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The role of policy in shielding, nurturing and enabling offshore wind in The Netherlands (1973–2013)

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ABSTRACT

It is widely acknowledged that many renewable energy technologies cannot (yet) compete with incumbent (fossil fuel) options e.g. in terms of price. Transitions literature argues that sustainable innovations can nevertheless break out of their 'niches' if properly shielded, nurtured and empowered. Most studies using this perspective have focused on how innovation champions engage in shielding, nurturing and empowering (SNE) activities: none have so far focused specifically on the role that policy plays in relation to these three processes. This paper therefore aims to analyze the way in which policy constrains and enables the shielding, nurturing and empowering of renewable energy innovations. To do so, it presents a qualitative review of the development of offshore wind power (OWP) in The Netherlands over the past four decades. Based on interpretation of a wide variety of written sources (academic histories, reports, policy documents, parliamentary debate transcripts, news media) and nine semi-structured interviews, it discerns six periods of relative stability in the history of Dutch offshore wind. It then analyzes the effects of various policies on the shielding, nurturing and empowering of offshore wind in these periods. The paper contributes to transitions literature (1) by providing an analysis of how policies can enable and constrain the shielding, nurturing and empowering of renewable energy innovations, and (2) by bringing together, for the first time, fragmented accounts of the surprisingly long history of Dutch offshore wind development and implementation. Both contributions are timely, given the recent reprioritization of OWP on the Dutch policy agenda.

Contents

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1. Introduction

Over the past decade, offshore wind has proven to be a growth market. Having been considered a promising near-future energy source since the early 2000s [1,2], global installed capacity has increased from under 100 MW in 2001 to well over 6500 MW by early 2014. A further 3000 MW is currently under construction and an additional 22,000 MW is consented [3]. Despite this significant growth, the majority of which has been realised in the UK [4], offshore turbines account for less than 2% of global wind power capacity [5] and its contribution to global electricity production remains marginal at around .04% [6]. Offshore wind has to compete with efficient, matured and cheaper incumbents solutions [7], and is not simply a diversification of onshore wind to a new segment [8]. It is relatively expensive compared even to other renewable energy sources, in part because of technological challenges like harsh and extreme installation and operation conditions and connection to electricity grids [9]. As such, the recent capacity growth has been facilitated by public support in the form of subsidies, tax breaks and other incentives.

This was the case in The Netherlands as well, where two subsidised OWP farms were connected to the grid in 2007 and 2008, which made The Netherlands the third largest offshore wind country after 'first mover' Denmark and 'early adopter' The UK. The Netherlands appear to be in an ideal position to take advantage of this particular growth market, having a widely-known history of harnessing the power of wind; an international reputation for civil engineering in aquatic environments; substantial wind resources in a favourable part of the North Sea; an excellent infrastructure of sea ports experienced in facilitating offshore industries and providing access to Dutch exclusive economic zone; and ambitious climate change and sustainable energy goals (interviewees 3,4,7,9). The Netherlands also undertake pioneering research into offshore wind, and have several large firms that are highly active in the offshore sector internationally and have amassed experience especially in the development and construction segments of the offshore wind energy value chain (interviewees 1,2,6). Nevertheless, no further deployment has taken place since 2008 and The Netherlands was outpaced by both Belgium and Germany in 2012 (see Fig. 1).

Fig. 1 clearly shows that since 2008, several countries in the North Sea Region have expanded their installed capacity, whereas this development has stagnated in The Netherlands. In their quantitative review of the European offshore wind energy innovation system, Wieczorek et al. [7] also find that Dutch offshore wind market formation is lacking compared to other nations, in spite of a strong knowledge base and world-renowned offshore contractors: "(…) Dutch constructors do belong to the group of international market leaders but, contrary to the German firms, they are not backed by the national government and a strong home market." ([7]: p. 302). Indeed, they point to a particular weakness in the Dutch offshore wind innovation system compared to that in other North Sea Region nations in terms of the current level of 'guidance' offered by formal and informal institutions (e.g. governmental commitment, presence and reliability of policy goals and vision, expressed expectations, presence and quality of regulatory regimes, policy instruments and licensing procedures) ([7]: p. 301). And indeed: while initially thought of in policy circles as promising, policy support for the relatively expensive offshore wind option was withdrawn from the Dutch renewable energy subsidy schemes in favour of cheaper options (interviewees 3,4,6).

We agree with Wieczorek et al. that the fate of Dutch offshore wind seems to be tied strongly to the direction in which the policy winds are blowing. Recently, the government's attitudes regarding offshore wind appear to have changed once again: in late 2012, the Dutch government increased its target for renewable energy generation in 2020 from 14% to 16% in 2023 [11] and acknowledged that this target can likely not be realized without a significant increase in the application of offshore wind energy [12]. Although the renewable energy target has decreased again since, the government's ambition is currently to have 4450 MW installed by 2023. This reprioritization of offshore wind on the Dutch policy agenda leads us to this paper's main research question: *how did policy enable and constrain the development of offshore wind in The Netherlands?* No comprehensive review of Dutch offshore wind policy currently exists in literature: most policy reviews have so far focused mainly on the technology's *onshore* application (e.g. [13–17]): offshore wind developments are either cursively discussed or omitted, e.g. on the argument that they "(…) are a different story altogether since wind energy offshore has met with very different challenges in its development and implementation" ([15]: p. 18). This paper therefore also aims to make a second contribution: providing a comprehensive, longitudinal review of Dutch offshore wind policy throughout the (perhaps surprisingly long) history of the technology's development and implementation—an account so far lacking in literature.

2. Conceptual framework

Van de Ven distinguishes between two basic scientific models: variance models and a process models [18]. Variance models typically aim to establish statistically significant relations between dependent and independent variables, and explanations tend to take the shape of causal models that incorporate these variables (i.e. "*X* causes *Y*") [18]. Conversely, process models aim to give meaning to a specific sequence of events: they contextualize significant relations (i.e. "explain how it came to be that *X* causes *Y*"). This paper is underpinned by a process model. This does not mean that it is our goal to only *describe* the Dutch offshore wind policy history: "(…) to describe a process, one needs event sequences. But to *explain* a process one needs to identify the generative structures that enable and constrain it ([19]: p. 722). To find such 'generative structures, we turn to transitions literature. In this field, a conceptual framework has been developed to analyse the development of 'infant' sustainable innovations such as offshore wind. These innovations, which present sustainable alternatives to mainstream electricity generation options but are not (yet) technologically and/or economically competitive, are conceptualized as 'niches'. Early work on niches primarily emphasized how innovations within these niches ought to be *nurtured*, focussing specifically on the articulation of expectations, the formation of networks, and the organization of learning processes [20–22]. More recently, the emphasis has broadened from what goes on *within* these protected spaces to (1) how these spaces are constituted, and (2) how they are removed or institutionalized.

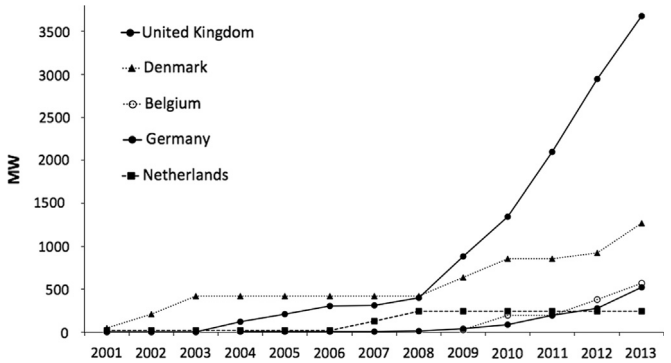

Fig. 1. Offshore wind installed capacity development over time for top 5 countries. Own illustration. *Sources*: [3,116–119].