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Spatial and Climate Governance and Policy to Tackle the Challenges of the Anthropocene: A Critical Analysis Based on the Paradigmatic Tourism Destination of Mallorca (Spain)

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Abstract: The Anthropocene era demands a future alternative to the current state of play. The aim of this study is to analyze spatial and climate governance and policy through a critical geographical study of the island of Mallorca (Spain), an example of the model of urban development and tourism growth that has generated acute environmental impacts. Beginning with the European Union and Spain, the work then narrows its focus to the case study of Mallorca. The study is based on a review of the academic literature, statistical sources, and an analysis of the content of spatial and climate policy in Spain and the Balearic Islands. The work reflects on the flawed spatial planning responses to climate change and outlines strategies to adopt more radical measures for effective climate action. The work identifies six main shortcomings and makes proposals to tackle the challenges of the Anthropocene in Mallorca, responding to each of the deficiencies detected. The article seeks to encourage reflection and proposes key strategies for spatial governance and climate policy to lend coherence to the fight against climate change.

Keywords: Anthropocene; climate change; energy transition; climate governance; climate policy; Mallorca

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1. Introduction

From the seabed to the upper layers of the atmosphere, the human footprint today is undeniable. Since the publication of Crutzen and Stoermer's widely cited 2020 work entitled "The Anthropocene" [1], the scientific community has increasingly made use of this neologism to describe the geological age in which we live. Its use has become a synonym for the threat human activity poses to our planet [2]. Although there is no consensus on the date the Anthropocene began, it is considered to have emerged in the middle of the twentieth century as a consequence of a process of industrial and urban growth known as the Great Acceleration [3–5]. Following Rockström et al. [4], a series of negative Earth-system processes have been occurring: biodiversity loss, interference with the nitrogen and phosphorus cycles, stratospheric ozone depletion, ocean acidification, global freshwater overconsumption, atmospheric aerosol loading, and chemical pollution. Tourism and urbanization are two of the most significant driving forces that have generated massive pressure and impacts on nature. Global capitalism has encouraged worldwide growth in tourism associated with urban development and spatial transformation, forging dire environmental impacts [6].

When the ecological footprint exceeds biocapacity, there arises a situation of unsustainability. This is explained by the consumption of resources from ancient geological networks and fossil fuels, jeopardizing the sustainability of future generations through

global warming. The use of fossil fuels was the engine of economic growth in the twentieth century [7], but the future lies in finding a model that overcomes our dependence on such energy [8]. The challenge is to desist from the exploitation of fossil fuels and achieve the aim of zero emissions by or before 2050, a goal set out by the European Union (UE). Only a path to a zero-carbon future can avoid the most destructive effects of carbon change [9].

The advent of the Anthropocene underscores the urgency of solving the task of reversing the situation [10]. The concept itself is an opportunity to rethink the worldview and create new narratives [11]. It allows for growing awareness of the anthropogenic nature of global geological change and helps to establish and refocus the efforts required to transition to sustainability in a more innovative and effective way [12].

Territories have the capacity, by means of regulations, sustainable services, implementing eco-efficiency, developing smart clean-tech systems, and reducing CO_2 emissions to modify the intensity of future global climate change [9] and to regenerate their own environment. To this end, innovative governance and transformative policies toward sustainability are needed [13–15]. The Anthropocene demands policies that take up its challenges and provide solutions [16]. Here, the capacity of institutions and governance structures to adequately address the challenges comes into play [17].

Are spatial and climate governance and policy tackling the challenges of the Anthropocene? This is the main research question that this paper aims to answer, and for this reason, we conduct a holistic analysis and not a study of a single aspect, as might be the implementation of the circular economy, for example. For this purpose, a critical analysis is carried out based on the paradigmatic tourist destination of Mallorca (Spain). The aim of this study is to analyze spatial climate governance and policy by means of a critical study of the island of Mallorca (Spain), an example of tourism growth linked to urban development, real estate business, and the generation of dramatic environmental impacts. Urbanization and touristification have resulted in an unsustainable spatial model [18].

In this regard, overtourism is particularly dramatic in well-established sun and beach destinations, where the environmental impacts of tourism are prominent [19–25], resulting in increasingly unsustainable developments that are especially evident on islands [26,27]. Due to their smaller surface area, islands are more vulnerable to the impacts of large numbers of visitors and overtourism [28]. They are characterized by fragile ecosystems and limited size. An intense interaction between residents, tourists, and the territory can more easily reveal the negative impacts caused by tourism development [29]. This is true of the significant case study addressed in this work, that of Mallorca [30,31], one of the world's leading mass tourist destinations.

The islands are being productively re-thought in and for more recent Anthropocene thinking [32,33]. This work uses the present case study to reflect on the flawed spatial planning responses to the challenges of climate change and to outline strategies for more radical measures to spur effective action. A critical analysis of policies is conducted to identify their main shortcomings. Drawing on this, we develop proposals to tackle the challenges of the Anthropocene in Mallorca, proposals that respond to each of the deficiencies identified. The analyses may be extrapolated to other territories that have specialized in tourism monoculture. The case of Mallorca is not unique, and many other territories around the world are experiencing a serious threat to their future in the Anthropocene due to the impacts of tourism, regardless of whether they are islands, as in the present case study or not [34]. Indeed, anthropogenic climate change will trigger a global change in tourism in the 21st century [35], and tourism must be interpreted from the Anthropocene [36].

The rest of this article is structured as follows. Next is a section devoted to the literature framework. This is followed by a section on the study area, the island of Mallorca, as a paradigmatic case. We then describe the methodology and the results, analyzing spatial and climate governance from the European Union (EU) to the island of Mallorca and the environmental and climate policy enacted in Mallorca. The discussion section, divided into several subsections, then provides a critical analysis of spatial and climate governance

and policy based on the paradigmatic case of Mallorca. The article is completed with the presentation of conclusions and references.

2. Literature Framework

The arrival of the Anthropocene signals the urgency of reversing the situation [10]. The concept itself represents an opportunity to rethink the view of the world and elaborate new narratives [11]. The concept allows for an expansion of the awareness of global geological change and helps leverage and refocus efforts in a more innovative and effective way in order to transition toward sustainability [12]. Of biophysical origin, the idea of the Anthropocene has also attracted the attention of social scientists and human geographers and has driven new frameworks for thought and research [10].

Regions have the ability, through regulations, sustainable services, the implementation of eco-efficiency, the development of smart systems for clean technology, and the reduction of CO_2 emissions, to modify the intensity of global climate change [9]. To enable this, innovative governance and policies to transition to sustainability are needed [13,14]. Anthropocenic politicization [37] and anticipatory governance [38] adapted to the challenges of climate change to achieve spatial resilience [39] are key in adjusting to climate change.

The Anthropocene requires policies that accept the challenges at hand and provide solutions [16]. The aim of this study is to analyze spatial and climate governance and policy through a critical geographical study of the island of Mallorca (Spain). Consequently, for the literature framework, we searched for policy responses and sustainable and regenerative measures in the Anthropocene. Although it is evidently impossible to take account of all the related bibliography, drawing on a systemic analysis, we cataloged a series of measures, grouping them into four policy categories: joint action on spatial metabolism, eco-sustainable urban construction, and design, sustainable transport planning and policies and regenerative urbanism. Table 1 lists the main measures for each of these four policies, as well as the key authors. This framework will subsequently be of great use in the results section for our analysis of the policies undertaken in the case study.

Table 1. Policy responses and sustainable and regenerative measures in the Anthropocene.

Policies	Measures	References
Joint action on spatial metabolism	• Increase local production of renewable energies. • Change energy sources. • Develop CO_2 sequestration mechanisms. • Recycling of waste materials. Waste as a resource. • Water recycling. • Decarbonization of energy. • Integration and maximization of biodiversity. • Lower energy consumption. • Reduction of greenhouse gas emissions. • Sustainable urban water system.	[2,9,40–45]

Table 1. *Cont.*

Policies	Measures	References
Eco-sustainable urban construction and design	• Change building practices. • Biophilic, healthy cities. • Eco-sustainable buildings with systems using gas and electricity from renewable sources. • Include ethical values in the shaping of built environments. • Improve the energy efficiency of buildings. • Improve urban design to avoid diffuse urbanization.	[46–50]
Sustainable transport planning and policies	• Eliminate the use of private vehicles. • Improve cities' public transport systems. • Reduce mobility. • Restrictions on use of automobiles in certain areas, exclusion of most polluting vehicles, etc. • Low carbon transport: pedestrianization, use of bicycles, eco-sustainable public transport. • Reduction of passenger flights and dependence on shipping.	[2,51–55]
Regenerative urbanism	• Abandon the concept of the city as an engine for growth. • Compact cities with a social mix. • Citizen participation across the complete planning process. • Integration of local, community knowledge in innovations. • Integrate environmental and economic assessment with transport and land use planning. • Rediscovery of the neighborhood and community at a human scale to tackle dispersed growth, without the benefit being exclusively for the privileged social classes. • Urban planning for sustainable cities. • Climate urbanism.	[2,56–61]

The first type of policy response in the Anthropocene is joint action on territorial metabolism. Here, the aim of policies is to change energy sources in order to reduce greenhouse gas emissions, acting on water use and waste recycling. The second series of policies focuses on eco-sustainable construction and urban design to change construction practices through more energy-efficient buildings and urban designs that reduce the consumption of resources. The third group of policies focuses mainly on transportation, proposing measures to improve its sustainability and planning, which would allow, among other actions, private vehicles to be replaced by low-carbon transport. Finally, the fourth category of policies covers those concerning regenerative urbanism. These aim to change the city model to allow for more compact forms with a social mix and to adopt urban plans for sustainable cities. Clearly, this taxonomy coexists with a reality where policies and

measures are combined, although typically prioritizing some over others, as will be seen in the results of the case study.

In the Anthropocene, patterns of urban growth have focused on expansion, leading to high consumption of land, water, and fossil fuels. In Mallorca, overexploitation, salinization, and pollution of groundwater masses have been detected [62]. The island's economic model is oriented towards summer tourism, resulting in increased consumption of water at times of the year when there is the least rainfall [62]. This has necessitated the construction of desalination plants, with a subsequent increase in greenhouse gas emissions [43].

Climate policy and governance have been unable to tackle the roots of the island's environmental problems: urban sprawl [63]. Van de Weghe and Kennedy [64] empirically evidenced that CO_2 emissions increase dramatically in auto-dependent residential sub-urban areas with high per capita levels of dispersed single-dwelling homes located far from services, compared to neighborhoods with multi-family housing and public transport. Urban density, morphology, and spatial organization have a critical impact on energy consumption, especially with regard to transport systems and construction; they determine the use of land and the cost of infrastructures and municipal services [65]. The extension of the urban fabric based on the use of cars destroys ecologically valuable, food-producing agricultural land.

The main aim of climate policy is typically that described by Heinberg [66], namely, to create energy infrastructures with zero CO_2 emissions and to initiate a post-carbon era. There is an evident nexus between carbon-based fuels, global environmental change, and climate impacts [9]. It is essential to increase local renewable energy production while reducing energy demand [9]. This is assumed to be possible once sources of renewable energies, such as wind and solar energy, are able to replace the more concentrated hydroelectric, carbon-based and nuclear energy sources [65]. Nonetheless, this process comes up against what Gómez-Baggethun [67] calls the technological utopia of modernism, which offers false solutions to the environmental challenges of our time. If the equivalent replacement of pollutant energy sources with clean, renewable ones is unlikely, the solution lies in drastically reducing energy consumption through changes in the use of energy.

3. The Study Area: The Island of Mallorca as a Paradigmatic Case

The concept of the Anthropocene offers multiple elements for the spatial analysis of an overcrowded, urbanized, mass-tourism island such as Mallorca. It is a small island with a high degree of urbanization driven by tourism and an economic model that consumes large areas of land. Being an island, it is especially vulnerable to climate change. Of its coastal perimeter, which measures more than 626 km, 80% comprises rocky coastline; 10.1% is made up of sandy beaches, sandbars, and pebble beaches; and 9.9% consists of anthropogenic structures or modifications [68]. Thus, the highly likely 0.8-m total sea-level rise by 2100 and a possible rise of around 2 m [69] would mark a catastrophe for an island where most of the population lives at sea level [70] (GOIB, 2020).

Mallorca, and the Balearic Islands, in general, present the highest rate of tourism intensity of any island space in the world [71] and depend greatly on external resources [72]. This process has been defined as "balearization", exemplifying the loss of regional identity caused by touristification [73]. Mallorca has been an international laboratory for mass tourism and the configuration of a mature coastal destination, where urbanization has been designed as a spatial solution based on financialized capital [74]. The urbanization of Mallorca increased due to the dual influence of tourism development and the metropolization of cities in the richest European countries on which Mediterranean coastline tourism depends. The expansion of tourism in Mallorca, which began in the 1950s and continues today, is the main driver of the island's urbanization: the number of tourists visiting the Balearic Islands rose from 321,220 in 1959 to 16,453,636 in 2019, the number of tourist beds rose from 4609 to 443,019 across the same years, and the number of hectares urbanized rose from 5600 in 1956 to 30,381 in 2018.

The consequence is an economy that specializes in the tourism sector, resulting in a growth in population and construction on the coast, the neglect of the agricultural sector [62], and the abandonment of any pretense of a robust manufacturing production model. The service industry accounted for 85% of the gross value added of the Balearic economy in 2019. This overtourism gives rise to extremely high tourism indicators (Table 2). At the same time, the island's temporary population has increased, as has the number of permanent inhabitants, due to the arrival of immigrant workers and new residents, mainly from North European countries. In 2019, the population was 896,038 [75], with a density of 246.16 inh/km^2. In 1950, there were 341,450 inhabitants [76], and the population density was 93.8 inh/km^2. The rates of population growth in recent decades have been much higher than average for Spain and for the EU [77]. If we combine the inhabitants of the island and its visitors, we can calculate the index of human pressure, which yields the demographic burden of a territory over a certain period. In the case of Mallorca, this was a maximum of 1,465,222 persons in 2019 [76], representing a population density of 402.53 inh/km^2.

Table 2. Tourism indicators for Mallorca in 2019. Own preparation based on [75,76].

Indicator	Description	Value
Tourist Intensity Ratio	Percentage of tourists to the resident population.	1325.26%
Tourist Density Ratio	Percentage of tourists to land area.	3262.32 tourist arrivals/km^2
Tourism Penetration Ratio	Number of tourists multiplied by average length of stay and divided by number of population multiplied by 365 multiplied by 1000.	205.14‰
Tourism Density	Number of overnight stays per resident. Number of tourists per resident.	50.20 1: 0.07
Defert's Tourist Function Index	Number of total beds available in the selected area divided by number of inhabitants multiplied by 100.	33.87%
Charvat's Index	Intensity of tourism development; the number of overnight stays divided by the number of local residents multiplied by 100.	5020.29%
Maximum Index of Human Pressure	Daily estimations of resident population and seasonal population	1,465,222

Cities in Mallorca depend on many inputs, such as food, water, and energy, and generate many harmful outputs. Mallorca has undergone an intense process of urbanization, with a macrocephalic structure based around the urban area of Palma [67], that has endured from the expansion of tourism until our time. In this latter period, the cities have developed under the globalizing, neoliberal model. There has also been a centripetal implosion in the form of tourism and real estate investments, extending across the entire territory. Even the rural spaces of Mallorca have been structured under the urban logic of tourist capitalism.

4. Methods

The methodology used responds to the aim of the present research: the analysis of spatial and climate governance and policy by means of a critical geographical study in general and a case study of Mallorca (Spain). A case study is chosen to generate results and build theories from the corresponding research [78]. It applies a dialectic method in which theory and the analysis of specific situations feed off each other. Consequently, the methodology combines the universal and the particular to analyze the scientific problem under study.

We conducted a review of selected works from the available literature. This is not intended as an exhaustive review of the literature but a selection of studies that support the theme of this investigation. After the joint deliberation of the authors and based on the primary aim of the research, the following main categories were established for the literature

search: Anthropocene, climate change, governance, and Mallorca. These categories were combined as keywords from the conceptual area of the research were selected, attempting to combine several of them in search of the databases of Web of Science, Scopus, and Google Scholar. Figure 1 shows a prisma flow chart for the search strings.

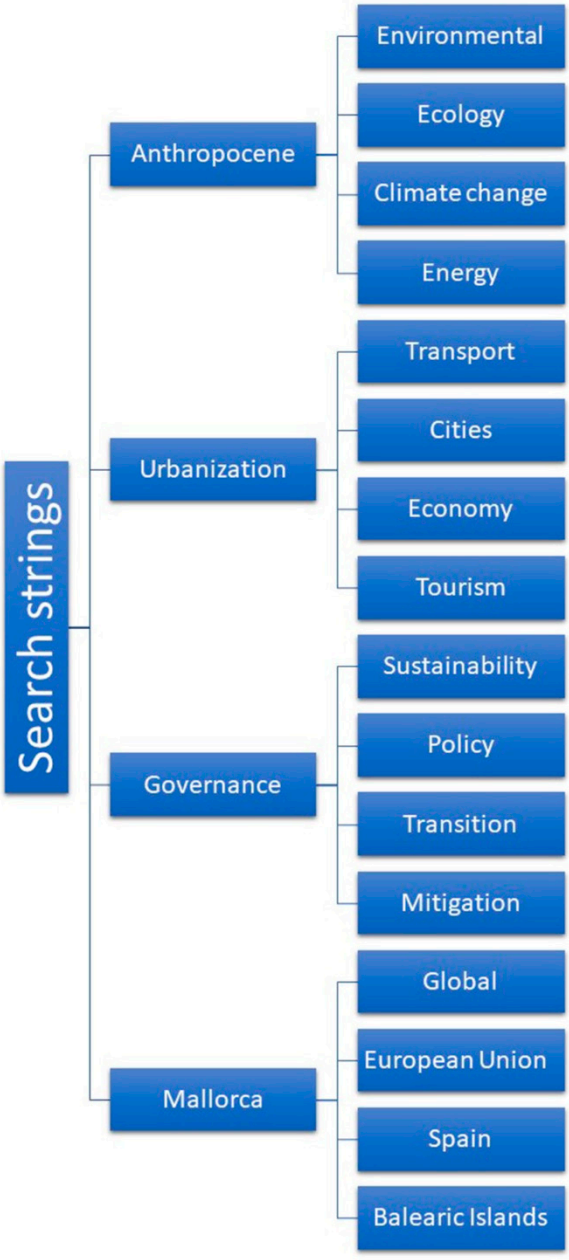

Figure 1. Categories and keywords used in the search chain.

The search yielded hundreds of results that exceeded the researchers' reading capacity. Consequently, only references with a Journal Citation Reports (JCR) impact factor in Web of Science, from Scopus Indexed Q1journals, or with a minimum of 50 citations on Google Scholar were selected for the analysis and results. This latter criterion was essentially applied to the books and book chapters selected. Only the references of Juhola [79] and Shi [80] fail to fulfill this criterion, but they do appear in a leading scientific publication of excellence. Using these criteria, a total of 135 references were read, of which those cited in the text and bibliography were used in the article, and the rest were discarded.

This literature review was also used to enhance the understanding of the case study. The same key terms were used, but in combination with the words 'Mallorca' and 'Balearic

Islands' (see Figure 1). As fewer works were available, the criterion for the study area was subjective and not based on indexation. We also drew on quantitative sources from the Spanish National Statistics Institute (INE) and that of the Balearic Islands (IBESTAT), and the Tourism Strategy Agency of the Balearic Islands (AETIB). These were utilized secondarily through the use of their data without recourse to processing and primarily to calculate different indices. The content analysis [81] of the Balearic Islands' spatial and climate policy focused on studying legislation and planning.

In short, this study takes a holistic perspective, which encompasses aspects of urban development, spatial planning, transport, and energy, among others. The approach to the case of Mallorca ranges from the context of the European Union, with a search for directives and regulations on the fight against climate change and environmental sustainability, to questions of Spain, where we examine Law 7/2021 [82] on climate change and energy. However, our main focus is on the strategies drawn up by the regional government. As the aim of the present article is to study policies and governance, the methodology centers on analyzing official documents and identifying the most significant weaknesses, drawing on the results of previous research. Juhola [79] suggests that many studies on climate change governance and measures are based on the analysis of documents to assess their scope. We conducted a search of the regional (Government of the Balearic Islands) legislation on the environment and spatial and urban planning and regulations in these areas specific to the island in question (Council of Mallorca). We chose to conduct a detailed analysis of Law 10/2019 (Balearic Islands) of 22 February, on Climate Change and Energy Transition, given that it is the most holistic law available, the aim of which is sustainability in the Anthropocene.

5. Results

5.1. Spatial and Climate Governance: From the EU to the Island of Mallorca

A key condition for meeting the challenge of sustainability in the Anthropocene is the creation of new governance to make this possible. The EU has demonstrated its strong political commitment to dealing with environmental challenges and the fight against climate change, which have been specific objectives since the 2009 Treaty of Lisbon. It has set the goal of achieving zero greenhouse gas emissions by 2050. In December 2019, the EU adopted the European Green Deal, which acts as a road map to fulfilling this goal. Under the complex governance of the EU, a wide range of initiatives have been enacted that, either directly or indirectly, deal with the fight against climate change. These take the form of directives (Directive 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings; Directive 2012/27/EU on energy efficiency, and Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources) and regulations (Regulation 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, and Regulation 2021/1119 of the European Parliament and of the Council establishing the framework for achieving climate neutrality).

At the time of reviewing this paper, a global energy crisis is underway, triggered in 2021 by the strong worldwide economic recovery after the recession resulting from the 2020 COVID-19 pandemic, and exacerbated since March 2022 by the Russian invasion of Ukraine. This crisis seriously affects the EU because of the direct dependence of many of its member states on Russian energy supplies. The abovementioned EU directives were published before the energy crisis that is currently afflicting Europe. How realistic, then, is the implementation of all the ideas proposed under these conditions? The EU has already decided to consider natural gas and nuclear energy as green or clean energies. A severe lack of energy supply may lead to a return to the use of coal, thus failing to honor the commitments made on greenhouse gas emissions.

Above and beyond the current scenario, in particular, the EU considers its islands to be priority spaces for the energy transition. It has thus launched the initiative Clean Energy

for EU Islands, with the aim of reducing greenhouse gas emissions and achieving the decarbonization of the islands by means of the use of renewable energy sources and innovative energy systems [83]. The European Environment Agency recognizes the Mediterranean basin as an area of high climate vulnerability.

The general EU proposals must, however, be substantiated through the spatial planning governance of the Member States. Each State is obliged to develop an Integrated National Energy and Climate Plan 2021–2030 (INECP), which is to be redrafted every ten years. In relation to this obligation, in May 2021, Spain adopted Law 7/2021 on climate change and energy transition (Table 3). The Law highlights actions oriented toward the process of decarbonization and sustainable planning of transport. Furthermore, it proposes general measures to be developed through subsequent plans and regulations. Finally, Law 7/2021 implies the adaptation of multiple laws already in effect, proof of which is that its adoption has led to the amendment of seven sectoral laws. In practice, the Climate Change Performance Index 2022 ranked Spain 34th in questions of climate protection [84].

Table 3. Proposals to tackle climate change and achieve energy transition in Spain.

Policies	Proposals to Tackle Climate Change and Achieve Energy Transition in Spanish Law 7/2021 on Climate Change and Energy Transition
Joint action on spatial metabolism	1. Reduction of greenhouse gas emissions by at least 23% by 2030 compared to 1990 levels. 2. Achieve climate neutrality by 2050 at the latest. 3. Penetration of renewable energies in end consumption of at least 42% by 2030. 4. An electricity system with at least 74% of renewable energy in the generation mix in 2030. 5. Reduction of primary energy consumption by at least 39.6% in 2030. 6. Leverage the effluents from water supply and sanitation systems to generate electricity. 7. Promote renewable gases (biogas, biomethane, hydrogen, etc.). 8. End the production of coal in Spain. 9. Disinvest in fossil fuel energy products. 10. Avoid the use of biofuels that negatively impact the environment. 11. Reduce vulnerability to climate change of agricultural soils, mountains, and forest soils. 12. Increase the capacity for CO_2 capture of land and marine carbon sinks. 13. Promote education and training for sustainable development. 14. Promote research, development, and innovation to find responses to climate change. 15. Encourage the circular economy.

Table 3. *Cont.*

Policies	Proposals to Tackle Climate Change and Achieve Energy Transition in Spanish Law 7/2021 on Climate Change and Energy Transition
Eco-sustainable urban construction and design	1. Apply a strategy until 2050 for renovating and rehabilitating buildings for the purposes of energy efficiency. 2. Use materials that produce the lowest possible carbon footprint. 3. Facilitate self-consumption photovoltaic installations in multi-family properties. 4. Promote zero-emission heating and cooling systems. 5. Introduce renewable energies, encouraging self-consumption and low-power installations.
Sustainable transport planning and policies	1. Reduce emissions in the transport sector. 2. Promote zero-emission mobility on foot, by bicycle, or by other active transport methods. 3. Promote the use of passenger and freight trains for distances of more than 300 km. 4. No direct CO_2 emission vehicles in 2050. 5. Enhance and extend the use of the public transport network, including multimodal integration measures. 6. Electrification of the public transport network and the use of zero greenhouse gas emission fuels. 7. Equip petrol and diesel service stations with electric vehicle charging infrastructures. 8. Install electric vehicle charging points in new buildings and in renovations of existing buildings. 9. Reduce emissions generated by the consumption of fossil fuels in maritime transport and at ports. 10. Establish sustainable mobility plans in municipalities with more than 50,000 inhabitants and in the island regions before 2023.
Regenerative urbanism	1. Adaptation to the impacts of climate change in Spain in urban settings. 2. Consider climate change in spatial planning and management and urban development policies and in interventions in urban settings.

Nonetheless, Spain is a state of autonomous communities where the competencies for spatial planning are decentralized. Law 7/2021 sets out the obligation of the autonomous communities to report their energy and climate plans to a Climate Change Policy Coordination Commission, as they are ultimately the competent authorities in the matter. Additionally, autonomous communities are responsible for spatial planning, urbanism, housing, the environment, and tourism, among other competencies. The good intentions in the fight against climate change at the level of the Spanish state are replicated at regional level. Few communities, however, have actually passed laws on climate change, with only three of the 17, Catalonia, Andalusia, and the Balearic Islands, having put legislation in place.

5.2. Environmental and Climate Policy in Mallorca

The response to the challenges of climate change and an ecologically sustainable future range across catastrophism, optimism, and managerial approaches to the problems [85]. The approach in the Balearic Islands is based on an optimistic vision. Climate policy consists of mitigation and adaptation strategies, where mitigation is related to the reduction of greenhouse gas emissions, while adaptation involves actions that seek to reduce climate

risks [79]. The government of the Balearic Islands follows a trend in which mitigation, rather than adaptation, is more broadly adopted as a policy. Specifically, policy is focused on carbon control, as occurs worldwide [86].

The Balearic Islands, and Mallorca as their main island, arguably have the most wide-ranging legislation in questions of spatial and environmental protection in Spain [87] and are pioneers in experimenting with spatial planning formulas to constrain growth [88]. Their insularity, spatial vulnerability, touristification, and the subsequent aggressive urban development process, and, in short, the problems resulting from the capitalist economic system based on tourism monoculture, have forced the construction of a legislative framework intended to mitigate the dramatic impacts of these phenomena. Consequently, environmental laws have been enacted (Table 4), together with planning projects and initiatives (Balearic Islands Climate Change Mitigation Plan 2013–2020). When the regional government adopted Law 10/2019, of 22 February, on climate change and the energy transition of the Balearic Islands, it took an important step towards spatial planning governance.

Table 4. Proposals to tackle climate change and achieve energy transition in the Balearic Islands.

Policies	Proposals to Tackle Climate Change and Achieve Energy Transition in Balearic Islands Law 10/2019 on Climate Change and Energy Transition
Joint action on spatial metabolism	1. Reduce greenhouse gas emissions by at least 40% by 2030 compared to 1990 and by 80–95% by 2050. 2. Reduce use of energies with highest CO_2 emissions. 3. Enhance the role of renewable energies—the proportion of renewables in final energy consumption is to be 35% in 2030 and 100% in 2050. Installation of photovoltaic panels in publicly owned land and buildings. 4. Integrate renewable energies in the electricity system by installing energy storage systems. 5. Limit the use of generators at power plants that use the most polluting fuels. 6. Adapt electricity networks to facilitate the integration of renewable energies. 7. Promote the generation and consumption of biofuels derived from wastewater treatment and the reuse of domestic and industrial oils and from organic waste and remains. 8. Use sustainable forest biomass as a source of renewable energy, respecting the carrying capacity of woodlands. 9. Reduce external energy dependence. Achieve the maximum self-sufficiency and guarantees of energy supplies—by 2050, 70% of final energy consumption is to be generated in the Balearic Islands through renewable energies. 10. Stabilize and decrease energy demand, prioritizing energy saving—with a 26% reduction b7 2030 and 40% by 2050—and energy efficiency. 11. Promote self-consumption, where consumers can produce their own energy and release surplus amounts to the network for consumption by other users. 12. Increase public initiatives in bringing energy to market. 13. Save water and reduce waste. 14. Establish a hierarchy in waste management: prevention, preparation for reuse, recycling, energy recovery, and elimination. 15. Encourage the creation of a circular economy and the reduction of emissions from the transformation of raw materials. 16. Promote locally produced, organic agricultural products, with local varieties adapted to the erne climate conditions, and shift towards an efficient model of high-quality food self-sufficiency. 17. Support scientific research on the mitigation of and adaptation to climate change

Table 4. *Cont.*

Policies	Proposals to Tackle Climate Change and Achieve Energy Transition in Balearic Islands Law 10/2019 on Climate Change and Energy Transition
Eco-sustainable urban construction and design	1. Energy renovation of buildings. 2. Saving and energy efficiency measures in new buildings and in the restoration or rehabilitation of existing ones. 3. Use low environmental impact building materials, which are preferably locally sourced. 4. Limit fuels in heating systems. Substitute equipment and devices. 5. Establish energy management plans in all buildings. 6. District heating systems. 7. Utilize large ground level and covered carparks, depending on their viability, for solar photovoltaic generation. 8. Promote green urban spaces to reduce urban island heat effect and sequester carbon in these spaces. 9. Increase permeability of soils and the implementation of sustainable urban drainage systems to reduce flood risks. 10. Adapt urban planning regulations to minimize obstacles to the energy renovation of all existing buildings.
Sustainable transport planning and policies	1. Promote sustainable means of transport with zero greenhouse gas emissions: non-motorized mobility, especially in urban centers—specifically, use of bicycles. 2. Promote a collective or intermodal public transport model, which reduces the use of private vehicles. 3. Transition of road transport towards vehicles with almost zero direct emissions. By 2050, all motor vehicles must be greenhouse gas emission free. Exceptions: public service vehicles and those used at special events with authorization from the administrations. 4. With some exceptions, prohibit the circulation of diesel motorbikes and cars from 1 January 2025. 5. Replace current vehicles with others with lower emissions, or convert the existing ones. Promote shared vehicle systems 6. Electrification of the car population, especially through acquisition of new fleets by the public administration, transport companies, and car hire services. 7. Economic and administrative incentives for the conversion of substitution of private vehicles for other less polluting alternatives. 8. Develop a network of charging points for electric vehicles and a network of refueling points for alternative non-fossil fuels. 9. Reserve car parks for the exclusive use of zero-emission vehicles. 10. Development of the rail network, including extension, modernization, electrification, and improved services.
Regenerative urbanism	1. Plan and promote the resilience and adaptation of citizens, productive sectors, and ecosystems to the effects of climate change. 2. In new urban developments, reserve an area of land for the generation of renewable energy of sufficient size to cover the annual equivalent of the development's energy needs. 3. Renewable energy installations will comply with spatial and urban planning regulations. 4. Create zones of priority development delimited by the islands' spatial planning programs on any type of land where renewable energy installations will be admissible under spatial planning and urban development legislation. 5. Urban developers and large mobility centers will need the approval of a mobility study in the following cases: spatial planning, sectorial, general urban development and that in municipalities with more than 5000 inhabitants; retail establishments with a surface area of more than 5000; office buildings with a ceiling area of more than 10.000 m^2; sports, leisure, and cultural facilities with a capacity for more than 2.000 personas; hospitals and healthcare centers with a capacity of more than 2000 beds, schools with more than 1000 students; buildings, workplaces and complexes for more than 500 people; and tourism accommodations with more than 1000 beds.

As in the case of Spanish Law 10/2019, the Balearic Islands' legislation is based on actions aimed at spatial metabolism. Nonetheless, the Balearic proposals are more precise and address more fields of action than those contained in Spanish Law 7/2001.

Nonetheless, to date, the legislative implementation has not been as expected. Priority has been given to creating an image of sustainability and environmentalism abroad, mainly publicized in tourism markets, rather than actually focusing on obtaining results. A notable example was the project for the Plan for the Comprehensive Renovation of Palma Beach [88].

Furthermore, it should be noted that the processes of environmental transformation have already been initiated, and the Balearic authorities are taking appropriate measures intended to minimize negative human impacts on the environment of Mallorca, as well as those of the directives for the coming years analyzed in this work. Reviewing all these measures is impossible in an article of this length. However, a significant example within the Balearic government's current organizational structure is the Directorate General for Energy and Climate Change, which is part of the Department of Energy Transition, Productive Sectors, and Democratic Memory. As part of a policy of transparency, all its actions can be openly consulted on its website [89]. This directorate has made public calls offering assistance for the execution of programs to incentivize the implementation of thermal renewable energies in different energy sectors; subsidies for the promotion of renewable energy communities both in both owners' and business associations and in non-profit associations; subsidies for energy efficiency actions in agriculture and livestock farming; subsidies for energy self-consumption installations in the residential sector; and subsidies for energy rehabilitation in existing buildings, among many others [89]. Some of these measures, however, have not been received with enthusiasm by local administrations, which see their requirements as excessive [90].

Additionally, the importance and depth of these measures are far removed from recent academic proposals such as that of Torres et al. [91], who propose an extensive range of adaptation measures to address, before 2030, the most prominent impacts of climate change identified in the Balearic Islands. These authors identify ten areas that should be the subject of mitigation actions related to terrestrial and marine ecosystems, water resources, energy, infrastructure and urban planning, sustainable mobility, human health, economy, waste, law, and education [91]. They call for these measures to be implemented within the climate change mitigation and adaptation policies in Mallorca and all the Balearic Islands, which they consider to be currently insufficient [91].

6. Discussion. A Critical Analysis of Spatial and Climate Governance and Policy Based on the Paradigmatic Case of Mallorca

Swyngedouw [92], referring to environmental policies, suggests that so far, nothing has really changed. Juhola [79] states that the actual impact of climate policies, as evidenced by changes in urban patterns or social life, continues to be limited. It is necessary to look beyond the promises, propaganda, and politics associated with the concept of sustainability to explore both its meaning and practical implications.

6.1. A Utopian Energy Transition Viewed from the Perspective of Growth

As described by Heinberg [66], the primary aim of climate policy in the Balearic Islands is that of creating energy infrastructures with zero CO_2 emissions and initiating a post-carbon era. The spatial planning governance of Mallorca assumes this will be possible when renewable energy sources, such as wind and solar power, are able to replace more concentrated carbon-based, hydroelectric, and nuclear energy sources [65], the latter two of which are absent from the island. If the equivalent substitution of polluting energies with clean, renewable ones is unlikely, the solution lies exclusively in drastically reducing energy consumption and usage habits. In the Balearic Islands' spatial planning governance, this question occurs as an intention but is neither programmed nor self-evident.

The policy of the Balearic Islands continues to conceive of a transition based on economic, demographic, and urban growth. Indeed, their Law 10/2019 allows for fossil electricity generation if the demand cannot be met by renewable energy. The current productive model is upheld. In short, it maintains, albeit with certain nuances, the same

spatial, economic and capitalist social reproduction, as is the case in many of the current responses to climate change [80].

6.2. A Weak Circular Economy Proposal and Climate Policy in Mallorca

A circular economy is a regenerative system in which resource input and waste, emissions, and energy leakage are minimized by reducing, closing, and narrowing material and energy loops [93]. Thus, the capacity for ecological regeneration and adaption of urban systems is developed [94]. Policy in the Balearic Islands reflects a superficial understanding of the concepts of the circular economy, but the criteria to implement it are not enforced. Simple recycling, as proposed in the regional climate policy, is little more than a stopgap. Meanwhile, waste and pollution continue to accumulate as a result of a productive model based on the steady growth of tourism and urbanization.

Moreover, circular activities require space, while land in Mallorca is limited due to its process of hyperurbanization. For example, it is difficult to find the land needed to build renewable energy generation plants, which complicates achieving the sufficient economies of scale required by these facilities.

6.3. The Ingenuous Wish to Achieve the Domestic Self-Supply of Goods and Services

Today, the material needs of a region are supplied by the vast Spanish hinterland and, increasingly, by a global supply chain [2]. The agri-food industry and its global supply chains generate greenhouse gas emissions. Mallorca is a net consumer of resources from the rest of Spain and other countries [72]. Its internal assets have been replaced by a global chain of production in which foodstuffs and other basic goods are not obtained from nearby areas but, ultimately, from any part of the world. This leads to an unsustainable situation, as theorized by Rees and Wackermagel [95], where the volume of consumption exceeds the balance of what a bioregion can regenerate. The replacement of external products for consumption for other internally produced ones, a measure provided for in the Balearic Islands' climate policy, is a vain desire if the tourism-based productive system is maintained and growth is sustained. Mallorca's dependence on external provisions is clearly evidenced on the occasions when supply networks fail.

6.4. A Superficial Approach to Ecological Urbanism or Climate Urbanism

Urban habitats should be made up of eco-sustainable buildings [50], which utilize and adapt to climate conditions. Climate governance in Mallorca makes a superficial nod in this direction. Although it incentivizes the renovation of existing buildings and the adaptation of new ones, it does so under a deficient system. It fails to include new concepts such as edible urbanism or biophilic cities [46] and proposes no radical practices for an urban future under climate change, such as those provided for by the climate urbanism approach [57]. Additionally, it focuses on measures of mitigation rather than adaptation, failing to address the creation of a safe living environment that reduces the risks of extreme weather phenomena and long-term environmental changes. Such an environment should be achieved, furthermore, following the principles of climate justice, which includes vulnerable groups.

6.5. A Mistaken Commitment to Private Electric Vehicles

Eliminating car dependency cars is key to achieving sustainability. Nanaki and Koroneos [96] advocate the development of electric vehicles as a factor in mitigating climate change. In Mallorca, private cars have become the most commonly used form of transport, with this being precisely the most destructive option possible [97]. More than half of the journeys made by residents of the Balearic Islands are by car [98]. The situation is exacerbated by traffic being concentrated in certain principal areas, leading to an overload.

The Balearic government considers that the short distances on Mallorca make it an ideal space for electric mobility, and it defends the active implementation of this transition. However, simply substituting electric vehicles for hydrocarbon-fuelled ones is not suffi-

cient [2]: (a) electrical energy also continues to be produced by coal, gas, and oil; (b) the use of electric vehicles intensifies the need for concentrated sources of energy and requires a complex fuel distribution network [65]; (c) electric vehicles emit more CO_2 during their construction than fossil fuel ones; (d) the rest of the environmental impacts related to infrastructures and tires are not eliminated. Additionally, this commitment to electricity may give rise to privileged private sector investment in premium infrastructures [99], and hence the great interest among private enterprises in the leading energy transition in Mallorca [100].

6.6. Neglect of the Impacts Generated by Overseas Air and Maritime Transport

Air traffic and maritime transport are major greenhouse gas emitters. There exists in Mallorca, as theorized by Marsden et al. [101], a contradiction between the intention of carbon reduction and travel behaviors and the lack of autonomous community competencies to intervene upon one of the leading sources of emissions, namely, overseas air and maritime transport, sectors which are the responsibility of the State. In overtouristified Mallorca, the increase in international tourism has led to millions of air passenger journeys, the number of which has grown exponentially in the 21st century: 9,655,248 passengers arrived at Palma Airport in 2000 [76] and 29,721,142 in 2019 [102]. Meanwhile, Mallorca is dependent on supplies delivered by maritime transport. In the short and medium term, air and maritime transport are unable to offer solutions due to their greater technical limitations. The only possibility is to reduce the number of movements.

6.7. Proposals to Tackle the Challenges of the Anthropocene in Mallorca

A decrease in the demand for resources is urgently needed [103], as is degrowth within an inclusive developmental framework [104]. Jackson [105] advocates a future without growth, given the finite nature of our planet, and Kallis [106] defends the need for a process of dematerialization and degrowth.

This article concludes with a series of more committed, interrelated strategies to tackle the shortcomings detected *n* climate governance in Mallorca (Table 5). We work from the principle of a degrowth strategy to paralyze and turn around the deterioration of the environment by means of the robust coordination and support of the institutions of global governance. A transformational policy that, in order to tackle the challenges of the Anthropocene, repudiates the existing structures and flees from a mentality based on conservative political values of a return to normality.

Table 5. Shortcomings of climate policy in Mallorca and proposed strategies to tackle the challenges of the Anthropocene.

Shortcomings of Climate Governance and Policy in Mallorca	Proposals to Tackle the Challenges of the Anthropocene in Mallorca
Considering energy transition as an element of growth.	• Halting a productive model based on overtourism. • Degrowth and dematerialization.
Weakness of the proposals put forward and of the commitment to a circular economy.	• Implementation of, and economic, political and social commitment to, the circular economy.
Ingenuous desire to achieve internal self-supply of goods and services	• Internal self-supply for a limited population in accordance with the island's sustainable resources.
Superficial approach to eco-urbanism or climate urbanism.	• Active implementation of eco-urbanism.
Mistaken commitment to private electric vehicles	• 15- or 30-min city. • Stop the use of private cars and shift to eco-individual sustainable means of transport (walking, bicycles) and public transport (renewable energies).
Neglect, due to lack of jurisdiction, of the impacts of overseas air and maritime transport.	• Reduction in air transport and decrease in the dependence on maritime transport.

Governance of the Anthropocene should be based on a systemic improvement at global level. Local governance alone is insufficient to deal with the challenge without strong coordination and support from global institutions [16]. The organization of different governmental systems, the systemic and tiered levels of authority, and public participation must shape the ability to change [9]. These policy responses and governance mechanisms require an integrated, multi-level, multi-sector, and multi-actor approach that effectively connects and bolsters local and global policies and governance systems [12].

7. Conclusions

The Anthropocene era demands a future alternative to the current state of play. Achieving this requires courageous and not hesitant policies and the engagement of citizens and enterprises. An alternative to the current system of production, distribution, and consumption is needed. Mitigation as the core element of climate governance and policy is not simply a question of designing energy transition but also a deep-reaching ecological, economic, political, and social transformation.

In Mallorca, the solution lies in degrowth and a change in the economic model. Drawing on the present scenario of an overtourism-based economy and growing urban sprawl, this article analyses the spatial governance and climate policy enacted to respond to the challenges of the Anthropocene. The study proposes key strategies for spatial governance and climate policy to shape a more coherent fight against climate change.

In the Balearic Islands, regional governance alone cannot achieve an effective energy transition. Mallorca is dependent on carbon energy and the global supply chain. In response to this situation, the Balearic government has promoted measures focused on reducing greenhouse gas emissions by substituting renewable and local energies for sources of fossil energy, but such measures do not provide for an actual change in the economic model. Additionally, this study has detected inconsistencies, such as failing to put a firm limit on large new urban and tourism facilities and developing strategic plans to attract more flights and cruise ships.

Their energy transition is conceived of within a framework of growth. Given this perspective, many strategies are simply wishes or tenuous approaches to complex theories and practices such as eco-urbanism. Spatial governance in the Balearic Islands obeys the global policies that replicate capitalist economies focused on carbon control as a response to climate change [59,86]. The intention is to make a model of continuous economic growth, based on predatory and highly unsustainable tourism and dispersed urbanization, more eco-efficient. Policies in Mallorca fail to tackle the wide-ranging, disruptive, and systemic changes of a cultural, economic, and social nature required to achieve a sustainable future in the Anthropocene.

Finally, given the present scenario of a severe energy crisis in the EU, it is essential for future research to focus on the degree to which the protocols, objectives, and agendas intended to combat the harmful effects of climate change will be met in the coming years.

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