Mapping offshore renewable energy governance

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A B S T R A C T

This article has an empirical focus on energy transition using the emerging offshore renewable energy (ORE) industries in the context of global governance. First, it explores and assesses pertinent discussions on sustainability and transformation within energy systems and the marine space. Then, it studies potential policy linkages within ORE governance which, although relying on clearly defined objectives and targets (e.g. climate change mitigation, increased share of renewable energy, energy security), could translate into polycentricity and institutional complexity/fragmentation. Previous research has focused on the technical, legal and policy challenges of deploying ORE technologies, however there is not any systematic review of who are its global governors. Certainly, the importance of the International Renewable Energy Agency and other renewable energy intergovernmental institutions has not been overlooked. Nevertheless, there are other international organisations whose mandate extends beyond renewable energy and several non-state actors who claim a role in ORE governance. This article puts forward a comprehensive analysis of the institutional architecture of global ORE governance with emphasis on the EU in order to shed a light on how ORE is being governed and who is involved. Results should advance knowledge on the scope, type and function of the institutions currently governing the exploration and exploitation of offshore renewable resources.

1. Introduction

In the Information Age, modern society relies heavily on activities that require high energy consumption. Consequently, with population growth and economic development comes a higher demand for energy input [1]. Historically, members of the Organisation for Economic Co-operation and Development (OECD) have the highest share of energy intake, and most of these economies have developed based on fossil fuels: oil, coal and natural gas [2]. While oil powers most of the transportation sector, coal and natural gas power most of the electricity. In a nutshell, power plants burn fossil fuels to create electricity which entails large emissions of carbon dioxide, a gas that promotes the greenhouse effect and is often associated with global warming [3].

As a pioneer in climate change mitigation policies, the European Union (EU) has been making efforts to shift from this business-as-usual scenario to a setup that allows countries to limit the increase in global average temperature well below 2 °C above pre-industrial levels, and to pursue efforts to stay below 1.5 °C.1 “Renewable energy is a fundamental and growing part of the global energy transformation” [4], and combined with energy efficiency, it has the potential to put the world on the 2 °C pathway and on track to achieve several Sustainable Development Goals (SDGs). Ensuring access to (sustainable) energy (SDG7), managing climate change (SDG13) and promoting ocean conservation (SDG14) represent defining challenges of the 21st century and are included in the United Nations’ 2030 Agenda for Sustainable Development Transforming our World [5].

Turning this Agenda into practice requires innovative thinking and dedicated action from governments—mainly, but not only. States might have the primary responsibility to follow-up and review the SDGs, but there needs to be international cooperation and coordinated action of all stakeholders to achieve solutions to these shared problems [6].

In fact, “looking at intergovernmental processes is only part of the story of governance in any arena” [7]. This idea is reinforced by Avant and colleagues who acknowledge that “[t]he global policy arena is filled with a wide variety of actors – international organisations, corporations, professional associations, advocacy groups, and the like – seeking to ‘govern’ activity in issue areas they care about” [8]. These active agents are also known as governors. Shove and Walker found that in order to dislodge currently dominant socio-technical regimes2 and replace them with new configurations, “most recommend the

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1 Recently formalised by the Paris Agreement, the first-ever universal, legally binding global climate deal.
2 The energy supply sector is often conceptualised as a socio-technical system consisting of networks of actors such as individuals, firms, civil society organisations, etc., and institutions comprising societal and technical norms, regulations, standards of good practice, and more [9].
deployment of multiple methods and tools for intervention, also arguing for processes of governance (rather than government), for the involvement of diverse actors and knowledge" [10]. Transitions within socio-technical systems are characterised by changes among several dimensions: technological, material, organisational, institutional, political, economic, and socio-cultural [9]. "(T)ransforming the energy system involves replacing, or supplementing, established technologies with new ones. (...) However, there is a considerable risk that the existing configuration of competence, networks and institutions actually manages to hinder the process of creating variety" [11].

Governance and politics have been previously described as essential "to understanding, analysing, and shaping transformations towards sustainability." [12] Thus it seems plausible that a transformative agenda for sustainable development might require ‘transformed governance’ [13]. The scale of ongoing change is so significant, and the role of energy in modern life so central, that if the system needs to change, its governance also needs to [14]. In this context, one should perceive ‘transformed governance’ as a result of the ‘governance turn’ or “the increasing importance of multilevel decision-making arenas, the involvement of more stakeholders and thus the formation of policy networks and/or networked forms of governance” [15]. This should primarily translate into strengthened governance beyond the state: network-like arrangements of public and private actors, coalitions between business organisations and NGOs, and public-private partnerships [16].

Renewable energy plays a key role in mitigating global greenhouse gas emissions by radically lowering the emissions’ profile of the global energy system, therefore it should be at the centre of any strategy for countries to meet their climate goals while supporting economic growth and domestic value creation. The International Renewable Energy Agency (IRENA) has recently issued the REMap report [18] which comprehends a roadmap strategy to double the renewable share in global energy use by 2030. If this were to occur, it could potentially translate into a great reduction in air pollution and large financial savings. These forecasts cover multiple types of sustainable energy sources which are crucial elements for the energy transition, including offshore renewable energy (ORE) or renewable energy produced in the marine environment, namely offshore wind and renewable ocean energy.

ORE governance has been increasingly investigated in the past few years with a recent focus on the legal and policy challenges of developing the industry (e.g. complex permitting, consenting timescales, seabed ownership, Environmental Impact Assessment, grid connection, funding) [20–25]. However, none of these studies seems to: (1) understand the influence of climate change, energy, oceans and potentially other policy domains on the actual scope of ORE governance, (2) systematically identify the full spectrum of institutions and actors involved, and (3) demonstrate the complexity of ORE governance. Therefore, these are the three objectives of this article. It contains a comprehensive analysis of the institutional architecture of ORE governance with emphasis on the EU with the aim of acknowledging who are its governors, which issue areas they cover and which functions they perform.

The article is structured as follows: the Introduction (Section 1) contextualises this study and assesses pertinent discussions on sustainability and transformation within energy systems. The Literature Review (Section 2) summarises the current state of affairs of offshore renewables, and describes the potential linkages between ORE and other issues in the global agenda while exploring notions of polycentricity and fragmentation. The Conceptual Basis (Section 3) defines key concepts used throughout this article such as governance, governance architecture, regime complex, institutional complexity, polycentricity and fragmentation. Next, the Methodology (Section 4) briefly explains the analytical framework used to map the types, functions and issue areas covered by relevant institutions currently governing the exploration and exploitation of offshore wind and renewable ocean energy. Results are shown in Section 5 which also provides a clear visualisation of the governance architecture of ORE. The significance of these results are then addressed in the Discussion (Section 6) which also hints at future research. Finally, Section 7 presents a summary of the main Conclusions.

2. Literature review

Although renewable ocean energy and offshore wind are at different stages of development, the fact that these forms of energy might roughly share the same legal and policy challenges given the resources’ attributes and their localised nature justifies studying offshore renewable energy as a whole. Offshore wind energy, the most mature form of ORE, is growing at a remarkable pace as projects move further offshore and potentially to deeper waters due to significant reduction of costs [27] and technological developments such as the Vestas turbine capable of 8 MW power outputs [28] and floating devices [29]. Total offshore wind production already surpasses 14 GW with the North Sea region being considered the global leader in installed and planned capacity. The United Kingdom (UK) is the largest producer (over 5 GW), followed by Germany and Denmark [30].

On the other hand, ocean energy technologies have progressed at different speeds. Wave and tidal energy have been actively investigated at the international level for a number of years, whereas research into ocean thermal conversion and salinity gradient are still in the early stages. The urgent demand for clean energy and the great potential of these resources have been the main drivers for increasing interest in the EU [19]. Tidal stream or current devices which resemble submerged wind turbines explore the kinetic energy in tidal currents and are the most developed form of renewable ocean energy generation, fact that can be partially attributed to the higher predictability of tides in relation to waves. Currently, France and the United Kingdom are the EU countries with the highest installed capacity of tidal energy [31].

Harnessing offshore renewable energy is innovative, promising, and it is at the intersection of various concerns and interests [32]. It offers potential job creation and might help with energy security and development agendas, but it is located in a complex and delicate environment and considerable uncertainty remains as to the environmental impacts of the technologies. Notwithstanding, if included in countries’ energy mixes, both can certainly contribute to advance carbon mitigation goals and renewable energy targets.

According to Florini, “even by the low standards of most global governance, energy policy fares particularly poorly.” [33] As a “cross-cutting issue of transboundary policy-making” [34], energy not only comprises different policy problems but also interacts with different issue areas of global governance (e.g. security, environment, trade, development cooperation). This means that “decisions aimed at other goals often shape energy in an uncoordinated and incomplete way” [34]. Furthermore, energy is not characterised by “a single regime in the formal sense of a coherent framework of principles, rules, norms

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3 The IRENA was created in 2009 following growing concerns over the energy and climate crisis and it is headquartered in Abu Dhabi (United Arab Emirates). The leading states behind IRENA’s creation – Germany and, to a lesser extent, Spain and Denmark – are all founding members of the International Energy Agency (IEA). The IEA, located in Paris (France), has worked on renewables for over three decades. Although its membership is reserved exclusively for developed countries, it is often referred to as the closest partner we have to a “World Energy Organisation” [17].

4 According to IRENA [19], the generation of electricity from renewable ocean energies requires the exploration of ocean energy resources such as ocean surface waves, tidal currents, tidal range, deep ocean currents, thermal gradients or changes in salinity.

5 “The actual scope is the set of issues to which attention is actively being paid by a set of relevant actors” [26].

6 All UK references throughout this article comprehend assessments made while it was still part of the EU.
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