

## Diverse responses of coastal communities to offshore wind farming development in Southern Spain

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### Abstract

Despite having one of the fastest rates of wind power growth in Europe, offshore wind power development in Spain has been relatively slow. One of the factors affecting its deployment is strong local opposition. In this paper, we explore the main factors affecting local perceptions of offshore wind farms in the coastal regions of Southern Spain. We also compare local opinions of on-land and offshore farms, their impacts on local landscapes/seascapes, and their compatibility with local practices and values. To this end, a multi-phase research approach was applied, based on several stages of data collection and analysis and on surveys conducted between 2012 and 2022. Our study shows that the conflicts surrounding offshore wind farms are linked to the perception of the sea and the wind as important local resources and the perceived right of the coastal region to use these resources to generate wealth for their communities. The coastal communities' values, perceptions, and practices regarding the sea have a fundamental influence on their opinions. Our research indicates that local people are more likely to accept offshore wind farms if they provide socioeconomic benefits for their communities and if joint use of marine resources can be guaranteed.

**Keywords:** coastal communities; local resources; seascape; perceptions; wind energy; offshore wind; Spain

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### 1. Introduction

Wind power in European countries has enjoyed significant growth over the last twenty years. The total installed wind power capacity in Europe in 2021 was 236 GW, of which 207 GW were installed onshore and 28 GW offshore (WindEurope, 2021). By 2026 offshore wind energy could meet 24% of Europe's electricity needs, with over 341 GW of installed capacity (WindEurope, 2021). Although still a relatively young industry, offshore wind farming has become a key element in renewable energy generation in many European countries such as the UK and Germany, who led the ranking with more than 12,700 and 8,000 MW respectively, followed by the Netherlands (3,000 MW), Denmark (2,000 MW), Belgium (2,000 MW) and Ireland (less than 40 MW).

Numerous studies have showed that the preference for offshore wind farms in these countries, as compared to onshore, was related to their supportive regulatory framework, the fact that landscape impact was perceived as less significant than that caused by onshore wind turbines,

and the limited onshore space for windmills and other competing land uses (see for instance: Bilgili et al., 2011; Ek, 2006; Esteban et al., 2011; Westerberg et al., 2013). Opposition due to other siting issues, such as visual and noise impacts, can limit the number of acceptable locations for onshore wind farms. Offshore wind farms (OWFs), by contrast, can be installed closer to coastal cities and require shorter transmission lines, while being far enough away to reduce the negative visual and noise impacts (Esteban et al., 2011). Finally, offshore winds tend to blow at higher speeds in comparison with onshore winds, so allowing turbines to produce more electricity. This, in turn, enables offshore turbines to use shorter, less visible towers (Bilgili et al., 2011). All these advantages mean that larger wind farms can be installed offshore with each unit producing more electricity (Esteban et al., 2011).

Despite all these advantages and the forecast of a huge increase in renewable energy (RE) in Europe for 2030, offshore wind energy (OWE) is growing in relatively few European countries at present (WindEurope, 2021). This is

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due to various factors. Firstly, OWE installations are more technically complicated in terms of design, construction, and operation (Esteban et al., 2011), which leads to higher costs, sometimes two or three times higher than onshore costs (Zhixin et al., 2009). Secondly, offshore development is enormously dependent on a favourable energy policy framework and social support in these countries. These vary greatly from one country to the next and even at different times within the same country.

The current energy crisis, with high prices and supply uncertainty, is causing EU countries to try to become more self-sufficient in energy terms by accelerating the development of domestic renewables. OWE is gaining support in many countries due to its rapidly falling costs (Qu et al., 2021). OWFs may give rise to conflicts and opposition from coastal communities with unique sociocultural values linked to the sea, however, which is also vital for their economies. It is important to avoid these conflicts because, as European Commission recommendation 2022/822 makes clear, delays in processing RE project authorisations could jeopardise the timely reaching of energy and climate targets and increase the cost of the projects.

This paper traces the ambivalent responses to offshore wind farming projects in coastal communities in Southern Spain. Surveys carried out by the authors in previous years (between 2012 and 2022) indicated a divided response in local communities, which has been changing over time. The aim of this paper is to explore the main driving forces behind the perception of OWFs in rural coastal communities and compare their views of on-land and offshore facilities, their impacts on the landscape and the seascape, their opinions regarding their compatibility with local territorial practices and socioeconomic values. In addition, we aim to work towards a new understanding of the seascape as a dynamic entity characterised by changing social relationships, rather than as a visually static backdrop to our lives. We argue that local visions of OWFs are less affected by the specific characteristics of these installations or by the overall perception of wind energy, and are much more a product of the, often complex, set of relations linking coastal communities with the seascape and marine resources. The potential emergence of new seascapes in which this renewable energy resource plays an important role is therefore closely linked to public perceptions of the seascape, which, in turn, are linked to the specific social, political, economic, and cultural characteristics and values of the coastal regions and their local communities.

After reviewing the theoretical background (Section 2) and explaining the current situation of renewable energy development in Spain (Section 3) below, Section 4 describes the case study area and explains the methodology applied. Section 5 considers the main factors influencing the perception of OWFs by coastal communities in rural areas. Section 6 offers a discussion of the results in the light of relations between coastal communities and seascape and marine resources. The paper concludes with compelling findings and recommendations for future OWF development (Section 7).

## 2. Theoretical background

### 2.1 Offshore wind farms, marine spatial planning and coastal communities

In recent years, the appearance of fixed structures, such as OWFs, in the sea is viewed as a sign of its growing industrialisation and of a conceptual shift away from

a natural environment to a cultural landscape, i.e. one that is being visibly altered by society. Besides the usual ‘developer’ vs. ‘local population’ syndrome, larger scale issues such as the conflict between energy policy/planning and spatial/land use planning processes need to be addressed at varying scales (Greer-Wootten, 2017). This is manifested, for example, in the emergence of a spatial planning perspective of the sea, defined as a normative approach to develop, order, and secure marine space (Douvere and Ehler, 2009; MABL, 2005), and the designation of large-scale “suitable areas” for offshore wind farming. But this rational “spatial” perspective of the sea as a renewable energy seascape run by politicians and planners is often completely unrelated to that of local residents (Gee et al., 2017; Todt et al., 2011; Wolsink, 2010). Moreover, as Saunders et al. (2019) pointed out, maritime spatial planning is largely devoid of social context, avoids meaningful inclusion of dissenting stakeholders, is based on limited, mainly technical knowledge input, and is “mostly concerned to give effect to a state agenda that privileges elite or powerful groups, and lacks meaningful consideration of the distribution of the cost and benefits of marine use” (see also: Flannery et al., 2016; Flannery et al., 2018; Jentoft, 2017; Kidd and Ellis, 2012; Ritchie, 2014; Tafon, 2018).

Offshore wind farming can cause changes in sea-related activities and values (Gee and Burkhard, 2010; Busch et al., 2011). Its potential benefits must be balanced against possible drawbacks, as there are still many questions regarding the compatibility of large-scale OWFs with nature conservation, shipping, and fishing (Busch et al., 2011; Todt, González and Estévez, 2011), and with tourism (Westerberg, Jacobsen and Lifran, 2013). There is also growing divergence between the conception of the sea of those who experience it first-hand daily (such as fishermen) and those with a more remote, more distant perspective (such as OWF planners).

Therefore, despite its considerable growth and active promotion at national levels, OWFs are often a question for debate within the local community. Relations between society and the sea are underpinned by a broad array of religious, aesthetic, economic and place-based values (McKinley et al., 2019). Although our perceptions of the sea have changed over the centuries in response to greater technological control, our relationship with the sea remains ambiguous. Coastal communities, particularly on rural parts of the shoreline, often depend on fisheries, tourism, and agriculture, and have developed their own unique cultural activities and traditions, and the necessary resilience to cope with and adapt to developments and changes on the coast over generations (Lange and Cummins, 2021). There can be a strong sense of belonging to the sea, “not so much a landscape, not a sense of geography alone, nor of history alone, but a formal order of experience in which all these are merged” (MacKinnon and Brennan, 2012, p. 7).

Several reasons have been put forward to explain the negative reactions from coastal communities to OWF projects. Some research suggests it is due to the fact there is no community ownership of OWFs (Haggett, 2008; Bush and Hoagland, 2016). After initial resistance, some communities in the UK now accept “their” OWFs, after receiving compensatory payments to community funds. Other research suggests that visual aspects are paramount and the question of whether OWFs will be visible from the coast (Ladenburg and Dubgaard, 2009). Thus, landscape impact assessment becomes essential for local communities, especially if the deployment of OWFs could come into conflict with other economic activities in the area (Mehdi et al., 2018; Qu et al., 2021).

## 2.2 Renewable energy landscape and seascape

The different approaches to landscape policy and planning have different visions of the landscape. It has been variously regarded as a visual surface to be protected from visual interferences that might alter it (picturesque paradigm); as a part of the environment to be protected via the management of protected areas of different sizes (environmental paradigm); and as a part of the environment that has been shaped and endowed with shared meaning and values through cultural representations and territorial practices (cultural paradigm) (Bouneau and Varaschin, 2012). This third approach reaches beyond the expert view of landscape as a purely material entity and considers the opinions of the people who share, value and use it (Olwig, 2007). This way of conceiving landscape has affected the approach to energy landscapes in Europe. Initially viewed as de-naturalised, instrumental space, energy landscapes are increasingly perceived not only as material objects, but also as “containers” of deeply rooted local perceptions and sensitivities. Paraphrasing Calvert (2016, p. 110) the concept of a “renewable energy landscape” helps us to understand how different modes of sustainable energy production, distribution and use underpin both material (i.e. landscape form and livelihood arrangements) and immaterial relationships (i.e. perception and representation).

A “renewable energy seascape” is now emerging, as happened earlier with renewable energy landscapes. Just like any energy landscape, an energy seascape is the result of heterogeneous, multi-dimensional – i.e. material, social, institutional, political and historical – processes that take place above all within the local realm (e.g. Frolova et al., 2019; Nadaï and van der Horst, 2010). Such approaches are interesting when it comes to understanding the relationships between the physical, social, economic, and cultural processes that underlie the energy transition and the issues raised by the transformations they induce. A renewable energy seascape might be viewed as “a process itself in reconfiguring, in turn, the entities and relations that underlie its evolution” (Greer-Wootten, 2017, p. 63). Although it is not a “dwelling place”, the sea has long-standing links with cultural practices such as fishing or trading and has a deep cultural meaning as a place of local, regional, and national identity. In discourse terms, like any other energy landscape, the renewable energy seascape is interwoven with socio-spatial identities such as “community”, “nation”, “home”, “local” and “region” (Calvert, 2016).

As offshore wind-power develops, it seems likely that abstract, planning-oriented views of the sea from an essentially industrial, rational perspective will collide with these more emotional interpretations of the sea as a seascape. For those who live by the sea or come to visit it as tourists, it cannot simply be regarded as an abstract, empty space available for industrialisation, and instead must be viewed as a place that carries different meanings and which represents a point of identification for coastal communities. McKinley et al. (2019) emphasised a significant lack of consideration of social values, perceptions, and attitude-based data in the literature on Marine Spatial Planning (MSP). While most publications on MSP focus on societal relationships with the sea through resource use, the blue growth agenda, etc., it is also necessary to take the less tangible aspects of these relationships into account. Public perceptions need to be taken into consideration in OWF planning and consulting with stakeholders, and must be a critical issue in the decision-making process (Chen et al., 2015).

## 3. Wind energy development in Spain

By the end of May 2022, Spain had an installed wind-power capacity of 28,831 MW, producing 54.899 GW/h in 2020 (see Fig. 1) (REE, 2021b). A stable regulatory framework has been a key driver behind the rapid development of wind power in Spain. The structure of the sector and the scale of the developments have also played an important role. Between 1998 and 2012, Spain’s renewables policy was based exclusively on quantitative targets and economic incentives (feed-in tariffs), and the Spanish Government paid no attention to qualitative, spatial planning-related issues (Frolova et al., 2015). As a result, wind power developments have tended to be large scale and implemented in a centralised, top-down, technocratic fashion, an approach that has been promoted by the private-public partnership model (Frolova and Pérez, 2011; Alonso et al., 2016).

Despite having one of the fastest rates of wind power growth in Europe, offshore wind power development in Spain has been relatively slow. A huge increase in offshore wind power capacity was expected. The initial target of 3,000 MW by the year 2020, however, set out in the National Plan on Renewable Energies (Ministry for the Ecological Transition, 2011) was first scaled back to 750MW, and ultimately completely abandoned.

Although 32 OWF projects were planned prior to the economic crisis of 2008 (17 in Andalusia, 7 in Galicia, 3 in Valencia, 4 in Catalonia and 1 in Murcia) by companies such as Acciona and Iberdrola Renewables, Endesa, Unión Fenosa, Enerfin and Capital Energy (AEE, 2009), in the end they were all shelved, and today there is only one commercial operating OWF (ELISA) in the whole of Spain, with an installed capacity of 5 MW. A range of different factors have obstructed the deployment of OWE in this country: the character of the seabed, which limits the technical and economic viability of installations with bottom-fixed anchorage in Spanish waters; the lack of support for experimental offshore projects; the withdrawal of economic incentives by 2012 due to the economic crisis; a complex regulatory framework; unwieldy bureaucratic processes; limited availability of information; and strong opposition from local authorities and residents in some municipalities (Quero et al., 2021).

The general context is changing, however, and the current Spanish Government is strongly committed to renewable energy development. As a result, a new wave of expansion of green energies is taking place. Spain’s National Integrated Energy and Climate Plan (PNIEC) 2021–2030 has set a target of 50 GW of installed wind power capacity in 2030 from both onshore and OWFs. To achieve this goal, the current capacity

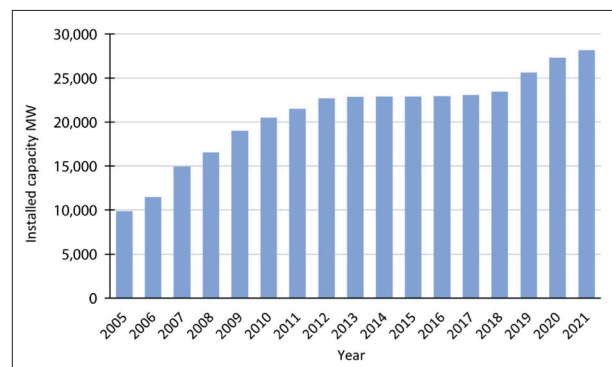


Fig. 1: Cumulative wind power capacity in Spain from 2005 to 2021 (MW). Source: Asociación Empresarial Eólica (AEE) (2022); authors’ elaboration



of 25.7 GW would have to be almost doubled. The targets for 2030 are from 1 to 3 GW of offshore wind and 40–60 MW of marine energy. The Roadmap for the Development of Offshore Wind and Marine Energy in Spain, however, published in 2021 (Ministry for the Ecological Transition, 2021), does not set out a timetable or specify the power to be installed. This lack of precision has nothing to do with a lack of potential energy, in that according to the Study on the Gross Potential of Marine Energies on the Andalusian Coastline of the Andalusian Energy Agency (AAE, 2009), up to 11,000 MW of OWE could be produced in the Andalusia region alone.

Marine spatial planning in Spain remains the responsibility of the central government, and public participation regarding OWF planning has so far consisted of formal consultations during the regulatory phases as part of the preparation and environmental assessment of the project (Frolova and Pérez, 2011; Quero et al., 2021; Suárez de Vivero and Rodríguez, 2012). Royal Decree (RD) 1028/2007 (which was complemented in 2009 with the Strategic Environmental Assessment of the Spanish Coast for OWFs Installation) identified 72 areas, which were classified as either: (i) suitable; (ii) an exclusion zone; or (iii) suitable but with environmental impact of the OWFs. Decision making in offshore wind power planning was left in the hands of a committee made up of representatives of several ministries, and the participation of the regional governments (known as Autonomous Communities) was limited to one representative of the region concerned (Frolova and Pérez, 2011). In 2021, the Spanish Ministry of the Economy issued Plans for the Management of Marine Spaces (POEMs), with spatial planning based on five marine demarcations, identified by Law 41/2010 and two types of area for the possible deployment of OWFs, namely:

1. areas considered of priority use for OWE (ZUPER); and
2. areas with high potential for OWE development (ZAPER).

The POEMs were criticised for their overly general geographic scale of planning, which does not correspond to the characteristics and the density of the marine space in some demarcations. There were also calls for specific plans with a smaller scale and a higher level of detail for certain marine areas that are intensively used for various purposes (Quero et al., 2021).

## 4. Data and methods

### 4.1 The case studies

The case studies are the result of long-term research over the last ten years in municipalities on the Atlantic Coast of the province of Cadiz in the Autonomous Region of Andalusia (Fig. 2). This area was chosen because of its long history of intensive deployment of on-land wind energy projects, the failure of several OWE schemes and a recent application for a new offshore project.

Due to its almost constant exposure to winds from the Atlantic, this province is extremely well suited to wind energy development and is the leader in wind energy production, in Andalusia. There are 71 onshore wind farms currently in operation in the Province of Cádiz (out of a total of 155 in Andalusia as a whole) with an installed capacity of 1,395.97 MW. This represents about 39.7% of the total installed capacity in Andalusia (3515.47 MW) (AEE, 2009). In the municipality of Tarifa alone, there are 32 wind farms with a total installed capacity of 548.20 MW, while in Vejer there are 7 wind farms with a capacity of 107.88 MW. These farms are concentrated in coastal areas (around 80% of the

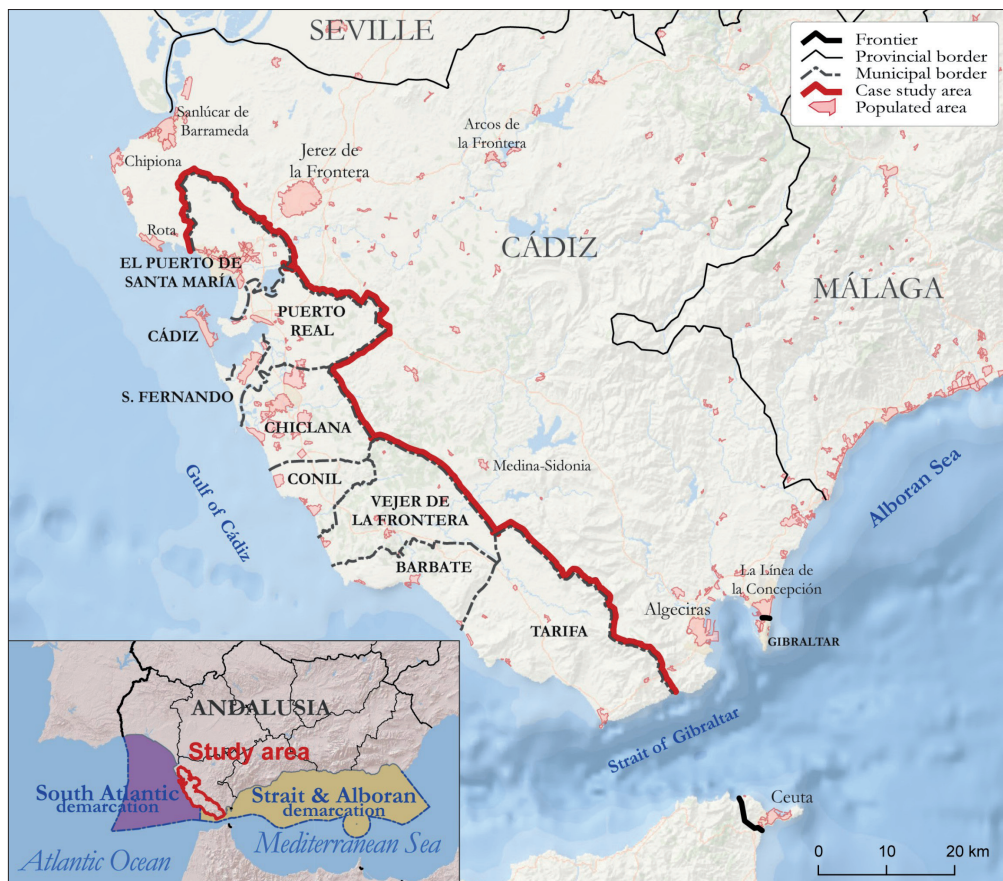


Fig. 2: Study area in the province of Cádiz  
Source: authors' elaboration

capacity on the entire Andalusian coast is in the Province of Cadiz). In Tarifa alone, there are about 1.33 wind turbines per km<sup>2</sup> (Díaz-Cuevas et al., 2016).

Cádiz is a large province (743,585 ha) with important natural resources. Over 30% of its total area is covered by Natural protection status (IECA, 2021), and there are several military bases in which land use is subject to severe restrictions. This is particularly evident in the municipality of Barbate, where protected areas and military bases make up over 82.8% of its total area, considerably limiting possible land uses for the local population.

At the same time, the province of Cádiz has the second highest unemployment rate in Spain (about 26% in 2021). These figures are even higher in the municipalities that depend on shipbuilding and fishing, such as Barbate (about 40% in 2021). Its traditional socioeconomic structure is based above all on the primary sector (agriculture, extensive livestock farming and fisheries), and includes artisanal fishing of bluefin tuna using a method known as *almadraba*, applied in the area since ancient times. The situation has been changing a great deal recently, however, and tourism and related activities are now a mainstay of the local economy. Many jobs have been lost in the shrinking agricultural, livestock, forestry, and fishing sectors.

On-land wind energy installations developed early in Cadiz (from the 1980s), compared to the rest of Spain and indeed Europe. These were centred above all in Tarifa, the municipality with the highest wind power capacity in Spain (REE, 2021a). The province of Cádiz is situated in the south-west corner of Andalusia and has a huge coastline running along the Atlantic Ocean and the Mediterranean Sea (including the Gulf of Cádiz, the Strait of Gibraltar, and the Alborán Sea). Its marine area is divided into two POEM demarcations (the South Atlantic Demarcation and the Strait of Gibraltar Demarcation). These demarcations contain the Gulf of Cádiz, the Strait of Gibraltar and the Alborán Sea, marine areas which are densely occupied and used for a multitude of different purposes: shipping (with busy traffic in the Strait of Gibraltar), fishing, recreation and tourism, the quarrying of aggregates, military activities, oil fields, transport, and mariculture.

The seascapes and coastal landscapes in these areas vary greatly: the northern part of the Gulf of Cádiz has an industrialised seascape with ports, intense shipping traffic and a developed, urban coastal area, while its central and southern sections have a more natural open seascape, with large, relatively undeveloped beaches. The Strait of Gibraltar is a very narrow (just 13 km wide in some places), densely occupied shipping lane with busy ports and excellent views of the North African coast.

Some parts of the sea, which offer a natural habitat for birds and marine fauna and flora, are designated as protected marine areas. The Strait of Gibraltar is an important flight path for migratory birds travelling from Europe to Africa. There is also considerable archaeological heritage in the sea off Cape Trafalgar, a fact that bears witness to past naval and shipping activities produced by the increase in commercial relations and military expansion. These diverse uses and values coincide with the multiple, often diverging interests of the various stakeholders involved, and the way they use the different resources offered by the sea. The parallel existence of multiple constructs is instrumental in the emerging conflicts of use. It is also important to stress that the role of some traditional activities in the local economy is changing due to both internal and external factors. The

contribution made by fishing, for example, to the economy of the Cádiz region has been declining for several decades, although its associated cultural and social values remain important. The very local scale of many of these uses and values does not fit well with the much larger scale used in maritime spatial planning for these two demarcations, which inevitably overlooks specific, local characteristics.

Figure 3 shows a map of the various pilot OWF projects proposed in the Bay of Cádiz (most of them in the 2000s). In the end, none of these projects went ahead because of the withdrawal of economic incentives for renewable power installations in Spain and the strong opposition of the municipalities concerned. The Forum for Offshore Wind Energy and Suitable Development, created by local stakeholders, was the first example of active participation by the public in OWF planning in Spain (Todt et al., 2011). Now, a new offshore wind project between Rota and Cádiz (“Bahía de Cádiz” wind farm) is again generating a controversial debate on OWFs in the local media (Diario de Cádiz, 2022b).

#### 4.2 Methods

We applied a multi-data approach, based on several stages of data collection and analysis, including previous documentary analysis, field observation, and in-depth interviews. Our research involved the following phases.

1. We analysed the planning tools for wind energy at national and regional levels and their evolution over the period 2003–2022. Case studies were identified and selected based on available literature/media documents. This included secondary literature and direct documentary information on wind power development in Spain since the 1980s, policy documents, the websites of the organisations involved, local newspaper articles, and academic literature on the opposition to these projects over the period 2003–2009 (Díaz, 2016; González and Estévez, 2005; Todt et al., 2011, etc.). On the basis of the sub-regional territorial plans and the literature on the Cadiz province coastline landscapes, coastal landscapes affected by wind development were differentiated in our study area (Palma, 1997; POT de la Costa Noroeste de Cádiz; POT del Campo de Gibraltar; POT de La Janda; Plan Estratégico Conil 25: Capital Natural, 2015). Through the literature analysis we also detected the sites of planned offshore wind farms.
2. Field observation was performed in these areas. Photographs of onshore wind farms and coastal spaces with different characteristics (cliffs, marshes, beaches, dunes, towns, fishing ports and marinas, coastal roads, etc.) were taken from the areas with highest concentration of population, viewpoints and main roads. The empirical information obtained from the analysis of documents and field observations allowed us to select principle stakeholders and issues related to wind energy development to explore in the interviews with them. The stakeholders included local politicians (town councillors and mayors), fishermen, tourism entrepreneurs, farmers, environmental protection officers, environmental NGOs, Regional Energy Agencies, and the representatives of Natural Parks, etc. Although there were already large numbers of on-land wind farms (OLWFs) in the area and local people had been living with them for decades, no OWFs had been constructed in the area.
3. In the periods 2012–2015 and 2018–2022, we conducted in-depth interviews in several coastal municipalities



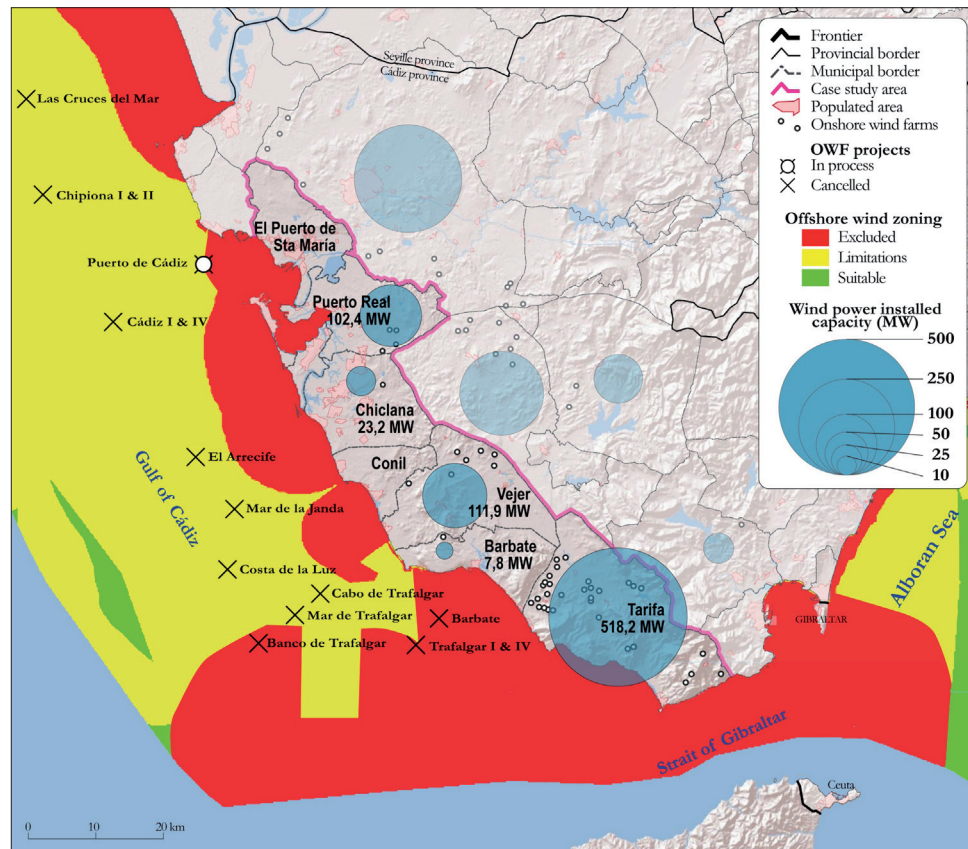


Fig. 3: Pilot OWF projects in the Bay of Cádiz

Source: Elaborated by the authors based on data from the Atlas Eólico IDAE and Global Offshore Wind Farms Database

in the province of Cádiz, adjacent to proposed offshore wind projects (Fig. 4). Some 45 in-depth interviews were held with different local stakeholders affected by the development of wind power projects. We conducted 28 interviews over the period 2012–2015 and 17 over the period 2018–2022. The photographs obtained in the phase 2 were used during the phase 3 to consult the interviewees about the most valued coastal and marine spaces. Although responses on OLWFs were based on real experience, as no OWFs had been constructed in the area, the responses on these projects were largely based on expectations regarding offshore wind development and its possible future impacts, rather than on real experience.

The interviews began with some questions about the personal background of the interviewees, before going on to focus on their values, attitudes, perceptions, beliefs, and experiences about the marine and coastal environment and wind energy projects. In the interviews, we explored their perceptions of the local landscape and seascape, how the resources associated with the sea and the wind are used, and the customs and practices related to different uses of the sea. Interviewees were also asked about the perceived benefits of wind energy projects (both on-land and offshore) and the threats posed by OWFs for other sea uses, such as fishing, tourism, nature protection, etc. All the interviews were intended to be individual, although in one case the interviewee brought two other people with him (Fig. 4). The interviews lasted between 30 minutes and two hours and were all transcribed verbatim.

4. In our analysis of the interviewees' responses, we sought to identify the items that appeared repeatedly in the interviews, and those that appeared in relation to many

other elements. These items were also compared with elements considered as important in the literature on the wind farms perception analysed during the phase 1, and our field observations. These items were classified according to the following categories: perceived landscape and seascape impacts, local practices, benefits, and the fairness of the planning process.

## 5. Results

In this section, we explore local attitudes towards OWFs within the framework of the local resources available to coastal communities and the different elements of their identity. We then compare their perceptions of on-land and offshore facilities, their perceived impact on both the landscape and the seascape, and their opinions regarding their compatibility with local territorial practices and



Fig. 4: Interview with the members of the fisherman association of Barbate. Photo: Y. Prokopenko

socioeconomic values. Finally, we look at questions of fairness in terms of the social, economic, and environmental benefits and the various drawbacks of each kind of windfarm (on-land and offshore) and the public confidence they inspire.

### 5.1 Seascape, wind, and the construction of local identity

The sea and the wind are both perceived as essential local resources and elements of local identity. “Many families get by with the help of the sea...”, said the President of a local Fishermen’s Association. Another interviewee remarked that “The sea is an enormous source of resources and part of the identity of all the Levante (eastern) shore...”. While tourism is the biggest economic activity in the area, fishing, varied land- and seascapes, unspoilt beaches and wind all make essential contributions to this important sector. Residents usually associate all these resources with the sea.

Throughout history, the sea has helped sustain the local populations. They do not regard it as an empty space and instead view the sea as full of meaning and symbolism: “The sea is a full space... a space full of life...”, a natural resource that “should be treated properly and safely”, since it will be “inherited by future generations”, according to the President of a local Fishermen’s Association. One of the local mayors pointed out that: “Tarifa and the sea have been an inseparable couple throughout history...”.

The sea is also closely linked to emotional values about the life within it, its aesthetic meaning, and its close ties with wellness and local identity. As one of our respondents said: “Mar” (Spanish for sea) was one of the first words my two-year old ever said. I like it. I’m lucky to live by the sea”. Another respondent added: “It’s a sacred place, the sea gives you something: energy, health...”. The mayor of one of the towns pointed out: “It is life... It is everything for us”. A member of a local association in Tarifa said: “The local seascape is very beautiful, and the submarine landscape is very wild. These are part of the success of Tarifa, which lives on tourism and its resources”.

The seascape also has important aesthetic values. Our interviewees distinguished several different seascapes in our study area: the Strait of Gibraltar, the more industrialised northern end of the Gulf of Cádiz and its “pristine” southern side. Place meaning is an integral part of the acceptance of OWFs. The Strait of Gibraltar is perceived as “a unique seascape”. As one of the Mayors of Tarifa we interviewed between 2012–2022 made clear: “In the area of the Strait of

Gibraltar, instead of seeing an immense open sea, we see the African continent, just 14 km far away from Tarifa”. Within Spain, which has long northern, eastern, and southern coastlines, the Gulf of Cadiz is quite special in that it faces west and for many years tourists have flocked to this area to watch and applaud the sun as it sets in the ocean (see Fig. 5). The Mayor of Tarifa said: “It seems a bit silly to us as it happens every single day, but two or three thousand people come to watch .... and they all start clapping ...”.

Fishing, and in particular, tuna fishing is a symbol of the Cádiz coast and has been a vital part of the economy for several thousand years, ever since the Phoenician era (1550–300 BC). The Atlantic bluefin tuna has been fished for centuries in the waters of Zahara de los Atunes and Conil using a unique technique called the *almadraba*. In some municipalities, traditional fishing is currently in difficulty and no longer plays an important role in the economy. However, it does remain an important feature of local identity. As the Mayor of Conil pointed out: “It is still very important socially”. The fish processing industry is still an important economic mainstay in some municipalities. As the Mayor of Barbate explained:

“Right now the fishing sector is the most important ... both culturally and economically because it supports both the fishing itself as well as the canning industry which is currently booming. Eighty per cent of the industrial estate is canning plants, most of which were opened in the last five years”.

Fishing has also left its mark on local landscapes with towns like Baelo Claudia – the centre of the fish trade during the Roman era, the Chanca de Conil tuna fish factory, which is now a museum, the Castle of Zahara, the fishing village of Sancti Petri and place names such as Zahara de los Atunes (literally translated as Zahara of the Tuna Fish).

The local westerly and easterly winds (the latter known locally as “our father Levante”) are also essential elements of local identity. It is a common belief in this region that the strong winds “protected this area from intensive urban development” and “mass tourism”, so saving it from becoming a second “Costa del Sol”, the highly developed tourist destination further along the Mediterranean coast to the East. As a result, the Tarifa and La Janda area still boasts unspoilt beaches, dunes, pine woods and wetlands, forming an ideal landscape for many tourists. It offers all the essential ingredients of a “sun and beach” holiday



Fig. 5: Tourists watching the sunset in Tarifa  
Photo: S. Briffaud



destination but with a natural landscape that makes it the exact antithesis of the Costa del Sol – so much so that a group of well-known Spanish writers and artists set up residence here in the summer, due to the relatively limited numbers of tourists, the peace and quiet, the harmony with nature and the wild landscape.

In addition, wind, which until the end of the 20<sup>th</sup> century was viewed as a barrier for local development, has now become an important local resource. According to the Mayor of Barbate: “*the wind was always a problem, ... but ... now it’s become an opportunity for Tarifa with kitesurfing and windfarms*”. The Head of an Ornithological Foundation in Tarifa explained: “*The wind has given rise to a wind industry ...*”. Numerous businesses have been set up on the back of wind-related tourism: “*kitesurfing, windsurfing, surfing, and other water sports have been a huge source of wealth for this area, enabling the town to become economically sustainable ...*”. These towns are the only wind tourism resorts in southern Spain. They have no competitors. And since the 1990s, windsurfing, kite surfing and other similar sports have become symbols of Tarifa and of the Cadiz coastline, in general. Even in Conil, about 65 km west of Tarifa, the Mayor declared: “*we are promoting nautical activities more and more... taking advantage of the wind to attract this kind of tourism*”.

The perception of the wind as a resource that benefits local people comes through the long-established presence and acceptance of OLWFs, which are generally viewed more positively than, for example, urban development in natural landscapes. One of the interviewees from Tarifa remarked that “*land-based wind energy... is an added value for the area because of its ecological and sustainable development values*”. Another respondent from Barbate made the following comparisons: “*Some infrastructures are much worse, especially within the towns, buildings, museums, etc., which spoil the area much more ... I prefer a windmill to a factory*”.

## 5.2 Factors behind the acceptance/rejection of on-land windfarms and their perceived impacts

### 5.2.1 Perceived impacts on landscape

In our study area, wind energy has been part of the landscape since 1988, when Tarifa’s first on-land commercial wind farms were officially registered as “experimental wind turbines”. Since then, several shifts in local perceptions of wind energy have been observed. According to the Mayor of Tarifa, a “laboratory” for wind energy development in Spain, in its initial stages, the local community did not receive any social or economic benefits from windfarm development, which met with widespread opposition. In addition, many of the windfarms were erected along bird migratory routes causing widespread mortality in the avian population. The swift development of wind energy in the Cadiz province led to a heated debate which, among other things, gave rise to the drawing-up of an On-land Wind Resource Organisation Plan in La Janda and nearby areas. This Plan classified the territory into areas that were considered compatible with the deployment of wind turbines, areas that were compatible under certain conditions, and areas considered incompatible. The plan also obliged developers to reach agreement amongst themselves regarding the territorial planning of wind farms in the programming sectors into which these Plans were divided (Baraja et al., 2015). This Plan, however, did not correct the mistakes of previous wind power developments. One of the Mayors clearly regretted this: “*What I think is sad is that*

*it could all have been planned much better without erecting windmills in an apparently random, haphazard fashion*”.

From the early 2000s, however, on-land wind energy development has become increasingly normalised in the area and in some municipalities is now the main economic resource. Paradoxically, local acceptance became widespread despite the progressive increase and concentration of on-land wind parks and their strong visual impacts. Many of our interviewees explained that local people had got used to the windmills:

“20 years on [since the first conflicts], the initial rejection of wind turbines and their impact on the landscape has disappeared” (local Mayor); “In Vejer ... they installed seven or eight wind-farms, and nobody minded ... Now we have some amazing views, and some windmills and people still take photos and it doesn’t mean that the world has suddenly come to an end” (local farmer); “I don’t think the windmills are ugly” (local environmental protection officer).

Most residents perceive windmills as a “lesser evil” and “the view of the wind turbine is preferred to that of other infrastructures or urban developments”. Another interviewee, an environmental protection officer in the area with the highest concentration of windmills, said:

“You get used to seeing a seventeen-floor skyscraper on the beach or a building and especially in the Málaga area at six o’clock in the afternoon in the summer, it casts a huge shadow over you as if the sun has already set and I don’t know ... I think there are worse things than that, worse things have been done ... there are a lot of people who come in to take photos of themselves with the turbines” (Fig. 6).

Some of the interviewees even argued that local people are more concerned about local seascapes than landscapes: “In my opinion, we don’t think they have so much impact on the landscape because we spend more time looking at the sea”.

### 5.2.2 Compatibility with local territorial practices and socioeconomic benefits

OLWFs are generally accepted by the local population and wind turbines are considered compatible with local land uses. The Head of a Cereal-Farming Cooperative in Conil pointed out that windfarms bring a whole series of benefits for farmers and have much less impact on land use compared to photovoltaic plants:

“First they produce money for the Council and then for the owner of the land. I like the energy produced by the windmills more than the photovoltaic plants, because they don’t spoil the land so much. All you need is a few tracks and that’s it”.

The mayor of one of the towns confirms that farmers can continue using the land where wind turbines are sited: “*in the case of wind-farms, the cows continue grazing and farmers continue sowing their seeds ...*” (Fig. 7). Other benefits mentioned by livestock farmers included the fact that the construction of wind farms and their associated tracks and paths made it easier for them to reach remote areas.

They also said that their animals enjoyed the shade provided by windmills in the hot summer months and the firm, well-surfaced paths when it was raining. Onshore windfarms are seen as a way not only to increase income for the owners of the land, but also for town councils who often rent out land for windmills. According to many interviewees, the landowners earned up to 6,000 Euros/year for each wind turbine installed on their land over the period 2012–2015.





Fig. 6: Wind farms near the village of Zahara de los Atunes  
Photo: M. Frolova



Fig. 7: Grazing cows near wind farms of Zahara de los Atunes  
Photo: M. Frolova

And as the Mayor of Tarifa (the town with the most intensive wind energy program) made clear in 2013: “Windfarms are the primary source of income for Tarifa Town Council... bringing in more than 2 million Euros per year” in taxes. Wind turbines are also accepted by many tourists and by the tourism sector. Some hotel owners in Tarifa even use windmills in their advertising brochures and the Tarifa business association produced an advertisement in which the mountain ridge was decked with windmills.

### 5.2.3 Questions of fairness, exclusion of local communities from the planning process and empowerment

Although many of those interviewed regard land-based windfarms as beneficial for their local economies, many complained that the income they generate is not distributed equally between all the different social groups and has no impact on their electricity bills. As one of the mayors emphasised:

“We get a decent amount of income from these turbines, but the people don’t reap the benefits directly ... they see them as very distant. The thing that affects them most directly is the electricity bill ... that each person must pay at home...”.

Another issue raised by local people was that wind farming was not really a solution to the energy problem.

A local teacher described wind-farm development as “a makeover operation”. She said,

“we always realised that the windmills spoil the landscape, and we did not believe that they were solving the energy problem. In fact, we came to the conclusion that they were fairly useless, we saw a lot of windmills that were not moving at all. There was a general sense of dissatisfaction due to the presence of monsters who were examples of the increasing taming of a landscape that we would prefer to keep wild.”

Many stakeholders feel excluded from the planning process and see the spatial planning procedure behind wind energy development as top-down and centralised. One of the Mayors said:

“I would say that the people have not participated in the decision to install windfarms even though we politicians are elected. But I don’t consider that to be participation, I understand it in a different way as participative democracy towards where we want to be”.

A manager of wind power energy planning from one of the local Town Councils explained it like this: “This activity is imposed upon us. We just granted a license. It used to be a Council decision but now the Council doesn’t decide, it’s the job of the Regional Department of the Environment, Industry

and *Regional Development*". An environmental protection officer from another town highlighted the weaknesses of the process of spatial planning of OLWFs:

"Before taking a decision on the siting of a windfarm, environmental impact studies are carried out. I do a study for you and if you don't like it, well you can get somebody else to do another study for you and perhaps they will give you a different opinion".

When members of the different coastal communities were asked about how much power they have in decisions on the use of local resources, significant differences were observed. In Barbate, the respondents felt particularly powerless as regards the use of their territorial resources. A Mayor of Barbate complained that

"40% of our municipal area is Natural Park and another fortysomething percent is a military area and that is real legal servitude... The result is that this town does not have the same growth potential as any other town with 100% of its municipal area to enable the town to grow or develop its tourism. We feel deceived by the higher tiers of government ... because I believe that the Natural Park, as well as being sustainable, should also be a much more important source of income for the town than it is at present. As regards the question of the Army, they tricked a previous Mayor into giving them 5,200 hectares. They promised to build a hospital and a football ground etc., and claimed we were going to be able to live on the Army presence.... They did nothing of what they promised and all they do is bother us with the noise from their planes at one o'clock in the morning, from explosions and firing their guns ... And we want to install a fish factory that would provide 150 jobs and they say no... They won't even give us 10 hectares and this is another production sector in Barbate... This explains why there is so much opposition. We don't want to be cheated again".

### 5.3 Factors behind the acceptance/rejection of OWFs and their perceived impacts

#### 5.3.1 Perceived impacts on the seascape

While public opinion regarding OLWFs is mostly positive, OWFs seem less popular. The idea of using the sea as an energy resource is not new in this area, but our interviewees consider that traditional uses of the sea for energy production were more environmentally friendly in terms of their impact on the sea and the landscape than future OWFs. A local teacher explained:

"In San Fernando... We've always tried to harness marine energies that were more landscape-friendly because we had watermills that were powered by waves, which have the opposite impact on the landscape in that they are sometimes quite beautiful and are under the water, so they don't produce this impact on the sea ...".

In fact, the perceived alteration of local seascapes is an important barrier for the acceptance of OWE. This was particularly evident in the interviews held in 2012–2015, when local people expressed mostly negative opinions about the visual impacts of OWFs: "A sea- and landscape disaster"; "destruction of a seascape"; – are common assessments of their impact. The local teacher complained: "If I were to look out to sea and see windmills, I think I'd break down and cry".

The OWE development projects proposed in this area at the beginning of this century (2003–2009) led a wide variety of stakeholders (Town Councils, local conservationist groups, fishermen's unions, tourism entrepreneurs, etc.) to

join forces in opposition to them (Frolova and Pérez, 2011; Todt et al., 2011; Baraja et al., 2015). These groups feared that the vibrations and the noise made by the turbines would affect the fishing grounds and the migration of birds, whales and bluefin tuna; they claimed that the windfarms were incompatible with underwater archaeological heritage, and that the fact that the turbines would be visible from the beach would alter local identity and damage tourism. They also feared that they would upset coastal dynamics and the clarity of the water, etc. One of the local Mayors remembered: "When the question of building offshore windfarms in the Sea of Trafalgar was first proposed in around 2008, it caused quite a stir". Another Mayor added:

"A platform against the offshore windfarms was set up and there was quite a lot of consensus between all the mayors along this part of the coast [La Janda], mayors from different sides of the political spectrum, we were all agreed" (Mayor Conil, 2013).

The sea off the coast of Cádiz is viewed as an area with many different uses and a fragile equilibrium between them all, on which a new use – renewable energy production – could have drastic effects. A representative of the NGO "Ecologists in Action" explained:

"In Cádiz this question is difficult because of the large number of constraints due to the presence of military bases and to protect biodiversity, unless they go a long way out to sea, but there they would interfere with shipping lanes."

The meanings we associate with places is another important factor in the acceptance of OWFs. In the Strait of Gibraltar, and southern and central parts of the Gulf of Cádiz, there is more opposition to OWF projects due to the "natural" seascape values attributed to these areas by our interviewees. Those near the Strait of Gibraltar were particularly concerned about the way OWFs might spoil the local seascape with Africa in the background – as one of the Mayors of Tarifa says:

"I cannot imagine the seascape we have here with wind turbines, perhaps in other places further away from the coast, maybe ... where the sea view stretches out to the distant horizon and there's nothing behind it, nothing so characteristic as the Strait".

Another Mayor of Tarifa listed the possible impacts of OWFs on the town:

"Shipping traffic, birds, whales, seascape, and then the transport of all the energy produced by the turbines and all the infrastructure that this requires on land will also produce a visual impact, plus the impact of the cables ... The electromagnetic impact has also been talked about a lot in our town.... They say you won't be able to see them that they're a long way off, but who's going to guarantee that once they've been erected? They would destroy this seascape, which is something innate to us, that we hold in our eyes and in our heart".

Most of the interviewees from the central area of the Gulf of Cádiz also reject OWFs because of their visual impact on the seascape. The President of the Conil Fishermen's Association said: "The only thing I'm worried about is their visual impact", while the President of the Conil Business Association made clear:

"Here the people are completely against offshore wind farms. I don't think they will accept the installation of windmills in the sea, because they will affect the bluefin tuna and the *almadrabas*, in addition to their visual impact... even if they are installed far away from the beach..."



The stakeholders from the Atlantic coast are also concerned about whether people will still want to come and watch the sunset if there are OWFs: *“they are going to ruin the sunset in the sea with the offshore wind turbines”*. In the more industrialised northern area, however, various interviewees are more positive about OWFs.

Visibility and distance from the coastline are important factors in the debate on the coast about the benefits of OWF. One of the Mayors had this to say: *“I’m not against them being installed in the sea but we don’t want to see them, they should install them further out to sea”*. Several local mayors interviewed in 2012–2015 were prepared to accept OWFs providing they were constructed far out to sea, where the visual impact was much less.

Not all the interviewees thought that OWFs would have a substantial visual impact, especially in the most recent interviews conducted in 2021–2022. They also mentioned that fog occurs frequently on the Cádiz coast and that this would drastically reduce the visual impact of the windmills. One interviewee from the Cádiz Port Association, where there are plans to construct a new OWF project said in 2021:

*“They’ve published pictures in the press with enormous turbines just off the beach of La Caleta, and obviously the visual impact is terrible, but the reality is that if these windfarms are eventually installed they will be so far out from the coast that their visual impact will be inappreciable and they won’t bother people so much”*.

There is also the possibility that local people will gradually get used to seeing OWFs: *“you get used to everything...”*, said one interviewee. Another interviewee remarked: *“In the same way as we got used to seeing windfarms on land, we will adapt to seeing them in the sea. It is something that is here to stay”*. Even those interviewees who expressed positive views about OWFs, however, would prefer it if they were constructed in industrial areas:

*“They would fit better in industrial areas or close to ports because you can situate the whole value chain there, create jobs in the local area and if this is combined with fish farming plants or green hydrogen, well, even better”*.

### 5.3.2 Compatibility with local territorial practices and socioeconomic benefits

Most stakeholders opposed to OWFs are worried about the possible damage they might cause to their businesses and do not believe that these projects will bring any socioeconomic benefits for their town. Many of the interviewees think that OWFs will not have any benefits for local people. One of them complained:

*“The technology would not be local; they would bring it in from outside. And what I am sure about is that they would occupy the space, that’s certain. The technical staff who would operate the platforms wouldn’t be from here either. I’m sure. Therefore, they would take over our natural space, and we would get nothing in return, because the main source of income in this town is fishing”*.

The possible negative impact of OWF on fishing lies at the core of many local concerns. These concerns cropped up at all the different stages of our research. One of the Mayors of Barbate remarked:

*“Most people disagree with installing wind turbines in the sea because we are a fishing town and anything that might endanger the already severely battered economy of our fishing sector could affect it and putting that at risk is in no one’s interest”*.

A local businessman pointed out that an essential condition for public acceptance of OWFs would be to demonstrate their positive economic impact on the town: *“putting wind turbines in the sea, without knowing what benefits they are going to bring, well, people’s first reaction will be to say ‘no’”*.

A Mayor of one of coastal municipalities expressed the same idea in more detail:

*“If wind energy is related with job creation, it will be welcomed, but if they present it to us as something that will ruin the *almadraba*, because it’s going to ruin the tuna fish, they’re going to ruin fishing because they can’t even catch squid or octopus. They’re going to destroy tourism because the visual impact is tremendous and the first thing you see from our town is the sea and some giant windmills, they’re going to be strongly opposed”*.

We observed that while during the initial research period (2003–2009) the OWF projects were widely rejected by residents, in later surveys conducted between 2012 and 2015, local communities were more receptive to their development as a means of creating wealth and employment.

In this case it is important to bear in mind the economic context in which the second round of interviews took place, with a severe economic crisis in an already vulnerable area. Some respondents argued that local people would be prepared to accept the strong perceived impacts of OWFs, if the projects brought economic and social benefits for the territory. The President of the Conil anti-wind-power platform, which paid a key role in the opposition to OWFs in 2003–2009, was interviewed in 2014:

*“We are not against alternative energy. You just must be a little bit fairer ... If they told us they were going to build the windfarms 40 miles out to sea... and that we won’t have to pay any electricity bills for the next 40 years and the farms won’t cause problems for fishermen, well we could sit down and discuss it”*.

The same year the President of the Fishermen’s Association in one of the towns said:

*“people in our sector think that if someone comes to install offshore wind farms and give us money, then we should accept it... That way there would be different jobs for us to work in ... For example, if we had a chance to put fish farms in the open sea, but we didn’t have the resources to do so, then OWF would make it possible”*.

A Mayor of one of the municipalities stated:

*“people’s perceptions will be positive if they tell us they’re going to set up factories for the assembly of wind turbines and they’re going to hire local people or set up fish farms under the windmills ...”*.

In 2021–2022, some respondents were more positive about the possible impacts of OWF on the local economy. *“Offshore windfarms will contribute to the local economy during construction and repair work. Projects of this kind always have a knock-on effect on the local economy”*, said the representative of the Cadiz Port Association, which is promoting a new OWF Project in Cádiz in 2021. Moreover, a local Mayor argued that in some cases, these farms will be highly beneficial for coastal communities: *“If you say ‘no’ to offshore windfarms, people get angry, because they need money now”*. In 2022, another interviewee, from the NGO “Ecologists in Action” stressed that:

*“We cannot waste this opportunity to create green jobs, as well as decarbonising the economy and reducing*

our dependence on oil, especially given everything that's happening in Ukraine, so if the [OWFs] are well-designed, well-planned and have no environmental problems..."

Although in recent years the coastal communities have tended to be more receptive to OWF, many people still oppose these projects, which are viewed as badly planned, without the participation of the coastal community. For example, the project proposed recently near the Port of Cádiz has been a source of great controversy in local newspapers (Diario de Cádiz, 2022a) and several interviewees rejected it outright. "It is pure speculation" – says a representative of the NGO Ecologists in Action:

"It's absolutely ridiculous to try to take advantage of a loophole in the port regulations to try to slip in a project that is completely unviable, not only because of the damage it will inflict on the landscape, but also because it affects shipping and the migration of critically endangered birds".

### 5.3.3 Issues of fairness, perceived exclusion of local communities from the planning process and empowerment

Another important issue was how the benefits of OWFs would be distributed within the coastal community. Local stakeholders were concerned about the fairness of the access to local resources and of the distribution of possible benefits from OWFs: "... This energy serves private interests, not those of citizens", one of the interviewees complained. A Mayor of one of the towns argued that it is very important for people to know "whether the benefits go to just a few or whether they are for the entire population"; another local stakeholder claimed: "I don't believe all this about financial compensation. It all ends up in foundations or in the hands of politicians".

According to our interviewees one of the best ways of avoiding unfairness would be to offer compensation to the fishermen, the sector most directly affected by OWFs. The Head of the Tarifa Fishermen's Association claimed that:

"99% of people agree with what I've just told you. It must have a direct input into the local economy. For fishermen, a wind farm is like a wall that we have to go through. They would have to give us tuna fishing quotas and some financial compensation too".

Many point out that the compensation schemes created by different public administrations, even for OLWFs, are ineffective. An expert emphasised in an interview in 2021:

"The compensation schemes are no good. In the end, the politicians set up their foundations and the money never actually reach the people. Rather than compensation, what we should be doing is correcting [the imbalances]."

Another common bone of contention amongst local stakeholders was their lack of control over the use of local marine resources. They feel totally excluded from the planning process and their economic interests are ignored. They also think that their access to these resources is being severely restricted and, in some cases, directly blocked. One of the interviewees from Barbate said:

"The land has its owner, but the sea belongs to the State, ... so ordinary people don't really have much to say unless it affects their business ... in this case fishing. If they put NATO ships here and windmills there, what can we do? Where can we fish?"

Another common grievance amongst stakeholders in our study area is that the process of planning and operation of wind farms is unfair. They insist that they support

renewables in general and wind power projects. The way the energy companies have taken control of their resources with no benefits for local energy consumers, however, is viewed as wrong. As one of local Mayors says:

"No one could possibly argue that in la Janda we haven't made a strong commitment to renewable energies, especially given the way the companies [mentions the name of one of them] hard sell you the electricity... Because... If not, they cut off the electricity to the school, they cut off electricity to the Town Hall or perhaps to the High School, and if not, they increase the prices or they force you to build a substation and you must pay for it and then assign it to them ..."

The power to decide about how to use local marine resources seems to be a key issue in attitudes towards OWFs. This would help empower coastal communities. Another Mayor offered his views on what would be a fair process of OWE planning:

"Offshore wind power development must be a joint project involving all the towns on the la Janda stretch of coast [including Barbate, Conil and Barbate] ... but ... everyone should benefit, not just the ones that always do, because we're afraid that ... they'll be mortgaging our future".

## 6. Discussion

Our study on the attitudes of coastal communities in Southern Spain towards wind energy projects gives a good overview of the main factors influencing local people's attitudes towards OWFs and the associated conflicts. These conflicts are closely linked to the perception of the sea and the wind as important local resources and the perceived right of the coastal region to generate wealth for its local community using these resources. Their attitude towards OWFs is also influenced by less tangible aspects of the underlying social, aesthetic, and cultural values that coastal communities attribute to the sea.

For the people who live on this stretch of coastline in the province of Cádiz, the sea is not an empty space. It is full of emotional, aesthetic, socioeconomic and cultural values and is used for a wide array of different purposes which seem threatened by OWF projects.

While OLWFs are generally viewed as compatible with other uses, such as farming, there is much greater resistance to the construction of offshore wind facilities. Our research shows that the fact that coastal communities have come to accept on-land windfarms does not necessarily mean that they will accept OWFs. They are perfectly aware of the need for renewable energy sources for more sustainable development and of the role that can be played by windfarms in general.

Paradoxically, according to most of our interviewees, on-land windfarms in this area are perceived as having less impact on the landscape than OWF projects have on the seascape. In general, they believe that on-land wind power developments are well integrated into the local landscape. The factors behind this positive perception are, for example, the fact that wind power has now been part of the Cádiz landscape for over a generation, that it is compatible with farming and other local practices, as well as the advantages offered directly by on-land wind power or indirectly via its impact on the local economy. As a result, the coastal community has a different relationship with local landscapes than their socioeconomic and cultural links with the seascape.



Here the perceived alteration of the seascape is an important barrier for the acceptance of OWFs, although many of our interviewees stated that they would accept OWFs if they were situated a long way away from the coast.

According to our findings, the main concerns amongst the people of this region regarding the installation of OWFs spring from their doubts as to how much their towns will benefit from OWFs and whether these benefits will be distributed fairly. They are also concerned about the effects they may have on the local economy, energy provision, and social development. Many feel that fishermen (part of the area's most vulnerable economic sector) should receive compensation for loss of income and reduced revenues. In line with other studies on stakeholders' acceptance of OWFs (Chen et al., 2015), however, many interviewees agree that the best strategy is to create new job opportunities to help fishermen, aquaculture farmers and local residents, or to train them in the skills they need to get better jobs.

The different perceptions regarding the economic and social benefits provided by on-land and offshore windfarms was another important issue for most of the stakeholders we interviewed. While most in the local communities appreciate the benefits they receive from on-land wind farms, even though they are not always distributed fairly, they often express completely different views about OWFs, which they believe will do more harm than good for local communities. Others feel that the installation of these facilities could cause control of local marine resources to be wrested away from them. The top-down spatial planning of marine energy systems without the involvement of local actors in the planning process and the fact that their social and cultural values are not considered, makes this feeling of being excluded from energy decision making even more acute amongst local people. There are therefore three key factors to help ensure that local communities are willing to accept OWFs:

- i. That they provide economic and social benefits for the area;
- ii. That they do not compete with other local uses of sea and wind resources; and
- iii. That they have the power to decide over how best to use these resources.

This is the best way to prevent them from feeling disempowered.

Sociocultural and economic relationships between coastal communities and OWF projects vary greatly from one place to another and at different times. As for the spatial variations within the study area, on the one hand, perceptions regarding the visual impact of OWFs varied in line with the different seascapes. The potential impact was considered more negative in attractive seascapes such as the Strait of Gibraltar and the largely unspoilt Atlantic coast of Tarifa, Barbate, Vejer and Conil, while the projects proposed in more industrialised port areas of the coast were viewed more positively. In addition, previous local experience with on-land windfarms, in which the community was more involved in the planning process and the benefits from wind facilities were considered to have been more fairly distributed, meant that some coastal communities in our study area were more predisposed to accept OWFs. Differences between the various towns in the study area in terms of their acceptance of wind projects are also linked to the perception in coastal communities regarding their power to decide on how to use local resources.

As for variations over time, we observed a gradual shift in local perceptions of wind energy installations in general, and especially of OWFs. During the first stage of wind-power development on land, the turbines were rejected by many local stakeholders. From the year 2000 onwards, however, they became increasingly normalised and integrated into local people's image of the landscape. At the same time (2003–2009) there was large-scale rejection of OWFs, in particular, when several OWF projects were proposed in the same area. From 2012 onwards, local communities became more receptive to OWF development as a mean of creating wealth and employment in an area that had been severely hit by the economic crisis, and in 2021–2022 OWFs were considered more acceptable by most of our respondents.

## 7. Conclusion and policy implications

Our research in the province of Cádiz in southwest Spain over more than ten years provides a valuable lens through which to explore the complex web of changing societal relationships with the sea and OWE. The production of OWE is an issue that goes far beyond the visual impact of the infrastructures. Our analysis of the responses of coastal communities to OWF projects shows that they are inextricably linked with the perception of the sea as an important local resource, over which these communities have less and less control.

Our results have challenged assumptions that coastal communities are more prepared to accept offshore wind-power development than on-land. Differences in local perceptions of the benefits of the former and the latter technologies and their relationship with seascape and marine resources are key to understanding coastal communities' responses to OWFs. While the negative visual impact on the seascape is another important obstacle to public acceptance of OWFs, our interviews show that local stakeholders would be more prepared to accept OWFs if they were situated further away from the coast and provided real benefits for local communities.

Our findings also show that opinions about OWFs can vary greatly from place to place and at different moments in time. These changing perceptions are linked not only to visual impacts and socioeconomic benefits, but also to fewer tangible aspects of our relationship with the sea. These cannot be captured by a purely visual definition of the seascape and instead require a multidimensional view that encompasses practices, emotions, and mindsets. Coastal communities have a very mixed set of values, attitudes, perceptions, beliefs, and experiences about the marine environment, which together form their vision of the seascape. Seascape is a useful tool for understanding local place perspectives and the sociocultural dimensions of renewable energy resources. These values and practices do not fit with the existing approach to MSP in Spain.

One of the greatest challenges is how to reconcile public perceptions of OWFs in coastal communities with the visions of planners and decision makers. This can be achieved through the co-management of marine spaces. It is therefore crucial to plan marine spaces in a way that respects existing sociocultural and economic processes, and the relationships between coastal communities and their seascapes.

The results of our empirical analysis show that the values, perceptions, and practices of coastal communities regarding the sea have a fundamental influence on their opinions on OWFs. If these were accounted for in OWF planning, the

likelihood of conflict and delay would be greatly reduced. Our research indicates that local people are more likely to accept these facilities, if they provide clear, tangible socioeconomic benefits for their communities and if a balanced, shared use of the sea can be guaranteed in which important local economic sectors can continue to thrive.

The implications of our findings for offshore energy planners in Spain is clear. With the recent increase in interest in offshore energy projects in Spain, the current energy crisis, high energy prices and rapidly falling costs of offshore technology, it is likely that OWFs will play an important role in Spain's future energy mix. The results of our study highlight that ignoring local perceptions and practices can result in long delays in offshore wind-power development, so heightening negative perceptions and community opposition.

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