and wind farms are placed 'sensibly', tourists and locals alike are not repelled by their presence. Acceptance of wind farms in areas of high rural tourism value are also tied to attitudes toward wind energy and renewables more broadly.

The only empirical evidence of impacts on the tourism industry appears to be positive; there are a range of studies that demonstrate tourists are not only *not* deterred from visiting areas with wind farms, but are drawn to them specifically, for a range of reasons. These include interest in technology, infrastructure design, pro-environmental causes, and curiosity. A small but developing body of academic literature on the concepts of 'energy tourism' and 'wind farm tourism' demonstrate that globally, wind farms attract significant tourism interest. Visits, tours, walking trails, and events can be offered to tourists to enhance the tourism value of a wind farm project. While Australian research in this area is under-developed, industry evidence suggests that currently operating wind farms employ similar methods to attract tourism. Wind farms can be embedded into rural communities offering high tourism value, and educational opportunities for schools and universities in their region.

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Mordue, T, Moss, O & Johnston, L 2020, 'The impacts of onshore-windfarms on a UK rural tourism landscape: objective evidence, local opposition, and national politics', *Journal of Sustainable Tourism*, vol. 28, no. 11, pp. 1882-1904.

Ólafsdóttir, R & Sæþórsdóttir, AD 2019, 'Wind farms in the Icelandic highlands: Attitudes of local residents and tourism service providers', *Land Use Policy*, vol. 88, p. 104173.

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Sæþórsdóttir, AD, Wendt, M & Tverijonaite, E 2021, 'Wealth of Wind and Visitors: Tourist Industry Attitudes towards Wind Energy Development in Iceland', *Land*, vol. 10, no. 7, p. 693.

Silva, L & Delicado, A 2017, 'Wind farms and rural tourism: A Portuguese case study of residents' and visitors' perceptions and attitudes', Article, *Moravian Geographical Reports*, vol. 25, no. 4, pp. 248-256.

Smith, H, Smythe, T, Moore, A, Bidwell, D & McCann, J 2018, 'The social dynamics of turbine tourism and recreation: Introducing a mixed-method approach to the study of the first U.S. offshore wind farm', *Energy Research & Social Science*, vol. 45, pp. 307-317.

Smythe, T, Bidwell, D, Moore, A, Smith, H & McCann, J 2020, 'Beyond the beach: Tradeoffs in tourism and recreation at the first offshore wind farm in the United States', *Energy Research & Social Science*, vol. 70, p. 101726.

Warren, CR & McFadyen, M 2010, 'Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland', *Land Use Policy*, vol. 27, no. 2, pp. 204-213.

**Appendix: Annotated Bibliography**

Beer, M, Rybár, R & Kaľavský, M 2018, 'Renewable energy sources as an attractive element of industrial tourism', *Current Issues in Tourism*, vol. 21, no. 18, pp. 2139-2151.

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This paper deals with the overview of the interaction of tourism and renewable energy sources, and evaluates their potential regarding tourism industry as well as in terms of increasing of tourism attractiveness in the selected area. Renewable energy sources can be considered an attractive element within the industrial tourism and, in some cases, can increase the number of visitors to the area, mainly due to its modern design, proportions, eco-image and, in certain regions, due to its uniqueness. In analysis, interactions of renewable energy and tourism were classified into four categories. The analysis showed that the touristic subjects connected to the sensitively selected and located type of renewable energy source could have significant numbers of visitors in tens of thousands. According to results of the analysis, the highest number of visitors reached the visitor centres next to geothermal power plants and wind parks, which can be explained by their unique visual aspects. The paper also analysed the possible impact of the renewable energy infrastructure on tourists, when available studies indicate the minimal impact of installation if the power plants are sensibly placed in the country regarding location or distance from considered subject.

Broekel, T & Alfken, C 2015, 'Gone with the wind? The impact of wind turbines on tourism demand', *Energy Policy*, vol. 86, pp. 506-519.

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While wind energy production is relatively free from environmental externalities such as air pollution, it is frequently considered to negatively impact landscapes' visual aesthetic values, thereby inducing negative effects on tourism demand. Existing evidence for Germany indeed points towards a negative relationship between tourism demand and wind turbine construction. However, the existing studies primarily rely on interview data and simple bivariate statistics. In contrast, we make use of secondary statistics on tourism and wind turbine locations at the level of German municipalities. Using spatial panel regression techniques, we confirm a negative relation between wind turbines around municipalities and tourism demand for municipalities not located near the coast. In the latter regions, the relation between wind turbines and tourism demand is more complex.

Brudermann, T, Zaman, R & Posch, A 2019, 'Not in my hiking trail? Acceptance of wind farms in the Austrian Alps', *Clean Technologies and Environmental Policy*, vol. 21, no. 8, pp. 1603-1616.

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Large-scale wind power projects are one of the bearers of hope for a transition toward low-carbon electricity systems. The question of social acceptance of such projects near residential areas, or acceptance of the technology in general, has received significant attention in the scientific literature. Less attention has been placed on acceptability of wind farms in sparsely inhabited mountain areas; the focus of this paper therefore is on acceptance of wind farms in the Austrian Alps from the perspective of tourists and day trippers. We conducted a quantitative survey with visitors of alpine regions ( $n = 137$ ) in proximity to recently constructed wind farms and identified drivers of (non-)acceptance by means of bivariate correlations and multiple linear regressions. Results indicate a high acceptance of wind technology in general and fairly high acceptance for the existing projects. Acceptance levels, however, are slightly, but significantly lower when respondents were asked to rate acceptability of wind farms in the Alps in general. Perceived benefits and reliability of wind power is the strongest predictor variable for higher acceptance levels, while annoyance through visual impact and noise is the strongest predictor variable for lower acceptance levels. Interestingly, factors like degree of information, concern regarding environmental impacts, trust in decision makers and climate change concern do not significantly affect acceptance levels. At the moment, no major opposition to wind power can be identified among tourists. Policy makers therefore should emphasize benefits of wind farms, as respective perceptions are a main predictor for acceptance. Operators should take annoyance concerns seriously, as this factor is predominant in predicting non-acceptance.

Carr-Harris, A & Lang, C 2019, 'Sustainability and tourism: the effect of the United States' first offshore wind farm on the vacation rental market', *Resource and Energy Economics*, vol. 57, pp. 51-67.

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One concern with offshore wind energy development is a negative impact to tourism. In this paper we assess this concern by examining how the Block Island Wind Farm, the first of its kind in the United States, has impacted the vacation rental market. Using data from AirBnb, we estimate a difference-in-differences model that compares Block Island to three nearby tourist destinations in Southern New England before and after construction. Our results suggest that construction of the Block Island Wind Farm caused a significant increase in nightly reservations, occupancy rates, and monthly revenues for AirBnb properties in Block Island during the peak-tourism months of July and August, but had no effect in other months. The findings indicate that offshore wind farms can act as an attractive feature of a location, rather than a deterrent.

de Sousa, AJG & Kastenholz, E 2015, 'Wind farms and the rural tourism experience—problem or possible productive integration? The views of visitors and residents of a Portuguese village', *Journal of Sustainable Tourism*, vol. 23, no. 8-9, pp. 1236-1256.

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Wind energy is recognized as a relevant alternative and renewable energy source, frequently exploited in rural areas, and potentially competing for land and resources with rural tourism. This study reviews the growing but limited research literature on the interactions between wind farms and rural tourism. Using results from a Portuguese village case study, it presents new and often complex insights regarding the potential impacts of these structures on the tourist experience, giving new understanding of the impact of wind farms on a rural tourism destination from the viewpoint of both visitors and residents who actively participate in experience co-creation and are directly affected by investment in both tourism and wind energy, with comparisons between national and international visitors, and between visitors and residents. Possible managerial actions of universal relevance are discussed, exploring the potential for integrating tourism with wind energy production, including tourism-research-related guidelines for wind farm planners, quality and market-targeted information and interpretation development, and efforts to include wind farms in tourist experience planning such as guided tours and event creation. More research is needed to promote wind farms as “green destinations”, capable of attracting a growing number of environmentally concerned visitors.

Fokaidis, PA, Miltiadous, I-C, Neophytou, MK-A & Spyridou, L-P 2014, 'Promotion of wind energy in isolated energy systems: the case of the Orites wind farm', *Clean Technologies and Environmental Policy*, vol. 16, no. 3, pp. 477-488.

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With the establishment of the first wind farm on the island, Cyprus has made progress to satisfy the European Union's 2020 renewable energy targets. Operational since September 2010, the 174 M€ Orites wind farm is currently the largest wind project in the Mediterranean region. In this article, the main characteristics of the project with regard to Cyprus's national action plan for the promotion of renewable energy sources are presented. The socio-economic impacts of the project and its feasibility in the context of an isolated energy system are also examined. The results of a public survey to identify the attitudes of surrounding households and neighbouring cities towards the wind farm are presented. The assessment was based on face-to-face interviews conducted with 50 households from the surrounding communities and 100 interviewees from neighbouring cities. According to the survey, the public opinion on the wind farm was generally positive, and the majority of the respondents considered the wind farm to be acceptable as of no considerable environmental impact.

Frantál, B & Kunc, J 2011, 'Wind turbines in tourism landscapes: Czech Experience', *Annals of Tourism Research*, vol. 38, no. 2, pp. 499-519.

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This study proposes to assess and empirically verify possible negative effects from the construction of wind turbines on the landscape image and tourism potential of affected areas, using the example of two comparative recreational localities in the Czech Republic: one with the construction of a wind farm planned and the other with an already existing farm. The empirical research consisted of two mutually linked parts: a questionnaire survey and focused, semi-structured interviews. Emphasis was placed on the subjective perception of the phenomenon by tourists and local business representatives from the sphere of tourism. The analysis focuses also on the social-geographical factors that shape tourists attitudes to the wind energy development dilemma.

Frantál, B & Urbánková, R 2017, 'Energy tourism: An emerging field of study', *Current Issues in Tourism*, vol. 20, no. 13, pp. 1395-1412.

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After conceptualizing the interrelationships between energy and tourism, the authors provide a definition of energy tourism as a new niche of industrial tourism, theorize on how it overlaps with other types of special interest tourism, and discuss specifics concerning its forms, locales, and possible societal impacts. Potential directions, along with research questions, for future research in the field of energy tourism are proposed. Then, the results of an explorative pilot study of energy tourism in the Czech Republic are presented to give a first insight into the proposed questions. Questionnaire surveys completed by tourists and operators of three energy tourism attractions – so-called Coal Safaris (guided tours through surface coal mines, observing minescapes and mining machinery in full operation), a nuclear power plant information centre, and Dragon Kite Festivals under wind turbines – have focused on exploring the motivations and perceived benefits of energy tourism for organizations; tourists' motivations for, and experience from, visiting; and any changes in attitudes towards current energy development dilemmas by visitors afterwards.

Liu, D & Upchurch, RS 2020, 'A glimpse into energy tourism via application of eye-tracking technology', *Journal of Leisure Research*, vol. 51, no. 2, pp. 230-244.

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Over the past decade, the Chinese government has strategically aligned its environment preservation and social enhancement policies encompassing energy tourism to provide residents with an economically viable, environmentally clean, and appealing leisure alternative. This study empirically tested previously noted consumer acceptance trends via the

application of eye-tracking technology. The results of this controlled test confirm the attractiveness of wind farms as associated with educational interest in wind energy technology, appreciation of natural surroundings, social affiliations, and engagement in recreational activities.

Liu, D, Upchurch, RS & Curtis, C 2016, 'Resident acceptance of wind farms—An emerging tourism market in China', *Journal of Hospitality and Tourism Management*, vol. 27, pp. 1-3.

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The concept of analyzing images captured by tourists before, during, and after a tourism experience is not something new to the field of tourism. Now for over forty years, the power of images captured prior to, as well as formulated during and post-event, have been associated with an individual's destination selection process (Gartner, 1994). This study conducted in China reviewed tourist blog posts which included photos posted to Baidu.com. The content analysis of the posted photographs and corresponding statements yielded four type of tourists: educational tourists, holiday tourist, romantic tourist, and nature tourist. Given the presence of these preliminary findings it appears that governmental tourism marketing activities should include wind farming as part of their national campaign.

Mordue, T, Moss, O & Johnston, L 2020, 'The impacts of onshore-windfarms on a UK rural tourism landscape: objective evidence, local opposition, and national politics', *Journal of Sustainable Tourism*, vol. 28, no. 11, pp. 1882-1904.

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Although the use of wind-turbines is widely accepted as generating clean and sustainable energy, when windfarms are sited in rural areas they are frequently opposed by locals because of their negative impacts, including on tourism. There is, however, little academic research on the role and significance of tourism in onshore-windfarm development disputes. The paper addresses this gap by way of a nuanced analysis of mixed-methods research undertaken on behalf of Northumberland County Council (NCC), UK, on the impacts of onshore-windfarms on tourism in Northumberland's rural hinterland. We also trace the influence the research has had on NCC's policy and land-use decision-making practices in the years since the research was completed in 2014, with particular focus on national policy changes enacted in 2016 that gave local communities more decision-making power on the siting of onshore-windfarms across the UK. From here we critique democratic decision-making on the development of onshore-windfarms more generally and consider political lessons learned from this case study that can have resonance anywhere wrestling with the same or similar issues.

Ólafsdóttir, R & Sæþórsdóttir, AD 2019, 'Wind farms in the Icelandic highlands: Attitudes of local residents and tourism service providers', *Land Use Policy*, vol. 88, p. 104173.

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Over the last decades the harnessing of wind power has gained increasing popularity and is currently believed to be one of world's best environmental options in seeking to meet the international target of reducing greenhouse gas emissions by at least half by the year 2050. There is undeniably an abundance of wind resources in Iceland. But what impact would the harnessing of this power have on the country's growing tourism industry? This paper focuses on the dynamics existing between wind farming, residents and tourism. Its overall aim is to evaluate the attitudes of local residents and tourism service providers in Southern Iceland towards the country's first proposed wind farm, which is to be located at the edge of Iceland's Southern highlands, and to critically discuss the causal relationship between the landscape and these attitudes. An on-site questionnaire was distributed to residents in the municipalities adjacent to the proposed wind farm. Interviews were also conducted with residents and tourist service providers. The results indicate that the relationship between residents and the landscape of the proposed site is based on its use as highland pasture and the residents' romantic conception of the landscape, which for centuries has been characterized by wildness and remoteness. This conception seems to linger on despite gradually increasing hydropower production in the area. The associations made by tourist service providers with the area differ since they are selling a certain image, that of unspoilt nature and wilderness. Wind turbines would be a new and prominent presence in the Icelandic landscape likely to transform the area from its previous perceived wild and natural state. As such, social acceptance of the location of wind farms in the Icelandic highlands is more critical than in the case of more traditional ways of harnessing renewable energy.

Rudolph, D 2014, 'The Resurgent Conflict Between Offshore Wind Farms and Tourism: Underlying Storylines', Article, *Scottish Geographical Journal*, vol. 130, no. 3, pp. 168-187.

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Efforts to put offshore wind farms in place have demonstrated that these are far from being conflict-free, evoking confrontations with a number of stakeholders' interests. One of the most persistent conflict lines refers to the feared adverse externalities on coastal tourism, although tourist surveys and initial empirical evidence seem to reflect the opposite. This paper explicitly addresses this gap and explores how and why certain stakeholders rationalise potential impacts on the tourism economy of coastal communities and, thus constitute the conflict between offshore wind farms and tourism. Based on two cases studies in Scotland and Germany, five storylines are identified that are invoked by local opponents to substantiate impacts on tourism. The paper will show that a particular meaningful construction of the coastal landscape is inherent in tourism and pen'ades all storylines. It is concluded that arguments of both opponents and decision-makers are embedded in epistemic uncertainty

which necessitates a thorough consideration of oppositional arguments in the planning process for offshore wind farms.

Sæþórsdóttir, AD & Ólafsdóttir, R 2020, 'Not in my back yard or not on my playground: Residents and tourists' attitudes towards wind turbines in Icelandic landscapes', *Energy for Sustainable Development*, vol. 54, pp. 127-138.

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To counteract the threat of global warming, many nations have resorted to increasing their use of renewable energy sources, wind farms being among the most popular. The greatest obstacle when it comes to the acceptance of wind farms is their visual impact. Recently, tourism has become Iceland's largest export sector, the country's natural landscape being the main attraction for visitors. This paper attempts to compare the perception of residents and tourists towards wind energy production in general and towards Iceland's first proposed wind farm, to be located at the edge of the country's uninhabited interior Central Highlands. The study is based on a questionnaire survey conducted among residents living adjacent to the proposed wind farm and among tourists travelling through the proposed area. The results indicate that residents are more positive than tourists towards wind turbines and consider them less intrusive in the landscape. Hence, the location of Iceland's first wind farm at the main gateway into the country's Central Highlands is problematic and likely to disturb the experience of tourists passing through the area. Despite the wealth of wind in Iceland it might be challenging to utilize it for energy production due to the importance of nature-based tourism for the economy. If Iceland becomes a physical exporter of renewable energy, it may be expected that more pressure will be set on the construction of wind farms. Thereby nature-based tourism and wind energy would be in direct competition over land use.

Sæþórsdóttir, AD, Wendt, M & Tverijonaite, E 2021, 'Wealth of Wind and Visitors: Tourist Industry Attitudes towards Wind Energy Development in Iceland', *Land*, vol. 10, no. 7, p. 693.

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The interest in harnessing wind energy keeps increasing globally. Iceland is considering building its first wind farms, but its landscape and nature are not only a resource for renewable energy production; they are also the main attraction for tourists. As wind turbines affect how the landscape is perceived and experienced, it is foreseeable that the construction of wind farms in Iceland will create land use conflicts between the energy sector and the tourism industry. This study sheds light on the impacts of wind farms on nature-based tourism as perceived by the tourism industry. Based on 47 semi-structured interviews with tourism service providers, it revealed that the impacts were perceived as mostly negative, since wind farms decrease the quality of the natural landscape. Furthermore, the study identified that the

tourism industry considered the following as key factors for selecting suitable wind farm sites: the visibility of wind turbines, the number of tourists and tourist attractions in the area, the area's degree of naturalness and the local need for energy. The research highlights the importance of analysing the various stakeholders' opinions with the aim of mitigating land use conflicts and socioeconomic issues related to wind energy development.

Silva, L. & Delicado, A. 2017, 'Wind farms and rural tourism: A Portuguese case study of residents' and visitors' perceptions and attitudes', Article, *Moravian Geographical Reports*, vol. 25, no. 4, pp. 248-256.

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Residents' and visitors' perceptions of and attitudes towards existing wind farms, as well as the perceived impact of wind farms on tourism, are examined in this article with reference to a built heritage site in the Portuguese countryside. Based on a set of semi-structured interviews, the paper sheds light on the positive impact that the community's or local actors' involvement in the constitution, management and decision-making processes has on the residents' perceptions and attitudes regarding wind farms, and also on the trade-off with the perceived effect of wind farms on local tourism. Moreover, it shows that although most visitors criticised the proximity of wind turbines to medieval architecture, a clear majority of them accepted their presence and virtually all of them stated that these facilities had no impact on their choice of destination.

Smith, H., Smythe, T., Moore, A., Bidwell, D. & McCann, J. 2018, 'The social dynamics of turbine tourism and recreation: Introducing a mixed-method approach to the study of the first U.S. offshore wind farm', *Energy Research & Social Science*, vol. 45, pp. 307-317.

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Understanding the complex dynamics that influence energy transitions requires mixed methods and collaborations among researchers, resource managers, and communities. This essay details how an interdisciplinary team of researchers used a mixed-method approach to study the social dimensions of tourism and recreation as they relate to the first offshore wind farm in the United States, the Block Island Wind Farm. Although impacts to tourism from wind energy systems are widely cited as a concern by communities and policymakers, little work has sought to define what constitutes tourism and recreation impacts or provided empirical evidence of impacts from operating projects. Researchers adopted an iterative approach to research that combined discrete studies using media content analysis, ethnographic participant observation, and stakeholder focus groups, to understand the social effects of the wind farm on the tourism and recreation experience and the quality of life in Block Island and coastal Rhode Island. We detail key insights from our experimentation with

an iterative mixed-method approach at Block Island and offer lessons for future studies using collaborative approaches to understand both the tangible and the intangible social dynamics of energy system transitions.

Smythe, T, Bidwell, D, Moore, A, Smith, H & McCann, J 2020, 'Beyond the beach: Tradeoffs in tourism and recreation at the first offshore wind farm in the United States', *Energy Research & Social Science*, vol. 70, p. 101726.

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Despite the growth of offshore wind energy and concerns that projects will harm tourism and recreation, there is a lack of empirical research on the effects of operating wind farms on tourism and recreation. The existing literature tends to treat tourists and recreationists as a monolithic group, focused almost entirely on beachgoers. Further, research regarding offshore wind energy and tourism puts forth a narrow conception of tourists, concerned primarily with a natural seascape. The 30-MW Block Island Wind Farm, the first offshore wind farm in the United States, is located offshore an iconic tourism destination and provides a laboratory for understanding interactions between offshore wind energy and the tourism and recreation sectors. We conducted an exploratory qualitative study through which tourism and recreation professionals and participants met in focus groups to discuss experiences with and observations of this project. Analysis revealed diverse viewpoints and largely positive encounters; though, some negative impacts were identified, and participants weighed project costs and benefits. Perspectives were shaped, in part, by experiences with the planning process. Visual impacts were a major concern; however, most participants described the project's appearance in neutral or positive terms. Overall, the wind farm is functioning as an attractant, either as a novel sight or as a recreational fishing destination. Participants felt the wind farm should be promoted for tourism but cautioned that interest may be short-lived and there may be less support for larger offshore developments. Findings support tourism and recreation sector engagement throughout offshore wind project planning and operation.

Warren, CR & McFadyen, M 2010, 'Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland', *Land Use Policy*, vol. 27, no. 2, pp. 204-213.

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This paper presents the results of a study of public attitudes to onshore windfarm development in south-west Scotland. Specifically, it explores the influences of different development models on attitudes to windfarms by comparing public attitudes towards a community-owned windfarm on the Isle of Gigha with attitudes towards several developer-owned windfarms on the adjacent Kintyre peninsula. The study, conducted in 2006, used a questionnaire-based

survey (n = 106) to test the hypothesis that community ownership would lead to greater public acceptance of windfarms. It also examined the attitudes of both residents and tourists towards the impacts of onshore windfarms on landscapes and seascapes, including cumulative impacts. The data show that the Gigha respondents were consistently more positive about wind power than were the Kintyre residents. However, the differences were differences of degree rather than diametrically opposing viewpoints. The most significant concerns about windfarms were intermittent production and visual impact, but majorities in both areas nevertheless regarded their visual impact as positive. The data also indicate that local attitudes could become even more positive if future windfarms were owned by local communities. The fact that the residents of Gigha have affectionately dubbed their turbines 'the Three Dancing Ladies' is indicative of the positive psychological effects of community ownership. These results support the contention that a change of development model towards community ownership could have a positive effect on public attitudes towards windfarm developments in Scotland.