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Territorial planning: new challenges facing wind energy.

Galicia Case, Spain

Planificación territorial, nuevos desafíos frente a la energía eólica.

Caso Galicia, España

Planejamento territorial: novos desafios da energia eólica.

Caso Galiza, Espanha

Aménagement du territoire : nouveaux défis pour l'énergie éolienne.

Cas de la Galice, Espagne

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[1] Postdoctoral research in progress on socio-environmental conflicts in Galicia. María Zambrano Grants for the attraction of international talent. Ministry of Science, Innovation, and Universities. Government of Spain.

Abstract

The public policies developed for the transition to renewable energies, through the implementation of a large-scale, extensive and dispersed wind energy production model, have had several negative impacts, which had been denounced by an important citizens' movement in Galicia. The aim of this research is to gain in-depth knowledge of the main criticisms and proposals made by citizens in order to assess the shortcomings and challenges for territorial planning. It concludes with the need for an integrated and effective regulation system, and the consideration of alternative spatial and energy models.

Keywords: social conflicts, territorial planning, renewable resources, wind energy, social participation

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Resumen

Las políticas públicas desarrolladas para la transición hacia energías renovables, a través de la implementación de un modelo de producción de energía eólica de gran escala, extensión y dispersión, han tenido diversos impactos negativos, denunciados por un importante movimiento ciudadano en Galicia. El objetivo de la investigación es conocer en profundidad las principales críticas y propuestas ciudadanas con el fin de evaluar las insuficiencias y retos para la planificación territorial. Se concluye con la necesidad de un sistema integrado y efectivo de regulación, y la consideración de modelos espaciales y energéticos alternativos.

Palabras clave: conflicto social, planificación territorial, recursos renovables, energía eólica, participación social

Resumo

As políticas públicas desenvolvidas para a transição para as energias renováveis, através da implementação de um modelo de produção de energia eólica em grande escala, extensivo e disperso, tiveram vários impactos negativos, denunciados por um importante movimento de cidadãos na Galiza. O objetivo da investigação é conhecer em profundidade as principais críticas e propostas apresentadas pelos cidadãos, a fim de avaliar as lacunas e os desafios para o planeamento territorial. Conclui-se com a necessidade de um sistema de regulação integrado e eficaz e com a consideração de modelos espaciais e energéticos alternativos.

Palavras-chave: conflito social, planejamento territorial, recursos renováveis, energia eólica, participação social

Résumé

Les politiques publiques développées pour la transition vers les énergies renouvelables, à travers la mise en œuvre d'un modèle de production d'énergie éolienne à grande échelle, extensive et dispersée, ont eu plusieurs impacts négatifs, dénoncés par un important mouvement citoyen en Galice. L'objectif de la recherche est d'acquérir une connaissance approfondie des principales critiques et propositions formulées par les citoyens afin d'évaluer les lacunes et les défis en matière de planification territoriale. On conclut sur la nécessité d'un système de régulation intégré et efficace, et sur la prise en compte de modèles spatiaux et énergétiques alternatifs.

Mots-clés : conflit social, aménagement du territoire, ressources renouvelables, énergie éolienne, participation sociale

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Introduction

The triple environmental crisis caused by climate change, pollution, and biodiversity loss presents significant challenges for policy and territorial planning (United Nations Environment Programme, 2021). In Spain, measures have been implemented, such as the installation of renewable energy sources to replace thermal and nuclear power plants. The Strategic Framework for Energy and Climate (2019) promotes a sustainable economic model and is structured around three key instruments: the Climate Change Law, the Just Transition Strategy, and the Integrated National Energy and Climate Plan (PNIEC, 2021). The deployment of wind farms is part of the strategies outlined in the PNIEC, which sets a target to achieve 42% of final energy use and 74% of electricity generation from renewable sources by 2030, with a goal of 100% by 2050. However, these policies from both the Spanish state and the European Union (2001) generate social and environmental impacts, leading to a notable citizen movement opposing the current model.

The case of Galicia, while representing a specific reality with its own legislative, political, and territorial framework, offers valuable insight into the experience of citizen demands and proposals for broader socio-environmental conflict studies. It thus reveals that in countries of the so-called Global North, situations of territorial and resource dispute, as well as challenges to existing ways of life, also occur.

This article is part of a broader research project dedicated to the current socio-environmental conflicts in Galicia. As part of this research, one of the conflicts—the installation of wind farms—was selected to better understand its nature, components, and contributions to improving territorial design and planning decisions.

The choice of wind farms was based on three reasons: the importance they hold in terms of their distribution across the territory; the fact that they represent one of the conflicts involving a significant number of citizens, as well as institutions and organizations; and the relevance, in the context of the triple climate crisis, of understanding the arguments of citizens opposing projects that aim to reduce the impacts of this crisis through the energy transition.

Citizen demands feature a complex argumentation that incorporates various environmental, economic, cultural, and political aspects, which are of great interest as they challenge perspectives and models that have thus far prevailed in territorial organization and propose new production and intervention models.

The case of Galicia, while representing a specific reality with its own legislative, political, and territorial framework, offers valuable insight into the experience of citizen demands and proposals for broader socio-environmental conflict studies. It thus reveals that in countries of the so-called Global North, situations of territorial and resource dispute, as well as challenges to existing ways of life, also occur.

All of this constitutes the primary objective of this article: to analyze the contributions of citizens to the energy transition process. Within the framework of an ongoing process, with significant public investment, that is transforming the territory, this article seeks to clarify the deficiencies and challenges in this area for territorial planning and its application.

The first section reviews the main bibliographical contributions related to socio-environmental conflicts in Galicia and defines what is considered a socio-environmental conflict for this research. After the methodol-

ogy section, citizen demands and proposals are presented, from both state-level and regional-level platforms. In the discussion section, an analysis of the main citizen critiques and current territorial regulation instruments is proposed, concluding with the main findings of the research regarding the challenges for territorial planning.

Approach to the Nature of Conflicts over Wind Farms

Socio-environmental conflicts in Galicia have been addressed from various perspectives. Critical situations related to food sovereignty, waste management, fishing, and interventions in aquifer systems are particularly highlighted (Hermida & Duro, 2015). Annually, reports are published on coastal impacts caused by ports, waste discharges, and industrial zones (Ecologistas en Acción, 2023). Additionally, there are academic studies on air and water pollution due to the paper industry (Doldán & Chas, 2001), water pollution (Bermejo, 2001), and the loss of native forests and their relation to wildfires (Guitián, 2001; Pazos et al., 2018; Cidrás, 2020). More recently, urban and territorial studies have addressed these conflicts with contributions from 14 authors (Tapia-Gómez, 2024). On wind farms in Galicia, there have been analyses from the economic perspective, as well as studies on production, consumption, and the evolution of their installation (Doldán, 2019 and Regueiro, 2023).

A significant contribution to understanding the economic and social dimensions of environmental conflicts is the work of Joan Martínez Alier, whose numerous publications, such as the *Revista Ecología Política* or the *Global Atlas of Environmental Justice* (Ejatlas, 2024), allow for the identification of common elements across conflicts. In the Atlas, 145 cases in Spain are documented, of which four are in Galicia, related to the exploitation and extraction of natural resources.

Additionally, other studies analyze citizen mobilizations denouncing the effects of environmental pollution since the 1970s (Soto, 2000; SLG, 2023). All of these impacts have different causes but must be understood as part of critical elements that exert pressure on the territory and the social forces inhabiting it. Therefore, the incorporation of a new conflict, such as the one studied here, sharpens and reverberates through the pre-existing ones.

The arguments put forth by the various associations and platforms opposing wind farms highlight their economic, social, and environmental impacts. They are socio-environmental conflicts insofar as, according to Walter (2009), the dispute centers on access to and management of natural resources. Leff (2004) extends this definition by emphasizing the involvement of communities or collectives that defend a territory and their sense of belonging.

Citizen movements organize within specific territories when processes affect their communities or natural spaces (Lussault, 1995; Melé, 2013). In the case study, a specific organization linked to a territory threatened by wind farms rapidly expanded, connecting with other groups until it reached platforms and actions of a supra-municipal and national scale. Citizen demands include the defense of conditions for local communities and the protection of natural and cultural heritage spaces. The critical experience in Latin America is particularly highlighted, proposing a socio-ecological transition not only based on the production of renewable energy but also on reducing consumption and the democratic management of available resources for the needs of communities and the protection of nature (Ávila, 2023).

Methodology

The guiding question of this research is: what is the contribution of citizen movements opposed to the current energy production model, from a perspective that could improve territorial regulation and planning? Therefore, the research focuses on studying the elements that argue against and oppose the projects, as well as the alternative proposals made for energy production.

As part of the analysis of the arguments and defense put forth by citizens, the manifestos of two platforms are examined. These platforms bring together a large number of organizations and represent a significant part of the experience and diversity of collectives and territories. The platforms are: 'Alianza Energía y Territorio' (Energy and Territory Alliance) from 2021, at the national level, and 'Coordinadora Eólica, así non' (Wind Power Coordinator, No Thanks), with its 2022 manifesto, in the Autonomous Community of Galicia[2] .Additionally, for the case of Galicia, the manifesto arising from the conflict over the defense of Monte Acibal (2023) is used, given its media impact and influence on public opinion. On the other hand, eight collective objections filed during the public consultation period of wind farm projects between 2021 and 2023 were reviewed, as well as the follow-up of six cases where a precautionary suspension of the projects was achieved during 2023[3].

[2] Spain is made up of 17 Autonomous Communities, which are the political and administrative divisions of the State. Galicia is one of them.

[3] Campo das Rosas Wind Farm, Monte Acibal Wind Farm, Zas and Santa Comba Wind Farm, Bustelo Wind Farm, Coristanco and Santa Comba Wind Farm, and Monte Toural Wind Farm.

Other primary sources used include 23 semi-structured interviews with activists in Galicia, who were asked about what they considered to be the main socio-environmental conflicts in the region. All of them identified this conflict as one of the most relevant currently. Specifically for this article, five in-depth interviews were conducted with members of the three citizen organizations that have filed lawsuits against more than 200 approved wind farm projects and successfully obtained the precautionary suspension of other wind farms: ADEGA (Association for the Ecological Defense of Galicia), the Asociación Petón do Lobo, and Ecologistas en Acción - Ecoloxistas Galicia Atlántica e Verde.

Citizen Demands and Proposals

Unlike conventional energy sources, renewable energies use resources dispersed throughout the territory (Prados, Barajas, et al., 2012). This dispersion is also what gives citizen movements their characteristic of being distributed across the territory. In Spain, the proliferation of renewable energy projects, such as wind farms and photovoltaic plants, has sparked citizen movements that, while supporting renewable energy, question the model of installing large infrastructures and the lack of planning, which produces various negative effects on local communities and the environment. These movements, organized into platforms that transcend local issues, bring together environmental, social, political, and cultural organizations. Below, we examine the demands of two representative organizations at the national level and one from Galicia.

Citizen Proposals at the National Level in Spain

In February 2021, the Alianza Energía y Territorio (ALIENTE) was created, launching a manifesto supported by more than 200 scientists and 80 organizations, advocating for an energy transition toward renewable energies while ensuring the conservation of biodiversity and a fair energy model. The initiative quickly gained support, reflected in a demonstration in Madrid later that same year, with more than 18,000 participants and 180 organizations from across the country signing the manifesto. The central slogan was "Renewables Yes, but Not Like This." This manifesto (ALIENTE, 2021) contains much of the demands and proposals from various environmental movements, which can be summarized as follows:

a. Protection and conservation of protected areas, and the creation of an Exclusion Plan that prohibits the construction of large-scale renewable energy installations and temporarily halts new industries until such a plan is in place.

b. Increase natural protection areas through the expansion of the Natura 2000 Network, currently made up of 1,468 Sites of Community Importance, plus another 662 Special Protection Areas for Birds, covering approximately 27.35% of Spain's territory and about 84,300 km² of marine surface.

c. Conservation and protection of biodiversity in line with European Union requirements and the country's 2020-2030 biodiversity strategy. Additionally, the proper monitoring of biodiversity conservation and protection of endangered species is emphasized.

d. Regulation of renewable energies through wind and photovoltaic plans for each autonomous community. There is also a call to improve environmental impact studies and ensure their independence from promoting companies, as well as to establish mechanisms for post-installation monitoring, also independent. Furthermore, it is important to establish measures that prevent the fragmentation of projects, which is a common practice to bypass a comprehensive evaluation of the project's total impact.

In terms of more structural proposals, various ideas are presented that relate to an alternative model, which can be summarized as follows:

a. Reduction of consumption and emissions by incorporating policies that allow for energy savings and reduce overall energy consumption.

b. Collective production and management of energy through a model of collective production and management, via cooperatives or municipal companies that handle the production, storage, and distribution of energy through small-scale plants and distributors, combining the use of photovoltaic and wind energy. This model would have a lower negative impact, and its benefits would directly impact the community managing it.

Following the ALIENTE manifesto, these proposals have been developed and deepened through the experience of energy communities in Spain, promoting the creation of new ones. Currently, there are demands for greater ease in the creation and management of energy communities, as well as public assistance for self-generation and consumption for individuals facing energy poverty (ALIENTE, 2023).

Citizen Proposals at the Regional Level in Galicia

Citizen mobilization in Galicia groups various platforms and collectives around the defense of the territory at different scales. At the regional level, the "Coordinadora Eólica, Así Non" (Wind Power Coordinator, No Thanks) was formed, which consists of 178 collectives,

according to the organizations that signed the call for the demonstration on March 23, 2022. Several simultaneous protests were held in different cities across Galicia, gathering organizations of various natures.

The complaints and objections against the wind farms focus on the negative impacts on the local reality. Regarding the impact on the local economy, the use of local resources and public investments directed towards large companies is criticized, as they do not improve the socio-economic conditions of the communities where they are located, nor do they generate new jobs. In this regard, the wind energy association in Galicia states that in 2019, the wind sector directly employed 4,886 professionals and created 2,136 indirect jobs (EGA, 2020), and by 2022, it had 5,436 direct and indirect jobs associated with the wind sector (EGA, 2022). Meanwhile, citizen organizations argue that the number of jobs is minimal. According to the ARDAN Report (2023) by the Vigo Free Trade Zone Consortium, the 45 largest wind companies based in Galicia employ only 37 people[4]. The negative impact on economic activities that currently sustain the population in affected areas is also raised, such as agriculture, livestock, forestry, and nature tourism, as well as the loss of property value near the wind farms, without adequate economic compensation.

Additionally, the impact on cultural and archaeological heritage is evident due to the loss or misplacement caused by the installation of wind farms in mountains that were of great importance during the Neolithic and later periods. Most of these areas contain valuable megalithic burial sites, dolmens, petroglyphs, as well as Celtic period settlements (3rd century BCE to 3rd century CE), along with chapels and pilgrimage sites that are still part of local traditions.

Regarding health and environmental impacts, noise and light pollution caused by the infrastructure and networks needed to transport the towers and blades of the wind turbines, as well as the construction of storage and distribution networks, are highlighted. These constructions also affect ecosystems in mountains, springs, rivers, and watercourses; fragment habitats and natural systems for terrestrial species (Martínez, 2021); and cause the death of thousands of migratory birds, which are vital to rural and mountain ecosystems[5], due to collisions with the blades of the turbines. These impacts are exacerbated when the farms are near or within the Natura 2000 network.

The manifesto of the Coordinadora, "Temos Alternativa! Enerxía Xusta e Sustentábel, Enerxía por e para o pobo" (2022)[6] presents an alternative energy generation model in nine principles that aim to protect nature and biodiversity, as well as the conditions sustaining the local economy, culture, and identity (Principles 1, 2, and 3). It advocates for the right to energy compatible with food sovereignty (Principle 4) and prioritizes energy savings and efficiency (Principle 5), with specific measures for sustainable and non-polluting mobility, as well as support for thermal insulation of homes, self-consumption, and the creation of energy communities. The manifesto also defends sovereignty over territorial resources and energy planning by and for Galician society (Principles 6-7), through a public model in which communities have the power to decide on the use of energy resources and maintain public ownership of wind resources.

The lack of public participation is criticized, the repeal of the decree that exempts renewable projects from environmental assessments is demanded (Principle 8), and the preservation of public health (Principle 9) is emphasized as a priority in the alternative energy model, aiming to prevent the constant rural exodus that has been a pressing issue in Galicia for the past 30 years.

As an alternative to negative impacts, a small-scale production and distribution model through energy communities is proposed. Currently, there are 69 energy communities in Spain and three in Galicia (IDAE, 2024), which allow citizens to collectively produce, consume, and sell energy, providing environmental, economic, and social benefits (Royal Decree-Law 23/2020).

Discussion: Challenges for Territorial Planning

The installation of wind energy infrastructure in Galicia, according to the demands of the citizens, is transforming the territory and causing negative impacts, which calls for a review of territorial planning. The conflict with territory regulation is examined below, and three aspects are considered: the weakness of planning in the face of the new phenomenon, which is exacerbated by the socio-economic and environmental fragility of the territory where the wind farms are installed, and the large scale of the wind farms.

[4] Information Appeared in Press Release. Diario Nos, February 24, 2024, p. 2-3.

[5] It is worth noting the creation of compatibility maps for the location of renewable energy installations, taking into account a lower negative impact on birds. SEO/BirdLife and the Spanish National Research Council (CSIC).

[6] "We Have an Alternative! Fair and Sustainable Energy, Energy by and for the People." (Translation by the author).

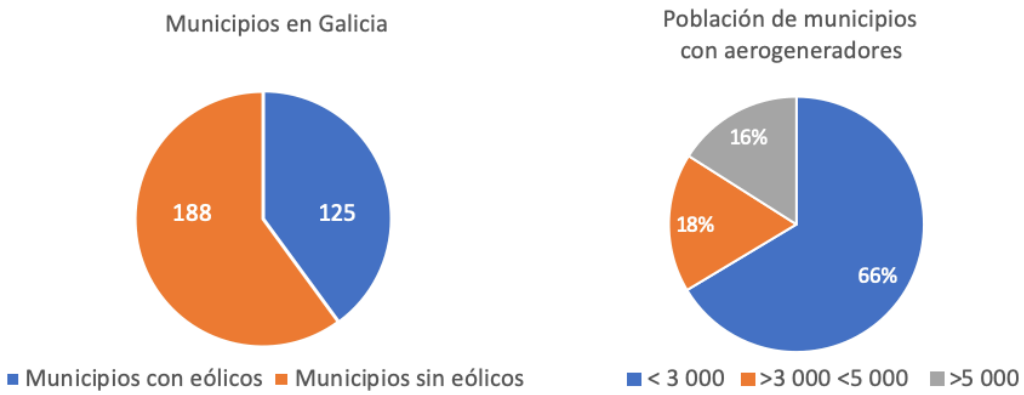

Figure 1. Number of municipalities with wind turbines and their population.
Source: Created by the author based on Xunta de Galicia (2024)

Municipio	Provincia	Número de aerogeneradores	Población	Aerogenerador cada 1000 hab.
Muras	Lugo	381	600	635,0
Abadín	Lugo	200	2203	90,8
Ourol	Lugo	161,5	980	164,8
Pontes de García Rodríguez, As	A Coruña	139	9867	14,1
Vilalba	Lugo	129	13870	9,3
Mazaricos	A Coruña	123,5	3737	33,0
Valadouro, O	Lugo	120	1890	63,5
Dumbría	A Coruña	114	2856	39,9
Ortigueira	A Coruña	114	5477	20,8
Forcarei	Pontevedra	105,5	3186	33,1
Vicedo, O	Lugo	88	1613	54,6
Somozas, As	A Coruña	87	1068	81,5
Lalín	Pontevedra	80	20282	3,9
Vimianzo	A Coruña	74	6840	10,8
Mañón	A Coruña	71	1244	57,1
Cedeira	A Coruña	70	6529	10,7
Fonsagrada, A	Lugo	70	3186	22,0
Cañiza, A	Pontevedra	62	5090	12,2
Nogueira de Ramuín	Ourense	53	2085	25,4
Lama, A	Pontevedra	51,5	2520	20,4

Table 1. Population relationship with the number of wind turbines in the 20 municipalities with the highest number of wind turbines

Source: Created by the author based on Xunta de Galicia (2024) and population data from INE (2024).

Weak Territorial Planning

The review of both the manifestos (2021, 2022, and 2023) and the objections highlights the non-compliance with legislation and European Union guidelines related to the conservation of natural spaces, natural, cultural, and landscape heritage. The scale of the citizen movement surrounding this socio-environmental conflict reveals the insufficiencies in the instruments for responding to citizens' demands for various reasons. On the one hand, the previous Territorial Planning Act of 2016 and the recent approval of the Territorial Planning Act (2021), which still lacks guidelines, or the Coastal Planning Plan (2017), have not been able to prevent the conflicts reported. The Territorial Planning Act itself, in its additional provision five, although it incorporates wind farms, determines that these will be regulated entirely by the provisions contained in the previous and sectoral law, Law 8/2009 of December 22, which regulates wind energy exploitation in Galicia and creates the wind power fee and the Environmental Compensation Fund.

On the other hand, the Landscape Law of Galicia (2017) and its Decree 238 (2020) advance in terms of protection and impact detection of infrastructures, indicating that landscape allows the integration of ecological, cultural, economic, and social aspects into policies in a holistic manner. It contains instruments such as impact studies and landscape integration and action plans in protected areas, which apply to projects subject to environmental impact assessment according to the Environmental Assessment Act (2013).

Decree 238 describes landscape quality objectives, with specific actions and measures for wind farms, so that they respect the unique character of the existing landscape and minimize their impact on the natural environment and landscape. Specifically, it points out that wind farms must be compatible with other productive uses that enhance the natural, economic, and social sustainability of the surrounding area in which they are located. However, these objectives only apply to areas of special attention in the Galicia Landscape Catalogs. Moreover, the measures and actions are more declarative than instrumental or specific and are supported by existing instruments or those that require creation. In this way, although the objectives express concern for and a nature of conservation regarding the installation of wind farms, their regulatory capacity is currently limited.

A second area of criticism focuses on the lack of citizen participation in decision-making about wind projects in Galicia, which is currently very limited to the public exposure period. There are no prior participation instances for affected municipalities nor consultations with interested organizations.

Citizens demand a planning process that includes the participation of local governments and citizens, given the magnitude and impact of these projects, and also considering that these are private initiatives with partial public funding. For example, it is pointed out that public exposure and objection processes for projects are carried out within a very short period and with an asymmetry of access to information, both regarding the subject matter and procedures, which does not facilitate the full exercise of the right to participate. Regarding the process, there are cases where the participation period took place alongside an impact study or where provisional approvals for the start of works were granted without the participation instance.

Finally, a third element relates to fragmentation, as wind farms are presented and evaluated individually, without assessing their cumulative effect. This fragmentation prevents a real evaluation of the impact they generate, as they are reviewed in isolation and at a smaller scale than they will have once the entire set of projects is approved. This practice is alleged to be common despite what is stated in the Ninth Additional Provision of Law 8/2009: "particular attention should be paid to the possible significant cumulative and synergistic effects of other wind farms in operation, under construction, or with administrative authorization."

Infrastructure and Fragility of the Territory

The impact of installing large wind energy infrastructures in Galicia is exacerbated by the number of existing wind farms, their repowering, and those planned for installation, as well as by the characteristics of the settlement patterns and pre-existing conditions at the installation site. Currently, there are 180 wind farms (EGA, 2022) and 4,018 wind turbines (Xunta de Galicia, 2024), to which an additional 75 wind farms would be added, according to the approval of the environmental impact declaration in January 2023 (La Voz de Galicia, 2023).

The magnitude of the impact of wind farms can be understood from the number of municipalities affected in Galicia and the distribution of wind turbines. An analysis of budget allocations to municipalities based on the number of wind turbines and lines (Xunta de Galicia, 2024) shows that Galicia has 125 municipalities with wind turbines, out of a total of 313, concentrated mainly in two of the four provinces: Lugo with 42.7% of the wind turbines and Coruña with 36.7%. Additionally, when cross-referencing the location of wind turbines with population data (INE, 2024), it shows that 84% of the wind farms are located in municipalities with fewer than 5,000 inhabitants (see Figure 1).

Table 1 shows the 20 municipalities with the highest number of wind turbines and their relationship with small populations: 13 of the 20 municipalities have fewer than 5,000 inhabitants, with the municipalities of Muras, Ourol, and As Somozas standing out due to their high rate of wind turbines per 1,000 inhabitants.

The areas where wind farm projects are located are characterized by processes of depopulation due to migration and the aging of the population, the abandonment of traditional agricultural land use, and its conversion for forest exploitation activities, as well as a reconfiguration of the new industrial, fishing, and agro-livestock structure (Lois, 2004). The land use changes that began in the mid-20th century have had a strong impact on the destruction of natural systems (Pérez, 2009). These characteristics are related to the historical economic delay of Galicia, due to a feudal-type land ownership structure, the lack of modernization in labor and agricultural activities, the absence of policies and investment, and the industrialization of Galicia (Beiras, 1972).

Another feature of the conflict relates to the proximity of the wind farms to areas of high ecological value, which require protection to conserve natural systems and their biodiversity, given their importance for the development of local economies. These impacts have been one of the main arguments raised in the approval processes and have led to the non-approval or suspension of projects due to judicial decisions, emphasizing the precedence of conserving and protecting natural areas according to the principles of the Natural Heritage and Biodiversity Act (2007).

The **Climate Change and Energy Transition Act (2021)**, for its part, suggests that the fight against climate change and the energy transition will involve changes and transformations in industry. This is why mechanisms of support for this transition must be created. At the same time, it proposes that achieving climate neutrality requires policies and investments for the conservation of biodiversity and carbon capture in forests, wetlands, and agricultural surfaces, issues that are not reflected in the current implementation model.

Scale of the Wind Energy Production Model

The installation of wind farms not only involves the specific infrastructure projects for the turbines themselves, but also requires various territorial transformation projects with their own environmental and social impacts. These include energy transmission lines, transformer substations, large-scale earthworks, the construction of new road networks, and changes to watercourses, among others.

In addition to the expansion of the network, wind turbines themselves have a significant visual and landscape impact due to their size: they can reach heights of up to 200 meters, and their blades can have a span of 75 meters. These works and modifications to the territory must be understood in a quantitative scale, considering the 180 wind farms in the area and their distribution across the territory and the affected population, as described earlier.

The scale and extent of the wind energy megaproduction model, as we have seen, is related to its location on natural, protected, or populated areas, where its impact is more pronounced. However, given the scale, magnitude, and territorial extent of these mega infrastructures, the negative effects on the territories they occupy will always be present. Therefore, it is not only about seeking compatibility of uses, but it is also necessary to evaluate the model of extraction, production, and distribution, considering its social and environmental impacts.

Conclusions

As the analysis demonstrates, public policies designed to address the climate crisis are generating new environmental and social vulnerabilities. The implementation of the energy transition through the establishment of wind farms has sparked massive citizen opposition, both in Galicia and Spain, which calls into question the effectiveness of the regulatory and planning instruments in the territory. Additionally, court rulings have halted certain projects following demands made by civil society organizations.

This call to attention by the public represents a contribution to the construction of regulation, mechanisms, and territorial planning instruments that ensure equitable and balanced development. The primary contributions from the criticism and proposals put forth by citizens regarding territorial planning are summarized as follows.

There is a need for greater integration and strengthening of the regulatory capacity of planning instruments in relation to the conflict between wind infrastructures and the conservation of ecosystems within the context of biodiversity loss. The reasons for this situation are linked to the fact that the legislation and regulation are relatively recent, necessitating their implementation and application to the current regulatory instruments, most of which predate this legislation.

In addition, the rapid pace of project implementation exacerbates the impact, as there is insufficient time to correct and adapt the regulations for a balanced devel-

opment. This makes it necessary to carry out an orderly and balanced planning of wind farm installations. To date, projects have been approved on a case-by-case basis, without encompassing the territory in its entirety.

The discussion between socio-environmental conflicts and territorial planning is one that arises from a very recent phenomenon and requires the consideration that current territorial planning instruments are under significant environmental regulatory pressure, also relatively new, which demands much deeper changes in the very conception of planning.

The inability of planning and conservation instruments to address the socio-environmental conflict generates public criticism of the administration, particularly regarding the definition of policies, regulatory instruments, and procedures. This creates a second layer of vulnerability concerning the lack of a regulatory framework that safeguards the interests of communities—ensuring they are not violated in their rights—and their vulnerability regarding their ability to demand these rights in relation to the large companies responsible for the projects and public authorities. This issue is exacerbated as it is not an isolated case, but one of hundreds of projects affecting different communities across Galicia and the State, calling into question both the legitimacy of public decisions and the citizen-state relationship.

From the citizen movements, there is a strong defense for a transition to the use of renewable energy. However, the current model of implementation is criticized for its large scale and lack of planning, which has negative effects on communities and territories. Therefore, its sustainability is questioned, and models of smaller scale production, along with community management and participation in the production, management, and benefits of renewable energy, are proposed. While public authorities have begun to incorporate community energy models as part of climate change measures, these remain minimal in comparison to the magnitude of private production and management of renewable resources. Consequently, it is of great interest to extrapolate the experience of community energy models into a spatial organizational framework that ensures the autonomy of settlements with lower energy consumption and environmental impact.

This leads us to one of the core characteristics of the conflict: the collision between private and public interests. This debate transcends legal considerations and delves into the conflict over the use and benefits of the resources within the territory, as well as the public investments made for renewable energy production. Currently, there is a large-scale production model with private management and profit within a market framework. From the citizen perspective, a small-scale production model with collective management and benefits is proposed.

The questioning of large-scale production, particularly from wind farms, is grounded in the evidence of the economic, social, and environmental impacts that these projects are producing or would produce. These arguments, from the perspective of the citizens' capacity to participate in the social metabolism, represent a challenge to the legitimacy of the decisions and the public utility or greater public interest of these projects.

Finally, concerning the specific characteristics and variables of the conflict in Galicia, fundamental issues related to the production and consumption models should be considered. It is argued that the energy transition seeks an alternative method of exploiting renewable resources, yet fails to address the need for creating conditions that encourage lower energy consumption and savings. As an alternative, a redistribution of resource use is proposed through distributed generation on a small scale, with collective management and use.

This underlying discussion is of great importance for fostering multidisciplinary interaction and dialogue regarding the nature of territorial planning instruments and what constitutes a public function, as well as how to equip it with regulatory capacity and hierarchical authority over sectoral regulations. It opens up multiple challenges for new approaches to territorial planning, based on alternatives to the current socio-economic development model.

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