



Article Connections between Water, Energy and Landscape: The Social Acceptance in the Monachil River Valley (South of Spain)

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Abstract: The relationship between water and renewable energy, as a vertebrate axis of the territory and landscape and its social acceptance in the Monachil river valley, was analysed. Qualitative interviews and surveys were designed and implemented using quantitative techniques that enabled the measure factors and dimensions of the perception of water, territory, and landscape. The main values and elements of the Monachil inventory, their links with ecosystem services, and traditional activities were identified. In addition, the influence of these premises on the acceptance of renewable energy projects was analysed. Results show that in Monachil, water is part of the territorial identity and landscape of the valley. There is also a strong link between the territory and hydroelectric power, which has generated a new energy landscape. More recently, solar energy has led them to pioneer an energy transition at the local scale. It is demonstrated how renewable energy infrastructures have been integrated into territorial practices.

Keywords: water; energy transition; renewable energy; landscape; social acceptance

1. Introduction

Since the beginning of the 21st century, and due to widespread concern over energy challenges, a very favourable framework for the development of renewable energies (RES-E) in Europe has been established. The energy challenges were related to both sustainability and greenhouse gas emissions, with the aim of improving supply and reducing imports. European governments supported this development with an energy policy that promoted RES-E, with economic incentives to the detriment of conventional energy sources [1]

Spain's implementation of European RES-E policies was successful until 2011. It has been a leading country in the installation of renewable electricity capacity, especially in wind, solar photovoltaic, and solar thermal technologies [2,3]. However, European renewable energy policies in the first decade of the 21st century also showed their limitations. It is recognised that the political and economic framework for their implementation is unstable and fluctuating. Even some of the most incentivising governments between 2011 and 2015 turned to retracting or abolishing feed-in tariffs, while re-prioritising the demands of the aggrieved conventional energy companies [4]. This led to the collapse of this sector in countries such as Spain, comparable to that of the real estate bubble. From 2018, Spain has made a clear institutional commitment to renewable energies by establishing increasingly favourable regulations combined with strong economic incentives. The goal is to achieve at least 32% of its energy from renewable energy sources by 2030, thus reducing greenhouse gas emissions to 40%, compared to 1990 emissions. Achieving these objectives will lead to a transformation of the energy system that encompasses technological, social, cultural, economic, and environmental aspects. The role of citizens and the general public in this process is strengthened and even more important in mountain landscapes. These territories



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Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). are often considered exceptional, due to their natural and cultural value, and they are often protected by national and regional environmental legislations that prohibit the industrial use of their resources, which would be detrimental to their conservation. Consequently, conflicts have arisen, with regard to the installation of RES-E infrastructures, because of their impact on the landscape.

Studies on the social perception of renewable energies and their relationship with the landscape and territory are of increasing interest to researchers. Generators of "clean" energy and renewable energy infrastructures are often perceived as sustainable development. However, their presence has opened a heated debate in many countries, in terms of their landscape and territorial impacts [4–7]. While the most 'acceptable' locations for these facilities have already been used, new projects encroach on the most densely populated areas, fertile soils, and valuable landscapes.

In the last decade, several papers have been published on the relationships between the landscape, the territory, hydropower, and its perception by the population [4,8–13]. Hydroelectric installations have generally been better accepted by the population, with power plants, reservoirs, dams, and canals being valued as authentic elements of the local landscape, which have contributed to the creation of hydroelectric landscapes [11]. In recent years, the perception of the different types of RES-E has changed, with solar photovoltaic energy taking centre stage in the vision of the future of energy transition. It is followed by biomass, which has relegated hydroelectricity to third place [14]. These studies highlight the need to expand studies on the social perception of renewable energies and improve the participation of the local population, involving social actors in the decision-making processes.

Based on these premises, the aim of this article is to study the relationship between water, renewable energies, and landscape in the Monachil river valley (located in Sierra Nevada, southern Spain), thus connecting them to societal value and identity and high-lighting their ecological importance. It also aims to analyse how the pressure exerted by RES-E on territorial values influences social acceptance.

Most of the studies that focus on the relationship between renewable energies, social acceptance, and landscape in mountain areas are mainly linked to the analysis of wind or solar energy. With the exception of Frolova's [4,8] works, no previous studies have been found on the relationship between water, renewable energies, and landscape in southern Spain. This study is presented as a necessary update that can serve as a reference for future studies that deepen and complements the multi-scale concept by focusing on the local level. This is of key importance in the current context of climate emergency, which demands speed and efficiency in future actions and, therefore, the efficient implementation of renewable energies. Furthermore, this study is based on the Millennium Ecosystems framework [15], and "the benefits that humans obtain from ecosystems" [16,17], focusing on indirect drivers of global change (demographic, socio-cultural, economic, etc.), which have generally been under-studied, but which are determinants in the acceleration of global change [18]. This approach can help people to give greater value and importance to their ecosystems and landscapes (through consideration of cultural aspects) and to take measures to care for and conserve them [19,20].

The present paper is divided into different sections. The "Background" section presents a general overview of the historical assessment of energy and water in Spain. The "Material and Methods" section presents the area under consideration and also the sources and methodology. The "Results and discussion" section presents and discuss the main results. Finally, the "Conclusions" section presents the conclusions.

2. Background

A multi-scale general overview of the historical assessment of energy and water in Spain is presented in Table 1. Special attention is given to the key actors who have influenced the social perception and relations between energy, water, and society.

	Period	Context
Hydroelectricity <5 MW	Late 19th century	Favourable topography. Available water resources. Small power plants—lighting nearby areas.
Hydroelectricity >5 MW	Mid-20th century	Emergence of alternating current—wide distribution area. Large plants reduce profitability, small plant closure.
Hydroelectricity and other renewable energies	1970–2009	1970 oil crisis. Renewable energies self-sufficiency reduce dependence on foreign energy and environmental impact. Special Regime. Recovery of hydroelectric projects and development of renewable energies.
Water Framework Directive (WFD)	2000	Water is a heritage to be protected, defended, and treated as such.
European Landscape Convention (EPC)	Europe 2000 Spain 2008	Cultural and natural heritage merge in an integral vision of the landscape that takes into account both natural and cultural aspects. Social dimension of landscape as an element of well-being.
Hydroelectricity and other RES-E	2009–2015	Stifle the development of the RES-E sector. Suspend economic incentives. Adopt fiscal measures that tax the generation and incorporation of energy into the electricity system. Elimination of the Special Regime. Charging for the use of inland waters. Same regulation for all installations that assume market obligations.
Hydroelectricity and other RES-E	2019- Current	New impetus for the renewable energy sector, backed by favourable legislation, incentives, and an international framework of uncertainty, where energy prices continue to rise. Processes are streamlined and EIAs, and public participation are eliminated for large wind and photovoltaic projects.

Table 1. Historical overview of hydropower in Spain.

Source: our compilation, based on Espejo Marín et al., 2017.

At the beginning of the 19th century, Spain had more than 60% of its active population engaged in agriculture with low land productivity, which triggered planned irrigation systems. Their evolution led to the use of natural river basins as fundamental planning units. Moreover, their purpose was to contribute to the expansion of irrigation, navigation, flood control, and energy production [21–23]. At that time, Spain was suffering from a chronic food deficit, and the expansion of irrigation was seen as the solution to the social conflicts existing in rural areas [24,25]. In 1939, the government of General Francisco Franco formulated a new plan that prioritised industry over agriculture and separated water policy from irrigation policy. This plan did not meet the objectives of irrigation, but the construction of dams progressed very rapidly, and the amount of water stored in reservoirs doubled between 1939 and 1952, thus leading to an exacerbated increase in hydroelectric power [21,23,25].

Although one hundred years later, the economic sectors had diversified and Spain was among the privileged nations of the world, the water issue was still very important. This was due to the shortages and droughts suffered, which highlighted the limits of the European water distribution system based on the hydraulic paradigm, i.e., a conscious government policy to develop water resources, so that everyone, everywhere, would have the water they wanted, when they wanted it [21–26].

At the same time, at the end of the 19th century, the development of hydroelectric energy began in Spain, due to the favourable topography and available water resources. The first hydroelectric developments were linked to small plants for lighting very close to the place of consumption [27]. This led to a large development of mini-hydroelectric plants of not more than 5 MW, which supplied nearby populations, as electricity could not yet be transported over long distances [28].

The emergence of alternating current expanded the area that power production plants could supply and, therefore, their geostrategic role. This caused the development of

large power plants and hydroelectric power stations in the mid-20th century, which led to the closure of hundreds of small mini-hydroelectric plants, due to lack of profitability, compared to these other facilities [27,29].

After the oil crisis of the 1970s, successive governments considered renewable energies, due to their autochthonous nature and capacity to reduce energy dependence, as well as their lower environmental impact [29]. From 1980 onwards, studies on the theoretical energy potential of rivers, together with the development of energy policies to promote renewable energy, encouraged the development of mini-hydropower [30]. This development continued until 2009, when the government changed its approach and tried to contain the development of the sector by suspending economic incentives, adopting fiscal measures to register the generation, incorporation of energy into the electricity system, and even establishing a tax for the use of inland waters for electricity production. Thus, the Special Regime was eliminated, and all installations were governed by the same market rules.

In 2000, the Water Framework Directive (WFD) [31] was published and transposed in Spain by Law 62/2003 [32]. This directive establishes that water is not a tradable commodity, but a heritage to be protected, defended, and treated as such. It organises the management of surface, inland, transitional, coastal, and ground water, in order to prevent and reduce pollution, promote its sustainable use, protect the aquatic environment, improve the status of aquatic ecosystems, and mitigate the effects of floods and droughts by setting a 15-year deadline for achieving its objectives.

The year 2000 also marked an important milestone related to landscape: the European Landscape Convention (ELC) [33], which was ratified by Spain in 2007 and came into force in 2008. This convention provides a new and solid framework for placing landscape at the forefront of European Cultural Heritage, Environment, and Spatial Planning policies. For the first time, the concepts of cultural and natural heritage are merged into a holistic view of landscape, taking both natural and cultural aspects into account. The social dimension of landscape was also introduced and defined as an element of well-being, highlighting the relationship established between human beings and the environment they inhabit. The ELC defines landscape as any part of the territory perceived by the population, whose character is the result of the action and interaction of natural or human factors; from this derives the importance of the population's perception of reality, since interventions on the territory must be assumed and approved by the population, in order to construct and protect the landscape.

At the end of 2016, the European Commission presented a legislative package, called the "Clean Energy for All Europeans" (COM (2016) 0860) [34], to achieve the 2030 targets on the promotion of the use of energy from renewable sources set out in the directive (EU) 2018/2001 [35].

Since 2018, Spain has given new impetus to the development of renewable energies by simplifying registration procedures (Royal Decree-Law 15/2018) [36] and eliminating the self-consumption tax (Royal Decree 244/2019) [37]. In addition, the directive (EU) 2019/944 on "citizens' energy communities" and "renewable energy communities" [38] obliges each state to submit its National Integrated Energy and Climate Plan (NICP). Subsequently, Royal Decree-Law 23/2020 [39] establishes the criteria for ordering grid access and connection permits, which are necessary for renewable energy developers to start up their plants.

In 2021, Royal Decree-Law 29/2021 [40] adopts urgent energy measures to promote electric mobility, self-consumption, and the deployment of renewable energies. In 2022, Royal Decree-Law 6/2022 [41] streamlines the procedures for renewable energy projects, thus eliminating the environmental impact assessment (EIA) procedure and public participation process for large state-competition projects, solar photovoltaic projects between 50 and 150 kW, and wind projects between 50 and 75 MW.

3. Material and Methods

3.1. Study Area

The municipality of Monachil is situated in the western part of the Sierra Nevada massif, in a fertile valley of the Vega of Granada, located 8 km from the capital. Its municipal district is the largest in Spain and covers a vast territory of 90.13 km². It is a municipality of great environmental value, with a large part protected by the Sierra Nevada National and Natural Park and the Los Cahorros gorge standing out, which is also included in the Andalusian Inventory of Georesources (Figure 1).

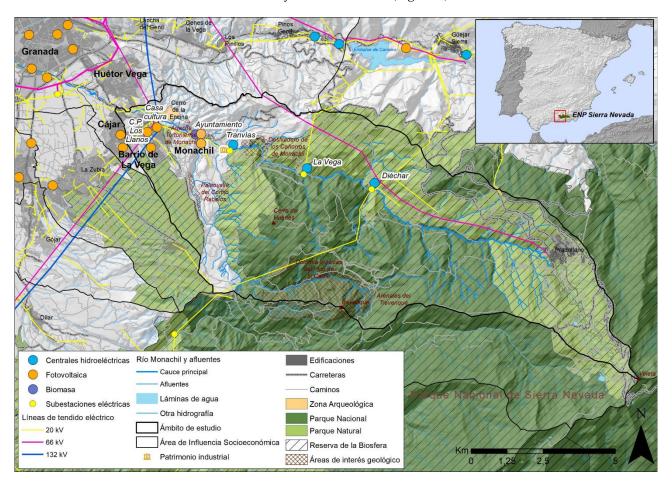


Figure 1. Study area—Monachil—Sierra Nevada. Source: our compilation, based on mapping of the VEDETTE project.

The Monachil River flows from west to east through the islet of Monachil, which has gradients ranging from 3394 m near Pico Veleta to 740 m in the lowlands. The river rises in the canyons of the Veleta, at an altitude of 2975 m, and flows for some 26 km through a narrow V-shaped valley in the beautiful landscape of Los Cahorros, until it flows into the River Genil on the outskirts of Granada. Its main tributary is the Arroyo del Huenes on its left bank.

The traditional activities in the region have always been small family farms growing cereals, potatoes, beans, and olives. Fruit crops such as cherry and almond trees appeared on farms as a secondary crop. Transhumance livestock farming specialised in sheep and goats [42], and there are still livestock farmers in the municipality today.

In the artisan–industrial sector, roof tile factories, oil and flour mills, essence boilers, and small hydroelectric power stations stood out. All these activities relieved the economies of day labourers and part-time peasants [42]. Crafts still have an important presence in the local economy, represented by ceramics, inlay, and esparto grass, among others. The light

factories, now converted into highly automated hydroelectric power stations, still employ some local workers.

Winter tourism is a very important economic source for the municipality, as it is home to the centre of Pradollano and most of the Sierra Nevada ski resort (which it shares with the municipalities of Güejar Sierra and Dílar). Summer tourism is becoming increasingly important, due to the boom in ecotourism, rural tourism, and active tourism in Sierra Nevada. The specific characteristics of Monachil include trails of great interest, such as the route of Cahorros of Monachil River. All these activities are dependent, to a large extent, on water and have a very strong territorial link.

Water and energy in the Monachil river valley have been of vital importance since the origins of the first human settlements (1700 to 800 BC) on a site called Cerro de la Encina, which, due to its strategic location on the "Los Olivares de Monachil" estate, served to control the passage to the Sierra Nevada, where the mining resources and pastures were located and fertile valley was easily accessible. Later, in Roman and Muslim times, the first irrigation channels were built to supply water for agriculture and to keep water in the valley for as long as possible during the summer. From the irrigation channels, mills were installed to grind flour and oil. The fulling mills used the motive power of water. Small hydroelectric power stations were also built on the river but were closed during the coal boom [43].

The direct or indirect transformations caused in the mountain landscape by renewable energy infrastructures have contributed to a change in landscape practices, and values and have sometimes generated relatively small but significant energy landscape complexes [4,44]. Several constructions are preserved in the territory, such as old mills (Los Aragonés mill, listed as BIC, Las Provincias mill) or ruins of the old hydroelectric power stations (La Trola hydroelectric power station), and a multitude of access roads that are now used by the population and tourism. In addition, the irrigation channels are still used today to transport water for agriculture and also function as ecological corridors that help to maintain the biodiversity of the natural spaces. Some of the hydroelectric power stations that had been decommissioned were also recovered, taking advantage of the boost given in the early 1990s to the generation of renewable energies. These plants were Tranvías, La Vega, and Diéchar, which are currently in operation.

The water from the high peaks, in the form of snow, has also been used for various purposes, such as the work of the "neveros" (who went up to get the snow at night to be able to refrigerate food, drinks or make ice cream) or tourist use of the ski resort, inaugurated in 1964, which gave a strong boost to the municipality. At present, water is also used to make artificial snow.

Finally, it is necessary to highlight that the municipality of Monachil is a leader in the commitment to energy efficiency and renewable energies, specifically in photovoltaic solar energy. This is due to the creation in 2018 of the Municipal Energy Office (OME Monachil) which, supported by an energy services cooperative (Cooperase), which promotes energy saving and renewable energy projects, helping to develop them in accommodation, restaurants, local industries, private homes, and municipal corporation buildings. They have also collaborated in the development of the "Comunidad Energética del Río Monachil", a local non-profit association that produces and shares energy in the locality. This association won the first prize of the Social Germinator of the cooperatives Som Energía and Coop57 [45] and is set as an example even at national level [46]. This has turned OME Monachil into a pilot project that is being replicated by other municipalities and even by the provincial council [47].

3.2. Material and Methods

This study is based on a review of secondary sources on the history of water use and the development of hydroelectric power in the Monachil river valley. The most relevant economic activities, legislation related to the subject, and published academic papers were also analysed. In parallel, supported by three research projects, interviews were carried out between 2012 and 2020 on aspects related to renewable energies and energy transition (Table 2).

Table 2. Interviews and surveys conducted in the area of study between 2012 and 2020.

2012–2015	5	2018–2020
Interview	s Interviews	Surveys
Total 20	10	118

Source: Our compilation.

Specifically, between 2012 and 2015, 20 interviews were carried out in Monachil linked to the project 1 "Ressources paysagères et ressources énergétiques dans les montagnes sud-européennes: Histoire, comparaison, expérimentation". Between 2018 and 2020, 10 interviews were carried out linked to the projects 2 "VErrous et DynamiquEs de la Transition énergétique en TErritoire demontagne: regards croisés sur les Alpes du Nord (France) et la Sierra Nevada (Espagne) (VEDETTE)" and 3 "Adaptation to Sustainable Energy Transition in Europe: Environmental, Socioeconomic and Cultural Aspects (ADAPTAS)".

The interviews were conducted with local stakeholders, as related to issues such as: public authorities (city and provincial council), promoters and entrepreneurs of local energy projects, rural development groups, entrepreneurs and workers in the hotel industry, active tourism and ecotourism, representatives of associations and other local groups, traditional workers (farmers, livestock farmers, and artisans), those responsible for the Sierra Nevada Natural Area and experts on landscape, biodiversity, land use planning, and renewable energies.

The first interview model (Supplementary Materials, Annex 1) was proposed by the French team of the project 1. Subsequently, this model was improved and modified by the Spanish team.

Semi-structured qualitative interviews were conducted that predetermined the relevant information to be obtained and a sequential script was written [48,49]. This model included the following themes:

- 1. The general presentation of the interviewee (his or her life, work, hobbies, problems, challenges, and initiatives in the valley).
- 2. Dynamics, evolution of the territory and main resources.
- 3. The relationship with the landscape.
- 4. The landscapes of the future.
- 5. Energy (renewable energies, renewable energy projects, relations with other economic activities in the locality, local articulation of the exploitation of resources, energy transition, factors that have led to the projects, and obstacles to their implementation).
- 6. Networks and social groups.

Finally, some reflections were shared with the interviewees to see if they had anything else to contribute.

The second interview model (Supplementary Materials, Annex 2) conducted in 2018–2020, was developed by a team linked to the projects 2 and 3 and included topics on:

- 1. Relationship to place.
- 2. Households and energy habits.
- 3. Energy transition.
- Local renewable and competition for resources.
- 5. Sustainability of renewable energy.
- 6. Energy landscapes.

The interviews were analysed through the identification and analysis of key words and key ideas from the interviewees. On the one hand, the ideas and key words were grouped into themes organised as broad categories and on the other hand, the language used by the interviewees was preserved to avoid the loss of information [48]. Once the phenomenon had been studied qualitatively, quantitative techniques were used [50] which numerically measured the different factors or dimensions of the perception of water, territory and landscape, through variables and their indicators [51–53].

Regarding the surveys carried out in 2018–2020 (Supplementary Materials, Annex 3), the aim was to reach the general population that is not organised in local collectives. The questionnaire model used combined quantitative and qualitative questions and included closed questions, with two or more pre-determined options and scaled questions to obtain relevant results and facilitate analysis.

The information from closed-ended questions is easier to interpret and analyse, as it is pre-delineated into a set of categories, however, it sometimes requires some cleaning and homogenisation. This system of analysis determines the words by counting the number of times they appear literally in the questions posed, and then classifying them into large groups, where they are structured and synthesised.

In addition to the analysis of the interviews and survey questions in an orderly fashion, a study was developed, in which information was obtained on the main ecosystem services or ecoservices valued by the population.

4. Discussion and Results

The main results are related to the analysis of hydroelectric energy in Monachil, relationship between identity values and ecosystem services, perception of renewable energies by stakeholders and the local population, fit of new energy projects in the territory, and evaluation of the pressure exerted by renewable energy projects on the fundamental resources or values of this territory.

4.1. Renewable Energy in Monachil: Hydroelectric Energy

At the beginning of the 20th century, the first hydroelectric power stations were built in Sierra Nevada and Monachil, which the local inhabitants called "light factories", containing only a small waterfall and little installed power (Table 3). These were used for the limited local lighting needs, as well as for larger projects, such as the Sierra Nevada Tramway, which revealed a close relationship between hydroelectric power generation projects and tourism. The tramway facilitated tourists access to Sierra Nevada via trails linked to these facilities. At that time, there was a strong link between electricity production and consumption [54], and everything was developed on a local scale. However, this link gradually disappeared, as a result of the development of alternating current power and, with it, transporting energy over long distances, which led to the gradual closure of all mini-power plants, as other more powerful and efficient ones were developed.

Table 3. Hydroelectric power in the Monachil river valley.

Designation	Installed Power	Waterfall Height	Operating Period	Owner	Recovery	Year of Recovery	State of Preservation
Old San Vicente Mill	7.5 kW	8 m	?	Antonio Jaldo Serrano	No		Disappeared
C.H. Sierra Nevada	20 kW	4.3 m	?	Eléctrica de Sierra Nevada	No		Disappeared
C.H. La Estrella	8 kW	20 m	?	Fernandez Amigos La Estrella	No		Disappeared
C.H. La Trola I	610 kW	35 m	1909	Eléctrica La Concepción	No		Ruined building
C.H. La Trola II	6 kW	11 m	?		No		Ruined building
C.H. Tranvías	1.900 kW	186 m	1907–1974	TEGSA supply (tramway)	Monachil town hall Power 2400 kW	1992	In operation
C.H. La Vega	2.200 kW	187 m	1904–1967	1894—Compañía General de Electricidad	Grupo Cuerva	1988	In operation
C.H. Diéchar	900 kW	160–173 m	1919–1966	Hidroeléctrica Santa Marta 800 MW	Sevillana Electricidad	1989	In operation

Source: our compilation, based on information from the Granada City Council, 2010, Andalusian Energy Agency, 2017 [55,56].

The oil crisis, together with the rise of environmental protection and geostrategic vision, facilitated feasibility studies that culminated in the recovery of many hydroelectric power plants [55]. In Monachil, three of these plants were recovered between 1988 and 1992, one public and two private, grouping around 5 kW of installed power. The publicly owned Tramway Plant has generated many resources for the municipality since its commissioning. These plants follow a different logic—the energy was not destined for local consumption but was fed into the grid. However, the link between them and the landscape has endured over time as has been verified through the interviews and surveys carried out, not only in the Monachil valley, but also in the Genil, Torrente, and Poqueira valleys.

In the first interviews the population claimed that energy infrastructures were part of the local identity [4]. This result remains unchanged between 2018 and 2020, as can be seen after the analysis of question 21 of the survey, in rows 1 and 7 (Table 4). Some hydroelectric installations, such as dams, former hydropower plants, etc., became an important part of the local landscape and heritage, and they are now considered to be tourist attractions [4].

Table 4. Local roots/memory/identity and renewable energy projects.

21. Are There Local Roots/Memories/Identities Related to Renewable Energy Projects in Your Territory?				
		Yes	No	I do not know
1	There are buildings/buildings and other objects related to renewable energy installations of historical/architectural interest (hydroelectric plants and dams, reservoirs, etc.).	53%	26.5%	20.5%
7	Old projects are part of the local landscape	52.1%	12%	35.9%

Source: Our compilation based on the results of the surveys, 2018–2020.

4.2. Identity Values and Ecosystem Services

According to the interviewees, the river and water are the elements most valued in the municipality. Many of the interviewees stated that Monachil would be another place without its river. They even highlighted that "being a long and narrow municipality, the municipal area revolves around the river, it is an interesting anecdote the culture of water, of the river here in Monachil" (Figure 2). These statements show how the culture of the water and river, as perceived through their historical use, survives in the municipality and is of the utmost importance to local inhabitants and stakeholders. It is also linked to many economic activities that are developed today, such as nature, active, eco-, sun, and snow tourism, as linked to ski resorts, agriculture, livestock, crafts, and the production of hydroelectric energy.

In addition, other outstanding values identified by the local stakeholders are those related to nature and landscape (which includes the nature, environment, mountain, image of the village, valley, views, and natural aesthetics), the sense of belonging (which includes the people, closeness, affection, good work, origins, and family), the ski resort and tranquillity (Figure 2).

Based on analysis of the surveys conducted among the local population of Monachil, the results show that the most important values were the river and water, followed by nature and landscape, tranquillity, and sense of belonging (Figure 3). The first two values coincide between stakeholders and the local population, although stakeholders attach more importance to the sense of belonging than to tranquillity, while the opposite is true for the population.

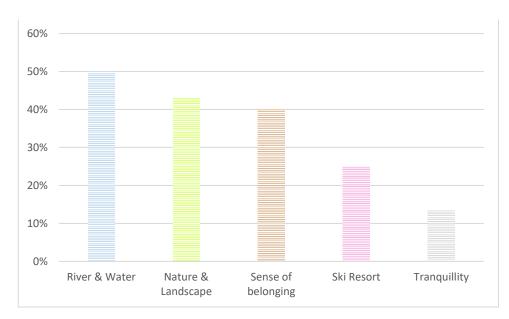


Figure 2. Values of Monachil as ascribed by the local stakeholders. Source: our compilation, based on interviews.

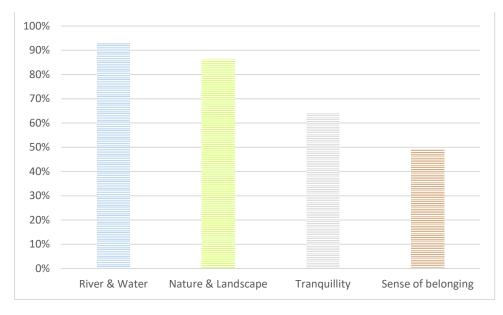


Figure 3. Values of Monachil by local population. Source: our compilation, based on analysis of surveys.

Although many elements coincide, it can be noted that there are also differences between the interests of the groups selected as local stakeholders and the local population. Thus, the local population of Monachil does not consider the ski resort to be an identifying element. These values and elements create a social construction of reality and local heritage, as driven by intersubjective or shared memory [57]. However, the valuation of certain elements in the collective imagination is not the only variable considered to grant them a cultural value. Economic, political, urban, educational, and professional factors, among others, must also be taken into account [58].

Despite these differences, it can be seen that the main values identified by local stakeholders and the population coincide, to a large extent, with the so-called ecosystem services provided by the mountain (Table 5).

	Ecosystem Services					
Area –	Main Values	Supply Services Regulatory Services Cultural Services				
Mountains	River and water Nature and landscape Tranquillity Sense of belonging	Water for irrigation and consumption Livestock products Agricultural products Forest products (harvesting) Forest products (timber) Medicinal products Minerals Hunting Energy	Climate regulation Pollination Habitat for species conservation Air quality Soil fertility Erosion control Water regulation	Aesthetic value Sense of belonging Rural and nature tourism Education and scientific knowledge Cultural traditions Traditional ecological knowledg Quality landscapes Peace and quiet		
Valleys	Nature and landscape River and water Tranquillity Sense of belonging	Agricultural products Livestock products Energy Water for irrigation and consumption	Soil fertility Pollination Climate regulation Habitat for species conservation Air quality Erosion control Water regulation	Traditional ecological knowledge Aesthetic value Sense of belonging Education and scientific knowledge Cultural traditions Quality landscape Peace and quiet		

Table 5. Ecosystem services (ES) in Monachil (Sierra Nevada).

Source: Our compilation.

4.3. Perception of Renewable Energies by Stakeholders and the Local Population

Support for the renewable energies has been increasing in this municipality in recent years. In the interviews carried out in the first years of the study (2012–2015), 75% of the local stakeholders supported renewable energies, with some interviewees stating that renewable energies were very expensive and could not be implemented in this municipality, due to the existing environmental protection (Natural Park and National Park, Natura Network—ZECs and ZEPAs, Biosphere Reserve). In recent years (2018–2020), the 100% of the consulted local stakeholders favouring them (Figure 4), although half of them were concerned about the impact on the landscape and the territory, so they opt for small plants to minimise the impact, preferably in the urban environment and/or locations where they cannot be seen.

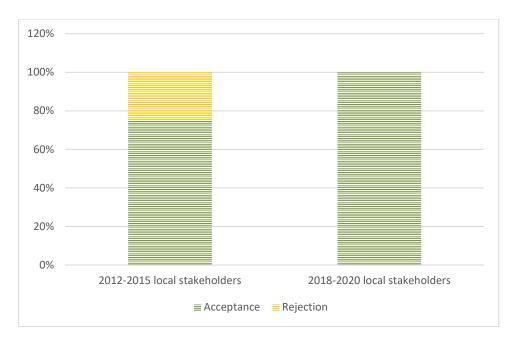


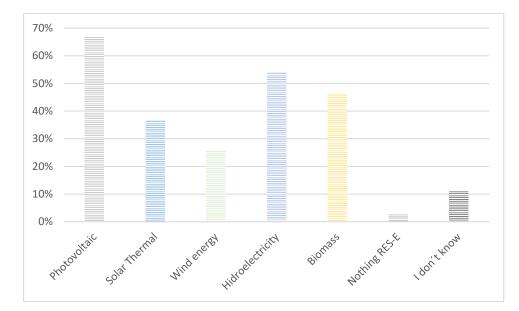
Figure 4. Support for renewable energies 2012–2020 by local stakeholders. Source: our compilation, based on interviews and surveys.

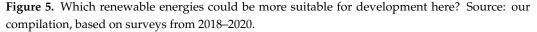
Almost all interviewees accepted hydropower, and even more, linked it to the local culture because they relate it to the culture of water, from the agricultural mills of yesteryear to the hydropower plants that were built later. "It is something very logical and generates resources for the village," said one of the interviewees. There are also those who consider that they are very well-integrated into the landscape and do not look out of place, but they seem unattractive for tourism, in general, although they could attract scientific and educational tourism (university students, and children). The majority of interviewees highlighted the value of water as a much-needed resource for its use in the production of snow in the ski resort, electricity in the hydropower plants, and irrigated agricultural land.

Surveys of the local population showed that 97% of those consulted supported renewable energies plants and only 3% were against them. Although, 71% highlighted the impact of hydropower plants on aquatic ecosystems. In contrast, more than half (54%) considered the recovery, repowering, or installation of new hydropower plants to be feasible.

Regarding other renewable energy resources that could be exploited in the municipality, most of the interviewees and respondents answered that solar photovoltaic energy has a great potential, especially on the roofs of warehouses and buildings. Many interviewees, and two-thirds of the respondents, consider that the development of forest biomass from pruning residues could be of great interest.

Wind energy was generally rejected by interviewees because of its incompatibility with the conservation of their landscapes, biodiversity, and tourism. Only in a few isolated cases was its development considered feasible (10%). However, in the surveys conducted between 2018 and 2020, more than half of the respondents considered it a usable resource, although only a quarter considered it suitable for the municipality (Figure 5—Question 19).





4.4. Competition of RES-E with Other Economic Activities or Land Uses—The Territory as a Source of Ecoservices

Through the study of the history of Monachil, the importance of the river, water, nature, and mountains has been proven for its inhabitants over time. It is possible to find the interrelationships established between socio-economic activities and the territory to which they are linked, thus verifying how the history, culture, and life of this municipality have always been linked to the ecosystem services (ES) provided mainly by the mountain and valley (vega).

Although all these ecosystem services have their importance, the connection of this municipality with river and water is clear through its multiple uses and exploitation, present

since the first civilisations settled in the territory. Monachil benefits from nature and snow tourism, agriculture, livestock, and traditional products, as well as handicrafts. All these activities depend on the ecosystem services provided by the vital mountains and fertile lowlands. This is what the interviewees said, thus indicating that the conservation of their landscapes, river, water, mountains, nature, culture, etc., is essential for the maintenance of life in the valley.

It was noted that the population recognises its heritage as a source of wealth and gives it economic value. It was observed that there is even competition for ecosystem services, especially for the different uses given to them in the territory.

Table 6 analyses the local population's perception of current and future renewable energy projects in the Monachil valley.

Renewable Energy Resources	Current Projects	Future Projects	
Hydroelectricity	Accepted by the population, they are part of the local identity.	Problems due to pressure on water. Impact on ecosystems and landscape. Competition with other economic activities, such as agriculture or tourism.	
Wind energy	None.	Impact on the landscape, biodiversity, values of the municipality, and territorial identity. Interference with tourism.	
Solar energy	There are projects in detached houses, companies, and industries. There are projects in municipal buildings and projects for shared self-consumption of energy.	Compatible in industrial areas or areas of new growth. Compatible as self-consumption installations on roofs. Interference with landscape, agriculture, and tourism.	
Biomass	Use in isolated dwellings Biomass boiler in the main building of the Town Hall.	Potential use of pruning waste. Impact on ecosystems. Possible interference with other economic activities.	

Table 6. Renewable energy resources: Acceptance/rejection.

Source: Based on our results of interviews and surveys.

Most of the interviewees highlighted the impossibility and/or incompatibility of wind energy development with the conservation of the municipality's values, territorial identity, and landscape, as well as the possible conflicts with tourism and regulations of natural and national parks. The majority of respondents considered that the effects on the landscape could be very significant, and half of them highlighted the effects on ecosystems and tourism.

Almost half of the respondents (46%) did not consider adequate the expansion of hydropower plants, due to the accumulation of pressures on the river and limitation of water as a main resource; more than half highlighted the effects of hydropower on biodiversity (51.3%), almost half the effects on the landscape (43.6%), one-third of the respondents mentioned the effects of hydropower on tourism (31.6%), and a quarter emphasise competition with agriculture for water use.

Concerning solar energy, 43.6% of respondents were against its development outside the city centre, due to the exclusive occupation of the land, and some of them (36.8%) highlighted the effects it could have on the urban landscape of the city centre.

Regarding biomass energy, the majority of respondents did not highlight any effects and one-third of respondents expressed concerns regarding the effects on ecosystems. Less than a quarter of the respondents also expressed concerns about possible interference with other economic activities.

Furthermore, the majority of respondents stated that only small renewable energy projects are compatible in mountain areas such as their territory, and that a strategic environmental assessment is needed to study each territory, its sensitivity, and existing projects, in order to take the possible cumulative and synergistic effects into account. Half of the respondents stated that renewable energy projects should not be developed in national parks or other sensitive natural areas, almost 50% of the respondents stated that there are areas with sensitive landscapes where renewable energy projects should not be developed,

and one-third considered that urban planning and the conditions of each municipality and its population should be taken into account.

Therefore, it can be concluded that, for the population, ecosystem services are limited/finite and vulnerable, due to the impact of human activities, and it is necessary to prioritise their uses, as the latter are highly dependent on the good conservation status of the former.

5. Conclusions

Due to the ambitious renewable energy targets proposed, the deployment of renewable energy plants in Spain is expected to increase. The development of approaches to understand and transfer the value of local people in the processes of implementing these uses in their territories and landscapes will be fundamental for an efficient and just energy transition. This paper analyses the relationship between water, renewable energy, and landscape in the Monachil river valley (located in Sierra Nevada, southern Spain), relating them to the value and identity of society and highlighting their ecological importance, thus constituting a pioneering work in the southeast peninsular that can serve as a reference framework.

The results show that energy transition and renewable energy production are very important for the population and local stakeholders. Hydropower infrastructures become part of the local landscape and culture and are considered attractive energy landscapes, from an educational and research point of view. This has led to both water and energy becoming the central axis of the landscape, as perceived by the population, which, in turn, is concerned about their maintenance and conservation.

Local people and stakeholders indicate that in Monachil the installation of small renewable energy projects is more compatible with traditional land uses and the maintenance of key ecosystem services. In the case of water, most stakeholders indicated that the maximum carrying capacity has been reached and, therefore, new hydropower projects could compete with other economic activities, such as tourism, landscaping, or agriculture, although the majority of the population considers that more projects could be developed. Regarding the future development of wind energy projects, the population finds it difficult to reconcile them with the conservation of the municipality's values, territorial identity, and landscape, as well as possible conflicts with tourism. With regard to solar energy, it is part of the valley's recent history, having been promoted by the local government and taken on board by the population. The aim is to bring about a local energy transition, based on collective and individual self-consumption, with more self-consumption installations in homes, industrial rooftops, town halls, and local businesses. However, there has also been reluctance to develop it in old town and agricultural areas because of the effects on the landscape and interference with tourism or agriculture. Biomass energy from pruning waste could be a potentially exploitable resource.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/land11081203/s1, Annex 1–3.

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