Marine Policy 90 (2018) 37–46

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Governance challenges of marine renewable energy developments in the U.S. – Creating the enabling conditions for successful project development

Marcus Lange[a,b,c,*], Glenn Page[d], Valerie Cummins[a,e,f]

[a] Marine and Renewable Energy Ireland (MaREI) Centre, Beaufort Building, Environmental Research Institute (ERI), University College Cork (UCC), Ringaskiddy, Co., Cork, Ireland
[b] Helmholtz-Zentrum Geesthacht, Centre for Materials and Coastal Research, Geesthacht, Germany
[c] Department of Geography, University College Cork, Co. Cork, Ireland
[d] SustainaMetrix, Portland, ME, United States
[e] School of Biological, Earth and Environmental Sciences (BEES), University College Cork (UCC), Co. Cork, Ireland
[f] Future Earth Coasts, hosted by the MaREI Centre at UCC, Co. Cork, Ireland

ARTICLE INFO

Keywords:
Governance
Marine governance
Marine renewable energy
Energy transition
Public engagement

ABSTRACT

Increasingly, marine renewable energy developments are viewed as an opportunity to meet climate change obligations, with the added benefit of powering the economy and the creation of jobs. Technical, economic and engineering challenges co-exist with governance challenges in the development of large-scale marine renewable energy projects. This paper addresses the question, if the prerequisites for sustainable project development are evident in selected case studies. It also asks what lessons can be learned from current practice in the context of energy governance at the local level. The authors argue that these lessons can be central enablers to support decision makers in future programmes, to better understand how to build the enabling conditions for programme implementation towards renewable energy at higher spatial scales of governance, importantly the national level. The study builds on a multiple stakeholder approach involving interviews and group discussions with key individuals from industry, government and civil society in emerging pilot programmes along the East Coast of the United States (U.S.). New policy windows were opening at the time of the analysis and ambitious development was underway by a range of actors who are driving progress in the sector and positioning the area to become a major provider of blue energy.

1. Introduction

Increasingly, marine renewable energy resources and ocean technologies are viewed as an opportunity to meet climate change obligations by developing a low-carbon supply of energy with the added benefit of powering the economy and providing the necessary conditions for the creation of jobs [1]. The International Energy Agency (IEA) [2] and Loorbach & Rotmans [3] highlight the value of large marine renewable energy developments as a central ingredient for the global energy transition. Energy transitions form part of a wider discussion on the potential for transforming human-technological interactions to achieve sustainable patterns of production and consumption [4].

The Intergovernmental Panel on Climate Change (IPCC) emphasise technological obstacles to marine renewables. Some of them are fundamental, particularly for wave and tidal [5]. Due to uncertainties around the commercial availability of wave and tidal energy at attractive investment costs, developments globally are still at R&D, pilot and demonstration stage. Whereas these technologies are at a nascent stage, offshore wind technology in some parts of the world, particularly in countries in Europe (Denmark, the UK and Germany), are deployed on a large commercial scale [5]. However, increasingly both the onshore and offshore wind sector are challenged to find technical solutions (e.g. around energy transmission) and to overcome institutional barriers. Institutional barriers are most importantly consenting regime issues, high costs of developments and public acceptance relating primarily to visual intrusion [5,6]. In terms of public acceptance, experiences of community opposition from Scotland and other countries emphasised that previous assumptions that marine renewable energy is "out of sight, out of mind" can be questioned [7]. The studies highlighted that local context referring to indigenous and local communities' rights and ownership matter, as these can strongly affect local perceptions of different marine technologies, whether it be visible from land or not. Given that in the meantime some countries have experienced getting large marine renewable energy developments off the

* Corresponding author at: Helmholtz-Zentrum Geesthacht, Centre for Materials and Coastal Research, Geesthacht, Germany.
E-mail address: marcus.lange@hzg.de (M. Lange).

https://doi.org/10.1016/j.marpol.2018.01.008
Received 15 October 2017; Received in revised form 15 December 2017; Accepted 8 January 2018
Available online 12 February 2018

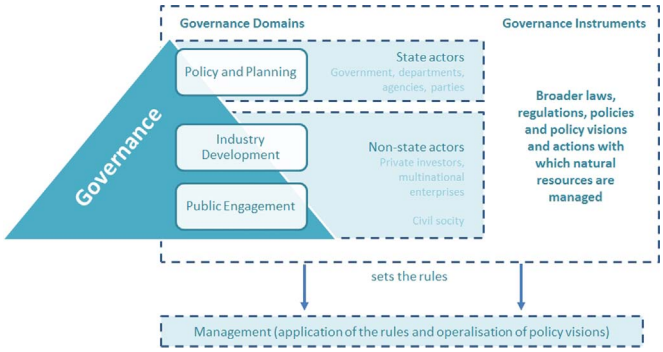

Fig. 1. Governance understanding as a basis towards setting up of rules for the management of human activities.

ground and into the sea, the international context for learning for countries with similar ambitions is of crucial importance.

In order to learn from country experiences, this paper sets out to show that governance issues are one of the main challenges of transitioning towards sustainable energy futures, with an enlarged share of marine renewable energy sources. Based on an assessment of the enabling conditions for programme implementation at the project level, the authors of this article draw general conclusions for the national level. Referring to UNESCO [8] and Folke et al. [9], they define governance as encompassing broader laws, regulations, policies and actions with which natural resources are managed. Management on the other hand is concerned with the application of these rules and operationalisation of policy visions. Van Tatenhove & Jan [10] focus on governance of marine use activities and dynamics within a framework of coalitions of state and non-state actors. Thus, governance sets the stage within which management occurs [11]. Even if technical, engineering challenges, laws and regulation exist, these co-exist with governance challenges at various levels, which relate to 'policy and planning', 'industry development' or 'public engagement'. Fig. 1 highlights the theoretical understanding of governance based on the authors referenced above. In addition, the figure highlights the governance domains and the instruments setting the rules for the management of human activities.

The authors of this article define the governance domains established above as the category system for the assessment. In this paper, they focus on governance challenges from the perspective of each one of the governance domains. *Firstly*, they ask if the prerequisites for sustainable project development are given in selected case studies. The *second* question addresses, what lessons can be learned from current practices in the context of energy governance at the local level. The authors argue that these lessons can be central enablers to support decision makers in future programmes to better understand how to build the enabling conditions for programme implementation towards renewable energy at higher spatial scales of governance, importantly the national level.

These questions are based on the concept of nested systems of governance at multiple scales [12]. The assumption is that decision makers and managers can address some issues more effectively at one level, and less effectively at another. Therefore, decision-making must recognize conditions at least at the next higher level in the governance system. The study builds on the work by Olsen et al. [12] and its governance baseline approach. This approach forms part of an 'orders of outcome analysis' framework presented in the context of Integrated Coastal Management (ICM). It is based on the analysis of governance response to ecosystem change and features the collection of selected case studies and profiles of stakeholders in current governance systems, namely from industry, governments and civil society as a core component of the framework (including understanding of power dimensions, decision-contexts around key issues that matter to residents and other key stakeholders). Marine renewable energy developments will involve multiple stakeholders within and outside coastal communities. Social science research needs to explore the context for each of these perspectives. From a science perspective, comparative studies can provide an opportunity to aggregate results from individual cases to higher level. From the perspective of decision makers, these studies can support a framework for learning and transferring of knowledge across scales [13].

This study applies the principles of the Olsen et al. [12] framework for analysing the governance dimension of energy in a range of marine renewable energy initiatives along the Northeast Coast of the United States (U.S.). The study team engaged with individuals from selected case studies in the States of Maine, Rhode Island and Maryland involved in the process of programme implementation within interviews and group discussions. In addition to the U.S. analysis, the paper provides high-level views on consenting solutions towards marine renewable energy transitions from Denmark and the United Kingdom (UK).

2. Background

The work is part of a larger study, looking at case study material from Europe, including Ireland and Denmark [14]. The U.S. as an example was chosen for three reasons: *First*, significant work was underway in pilot testing to leverage vast wind energy resources for potential electricity generation. *Second,* new policy windows were opening at the time of the analysis and *third*, ambitious development was underway by a range of actors who are driving progress in the sector at pilot scale and positioning the area to become a major provider of green and blue energy [15–17]. While onshore wind became the most important new renewable energy technology in the U.S. in 2006, leaving behind geothermal and solar energy, offshore wind has been a topic of much debate and controversy in the coastal zone [18–20].

As an example, the offshore wind farm Cape Wind in Massachusetts engendered the difficulties in U.S. consenting of marine energy developments and wide spread public opposition [21,22]. Opposition with a number of litigations was based principally on visual intrusion and on cost grounds. Applications for permits first emerged in 2001. Developers initially looked for the construction of the first offshore wind farm in the U.S., consisting of 130 × 3.6-MW turbines with a capacity of 468-MW powering more than 220,000 homes [17]. However, no turbine planned in this project has been installed by the time of writing. In 2015, the U.S. Departments of the Interior (DOI) and Energy (DOE) enforced policy changes by issuing leases and funding for demonstration projects. This together with promising externalities in market conditions unlocked potential for the completion of the first wind farm in U.S. offshore waters in August 2016 and 23 projects in various development stages. Energy experts expect that the 30-MW Block Island Wind Farm will power homes on the island and onshore. In December 2016, the company Statoil won an offshore licence off the coast of New York at a cost of $42.5 mi US [23]. The company views the U.S. East Coast as a key emerging market for offshore wind, bottom fixed and floating. The lease comprises an area that could potentially yield more than 1-GW of offshore wind.

The authors of this article carried out a comparative analysis of governance dynamics and priorities at the *federal government level* related to marine renewable energy developments and emerging pilot programmes in this field at the *state* and *local level*. This has been undertaken to understand the decision-making power at various scales and interconnections across different stakeholders. The study put only limited emphasis on technological aspects of energy sources, such as device development and grid connection, and economic conditions, such as the efficiency and security of the supply.

3. Material and method

The research method in support of this study was designed to