



# Empowering sustainable niches: Comparing UK and Dutch offshore wind developments



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## ABSTRACT

Offshore wind has been positioned as a promising technology that could play a major role in moving towards more sustainable energy systems, but deployment varies significantly across countries. This article aims to explain the contrast between the boom in the UK versus stagnation in The Netherlands, by analysing the niche empowerment dynamics building on Smith and Raven's (2012) distinction between 'fit and conform' and 'stretch and transform' strategies. Analysis focuses on the actor networks and the narratives they use to enrol support for the deployment of the technology. We conclude that because the narratives mobilised are quite similar in both cases, an explanation must lie with the actors. We argue that the UK's relative success is partly the result of the presence of a proactive 'system builder' in the form of the Crown Estate which plays a central role in powerful public-private actor networks around offshore wind. We also conclude that the Smith and Raven 'protected space' framework fails to capture how different national institutional settings shape the possibilities for empowering work of technology advocates as our analysis shows that despite the highly international nature of the offshore wind sector, attempts by multi-national companies result in different outcomes in different countries.

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## 1. Introduction

The development and deployment of renewable energy technologies are key to tackling climate change (IEA, 2011; IPCC, 2011). Since many renewable energy technologies are not (yet) competitive with incumbent fossil fuel technologies in most contexts, public sector investment in research, development and demonstration (RD&D) as well as incentives for deployment continue to play a major role worldwide (Klaassen et al., 2005; Sagar and van der Zwaan, 2006; McDowall et al., 2013). One technology attracting this kind of support is offshore wind (OSW). Historically, the deployment of wind turbines has focused on onshore developments, but several countries now pin significant expectations on moving offshore to exploit even greater wind resources (Esteban et al., 2011).

Especially in various countries bordering the North Sea, offshore wind power has been positioned as a promising renewable energy resource that could play a major role in moving towards more sustainable energy systems. For example the European Wind Energy Association (EWEA) argues that 150 GW of offshore wind capacity could be realized by 2030, potentially providing 14% of the EU's 2030 electricity demand

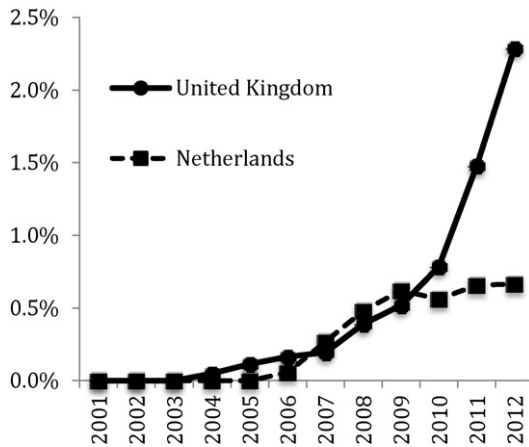
(EWEA, 2011). By the end of 2012, total installed capacity by European countries represented over 95% of the worldwide installed capacity and by mid-2013 well over 5,500 MW was operational (mostly in the North Sea), compared to just under 100 MW in 2001 ([www.lorc.dk](http://www.lorc.dk)).

However, there are sharp differences in deployment in wind resourceful countries bordering the North Sea. The UK has become the leading country in absolute numbers. As of mid-2013, the UK had 3,300 MW of installed capacity representing almost 60% of the global installed capacity ([www.lorc.dk](http://www.lorc.dk)). This UK dominance is likely to continue in the near future, with some 1,300 MW currently under construction, 400 MW contracted, and a further 1,900 MW consented. This is in sharp contrast with the Netherlands, whose governments have also touted the importance of offshore wind energy over the years. Initially, relative deployment numbers of offshore wind energy in the Netherlands were similar to those in the UK. Recently, however, deployment rates have levelled off (see Figs. 1 and 2).

This empirical observation, the stark contrast between the unparalleled deployment rate in the UK versus a stagnation in The Netherlands leads us to our research question: *What explains the difference in recent offshore wind deployment rates between the UK and The Netherlands?*

Explaining this contrast is particularly interesting given the fact that both countries have substantial offshore wind resource potential; that both countries' governments have publicly emphasized the importance

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**Fig. 1.** Offshore wind electricity production relative to total electricity consumption over time.

Sources: Centraal Bureau voor de Statistiek (NL)/Department of Energy and Climate Change & Crown Estate (UK).

of offshore wind for their future energy supply (Ministerie van Economische Zaken, 2002; BIS and DECC, 2009); and that some of the large and powerful industrial players involved in both countries' OSW deployment are identical (e.g., Shell, Siemens, Vestas, Fluor or Nuon). At the same time these two countries provide different institutional contexts (see Kern, 2011) which might influence the developments (discussed in more detail in Section 4.4).

We position our analysis in the academic field of sustainability transitions research (Markard et al., 2012; Elzen and Wieczorek, 2005; Geels, 2005; Verbong and Geels, 2010). This literature is a relevant starting point, because it has been demonstrated to be useful in explaining similarities and differences in the emergence of transformational technologies in national energy systems in the past (cf. Bergek and Jacobsson, 2003; Raven and Geels, 2010; Verhees et al., 2013; Smith et al., 2014). In focussing on explaining the difference between offshore wind deployment rates in the UK and The Netherlands we make three contributions to the literature concerned with the role of niches in socio-technical transitions towards sustainability (e.g., see Schot and Geels, 2008; Nykvist and Whitmarsh, 2008). First, we contribute two case studies of niche developments of a technology which has received little attention so far (Wieczorek et al., 2015; Markard and Petersen, 2009). Second, we explore the explanatory power of the

concept of niche empowerment recently proposed by Smith and Raven (2012). Third, we engage with the debate about the national focus of many transition studies (Raven et al., 2012), arguing that despite the highly international nature of the offshore wind sector, attempts by multi-national companies active across different jurisdictions encounter important national features which influence transnational activity and outcomes.

The remainder of the paper is structured as follows: Section 2 reviews the existing sustainability transitions literature relevant for addressing our question. Section 3 introduces our analytical framework and methodology. Section 4 provides a timetable of key events in offshore wind developments in the UK and the Netherlands in the past decade and presents and discusses the results of a cross-national analysis of these developments based on our analytical framework. Section 5 concludes.

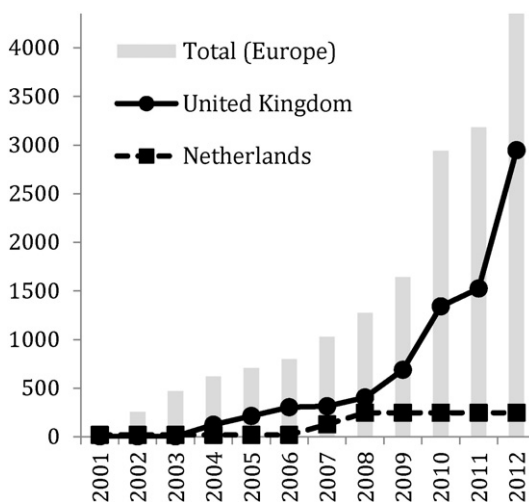
## 2. Literature review

In the sustainability transitions literature (and innovation studies literatures more generally), *onshore* wind power has been extensively analysed (e.g., Jorgensen and Karnøe, 1995; Gross, 2004; Kamp et al., 2004; Klaassen et al., 2005; Agterbosch et al., 2007; Breukers and Wolsink, 2007; Bergek et al., 2008; Kamp, 2008). Its offshore counterpart has so far received less attention. A few authors have focussed on the *consequences* of the 'move offshore', e.g., for ownership and organisational structures in the wind power sector (Markard and Petersen, 2009). Others adopted a European perspective on offshore wind development (e.g., Jacobsson and Karltorp, 2012; Wieczorek, Negro et al., 2013). This European level of analysis is typically (and justifiably) legitimised by pointing to the internationally interconnected nature of the offshore wind sector. Luo et al. (2012) assess the current state of the offshore wind innovation system and argue that, on a European level, the innovation system functions reasonably well at the moment: system functions that are lacking in one nation state are 'compensated' by others.

Yet this functional diagnosis provides only a partial answer: it does not explain how differences on these arguably important dimensions *came to be*. Our own empirical studies support the existence of differences between national jurisdictions on these dimensions. But such observations are snapshots in time: the differences have histories. Simply pointing to policy instruments as an explanation in our view obscures the processes through which such instruments came to be (i.e., their politics), and how these instruments shape the social and technological activities of offshore wind actors in both countries.

Even though installed capacity has increased dramatically over the past decade, offshore wind is one of the more technologically challenging and expensive renewable energy alternatives. The technical challenges are varied and include manufacturing reliable turbines for (and installing them in) harsh offshore environments, creating foundations for increasingly deep waters, and developing high voltage direct current transmission systems to connect large offshore wind parks to electricity grids. These challenges render offshore wind relatively expensive: the International Energy Agency (IEA) estimates the costs for offshore wind to be between 140–300 USD/MWh (compared to 50–140 USD/MWh for onshore wind and 40–90 USD/MWh for new coal (IEA, 2012)). Offshore wind currently receives major public financial support and other forms of 'protections' while there is also evidence of policy making significant changes to the selection environment to further accommodate offshore wind.

In the sustainability transitions literature, a conceptual perspective has been developed which specifically analyses such protections and the resulting spaces for sustainable technologies, which it refers to as niches. Strategic niche management (SNM) focuses analytical attention on the organisation of learning processes, the articulation of expectations, and the formation of supportive networks of actors (Kemp et al., 1998; Verbong et al., 2008; Quitzau et al., 2012). So, from an SNM



**Fig. 2.** Total installed offshore wind generating capacity in MW over time.

Source: LORC Offshore Wind Farms List (<http://www.lorc.dk/offshore-wind-farms-map/list>).

perspective, a working hypothesis regarding our research question would be that in the UK, offshore wind actor networks are broader and more resourceful, expectations are more ambitious and shared to a higher degree, and that learning processes are more reflexive and better organised. Yet, as was the case for the aforementioned functional technological innovation systems approach, such an explanation does not go into the necessary question of how this protective space came to be. In general, despite early claims of the importance of niche *creation* in transition processes (Kemp et al., 1998), SNM studies tend to take the existence of the protective spaces for granted (with the recent exception of Boon et al., 2014).

Recently, Smith and Raven (2012) have addressed this issue by introducing an analytical framework based on *shielding*, *nurturing* and *empowering*. *Shielding* relates to the work that innovation advocates do towards creating a protective space that holds off mainstream selection pressures that, without such shielding, would 'select against' the sustainable technology. Shielding thus enables *nurturing*, which is about the work that actors do to improve the shielded innovation's performance: work which is well-described in the strategic niche management literature. Finally, *empowering* relates to the outward-oriented strategic work that facilitates the wider deployment of the niche, including the actor-networks involved. These three processes are acknowledged to be analytical abstractions that researchers superimpose on the observed work of innovation advocates in an attempt to make sense of their actions. The practical, day-to-day and strategic work of these advocates, according to Smith and Raven (2012), consists of drawing on networks and creating narratives to enrol specific support measures that often combine elements of shielding, nurturing and empowering for the niche technology.

This conceptual framework is rooted in strategic niche management, but goes beyond this literature by 'zooming out' to include attention for how 'niches' are constructed (shielding), and how they are enabling deployment (empowering). Smith and Raven argue that empowering is the least developed concept in the SNM literature.

It is precisely in this area, empowering, that we seek to make a contribution through a comparison of these processes in the UK and Dutch offshore wind developments. We choose to focus our attention on empowering, since the aim of the paper is to explain the difference between the UK and The Netherlands in terms of installed capacity. This contrast seems to indicate that strategic work that facilitates deployment of the offshore wind niche (i.e., empowering) has been more successful in the UK than in The Netherlands. In the next section, we elaborate on the concept of empowering.

### 3. Analytical framework and methodology

#### 3.1. Framework

The sustainability transitions literature recognises two distinct empowering trajectories: 'fit-and-conform', which is about making "niche innovations competitive within unchanged selection environments", and 'stretch-and-transform' which is about changing "mainstream selection environments in ways favourable to a path-breaking niche innovation" (Smith and Raven, 2012: 1025). Both types, they argue, result from "(...) sense-making advocates with uneven access to resources who try to influence powerful actors in different institutional positions and who often frame sustainability challenges and innovative solutions very differently" (2012: 1031). Antagonisms between frames, they claim, make empowering inherently political (Mouffe, 1996).

Actors and their networks are important in studying empowerment as it is actors who mobilise resources, learn, lobby policy makers etc. Transitions are necessarily multi-actor processes as no single actor unilaterally has the power or resources to bring about transitions (Grin et al., 2010). Smith and Raven (2012) build on a familiar distinction between 'local' networks of socio-technical experimentation in specific project locations, and 'global' networks for converting that

experience into more generic processes and norms (Law and Callon, 1994; Geels and Raven, 2006; Geels and Deuten, 2006). To this, they add: "In the case of empowerment, global networks have an additional role to play if these processes are to persist, which is to secure the flow of resources that underpin these local-global processes. This requires commitments from actors in the wider social world. So in addition to inward-oriented network activities aimed at the practical development of a sociotechnical configuration, global networks are also engaged in outward-oriented activities of representing, promoting and enrolling support for that development" (Smith and Raven, 2012: 1031). They further acknowledge that the capacity to do so effectively differs between actors: "some are able to exercise greater influence owing to their resource attributes, experience, institutional positions, and connections with other influential actors" (Smith and Raven, 2012: 1031).

Narratives, Smith and Raven claim, are key political devices used by such global actor networks in their attempts to convince others to provide resources or enable institutional reforms. Global actor networks strategically construct empowering narratives to either argue for institutional reforms which change the selection environment in favour of the niche innovation (stretch-and-transform empowering), or for support aimed at achieving competitiveness within unchanged selection environments (fit-and-conform empowering). The two empowering strategies imply different kinds of criteria to be fulfilled by the technology and its advocates: When a narrative supporting a fit-and-conform strategy becomes dominant, technology assessment criteria will be directed towards low-cost, high-efficiency performance of the technology, while other criteria such as sustainability performance or democratic control of technologies are downplayed. This limits the potential application of technologies that are perceived by decision makers to perform poorly on the narrow cost-efficiency technology assessment criteria, which as we will argue in this paper, was the case for OSW in the Netherlands. Conversely, in the UK narratives supporting a stretch-and-transform strategy became credible, which led to broader sets of criteria in institutional reforms of (renewable) energy policies enabling rapid deployment of OSW in the UK.

This paper applies this conceptual perspective focussing on networks of actors, the narratives they employ, the contexts these draw on, and the outcomes (e.g., technology assessment criteria, supportive measures) they enable. We do this by using a set of indicators for fit-and-conform versus stretch-and-transform empowering strategies (see: Table 1) which we distilled from Smith and Raven (2012). The next section will lay out how we went about this.

**Table 1**

Indicators for empowering work.  
Based on Smith and Raven (2012).

Empowering strategy	Description	Look for evidence of...
Fit-and-conform	Global actor networks work towards niche competitiveness within unchanged selection environments	...Framing supportive measures as only temporary ...Framing niche developments as improvements in costs, performance and efficiency ...Arguing and promoting that innovation will be competitive under conventional criteria; no radical changes to institutions, infrastructures, skills, etc. required
Stretch-and-transform	Global actor networks work towards changes in mainstream selection environments	...Framing the niche as embodying widely desired sustainability criteria such as ecological or social benefits ...Arguing for the need for (and attempts at) achieving institutional reforms to enable to wider deployment of sustainable innovations



### 3.2. Methodology

We use a *comparative idiographic* case study methodology (Tsoukas, 1989; Yin, 2009), because we are not interested in finding ‘general laws’ that can explain offshore deployment rates for all countries (cf. nomothetic case studies), but in finding relevant patterns in the two cases in order to explain the observed difference between them. Our method consisted of the following four steps:

- Step 1 We compiled a timeline of key events around UK and Dutch offshore wind power developments. This timeline draws heavily on our national case histories of offshore wind developments (initially drafted as a basis for Kern et al., 2014 and Verhees et al., 2015), which were arrived at through desk research drawing on existing academic papers, histories of renewable energy sources, grey literature, trade press, stakeholder and government reports and news articles. The keywords used were: offshore wind AND UK OR Netherlands. The search yielded a large number of documents (around 80–100 in each case) and they were screened systematically for information regarding the development of offshore wind. Documents exclusively focussed on technical details or only mentioning the UK or Netherlands in passing were excluded from further analysis. The resulting timeline is reproduced in Section 4.1 in an abbreviated form. The national case histories cover the timeframe since the 1970s which is when there was initial interest in exploiting offshore wind in both countries, but for the purpose of this paper the focus is on the last decade which is when deployment started to diverge.
- Step 2 We did a series of *expert interviews* to understand the national case histories' underlying dynamics. The 21 experts were chosen for their knowledge of specific aspects of both countries' offshore wind developments: the (wind) energy sector, policy developments, research undertaken at universities and by other actors, etc. (see: Appendix A for a list of interviewees). We used a *semi-structured interview* method, which enabled us to tailor the interviews to the interviewees and explore new themes emerging from their responses (Lindlof and Taylor, 2002). The interviews were structured around a series of questions relating to our hypothesised shielding, nurturing and empowering processes as well as pro- and anti-offshore wind narratives, key actors and networks. On empowering the interviewees were asked to identify any attempts of offshore wind advocates to obtain support or favourable institutional or policy changes and how they tried to convince their audiences.
- Step 3 Based on the results from step 1 and 2, we compared the national case histories by applying our conceptual framework, using the indicators in Table 1 for investigating the two types of ‘empowering work’. We looked for salient differences regarding the empowering processes through the coding of interview transcripts and the documentary evidence. This was an iterative process in which the authors of the individual case studies compared and contrasted the interpretation of the material, first vis a vis the analytical framework and then vis a vis the empirical findings from the other case (Stake, 2010). This process helped to achieve cross-analyst reliability. This comparative analysis is reported in Section 4.4.
- Step 4 To triangulate (Yin, 1994) our assessment of the explanatory nature of these differences, we subsequently conducted one *key informant interview* with an actor who had professional experience in offshore wind in both countries. For this key informant interview, we used an *unstructured in-depth interview method* in which the interviewee was first asked to provide an explanation for the observed differences and was then invited to comment on our preliminary explanation of the differences (which was explained verbally to the interviewee) in the light

of their own explanation. This provided a useful test of the validity of our findings.

### 4. Empowering Dutch and British offshore wind: results and discussion

This section presents a brief timeline of key events in UK and Dutch wind developments (Section 4.1) and the results of our cross-case analysis. In line with the conceptual framework and the indicators introduced in Section 3 we first analyse the fit-and-conform and stretch-and-transform empowerment processes in both countries, focussing on which actors and which narratives played key roles. The analysis then concentrates on salient differences between these, and discusses to what extent they can explain the differing fortunes of offshore wind in the two countries over the last decade.

#### 4.1. A timeline of key events in UK and Dutch offshore wind developments

In Table 2, we provide a timeline of key events in the development of offshore wind in the UK and the Netherlands. This timeline is meant as an overview for readers unfamiliar with offshore wind developments in the respective countries, and provides a temporal context for the analysis in Sections 4.2–4.5. This is merely illustrative and our analysis draws on a much wider range of processes and events unfolding over a longer timeframe, starting from the 1970s. For a more elaborate account of these developments in the UK and The Netherlands respectively, see: Kern et al. (2014) and Verhees et al. (2015).

#### 4.2. ‘Fit-and-conform’ empowering

##### 4.2.1. Framing supportive measures for OSW as only temporary

There is evidence that in both countries support for offshore wind was framed as a temporary measure targeted at improving performance. For example, OSW in the UK context was portrayed by government actors as generally being a ‘commercially available, proven technology’ (LCICG, 2012) which just needs temporary, targeted support to make it cost competitive (at least compared to other low carbon technologies). When the legitimacy of such claims was threatened, action was taken. For example in 2011 in response to concerns about the high cost of OSW, the Offshore Wind Cost Reduction Taskforce was set up to bring together government with important industry players to develop a credible strategy to reduce offshore wind costs to 100€/MWh by 2020 to make OSW competitive with other low carbon electricity technologies which would enable the government to withdraw targeted support. The Crown Estate conducted much of the underlying analysis by producing a collaborative industry study demonstrating pathways which can reduce the levelised cost. Having been set up as an independent company to create revenue for the Treasury in 1961, the Crown Estate owns the sea bed out to the 12 mile zone as well as the right to utilise the resources of the UK continental shelf (but not including oil and gas). Although it has no specific sustainability agenda, it has been active in offshore wind since 2000, and the 2004 Energy Act gave it the right to license renewable energy production on the continental shelf (Crown Estate, 2010).

In The Netherlands, the framing of such support as a temporary measure by the government and the wind farm developers that had filed for subsidies, was contested in parliament in the mid-2000s. Christian democrats CDA and liberals VVD felt that the estimated cost of such support was too steep and wanted to pull the plug on the 6000 MW goal. The Minister of Economic Affairs argued that the estimates had been “calculated on the basis of current costs, which must come down”, and that “if they do not, we have to proceed on a different transition path” (Nieuws Stroom, 22 July 2004). As a compromise, he promised to follow a step-wise type approach to the implementation of the goal: “should the necessary cost reduction not materialise, we can shut off the money stream on time” (Financieel Dagblad, 11 October 2004).

**Table 2**  
Chronology of key events for Dutch and British offshore wind deployment (2001–2012).

	United Kingdom	The Netherlands
Pre-2001	OSW considered in 1970s: dismissed as too expensive 1980s–1990s: OSW still considered as very expensive; little funding provided Late 1990s: new Labour government announced funding for OSW demonstration projects to meet a 1997 election promise of 10% of electricity to come from renewables by 2010	OSW considered in 1970s: dismissed as too expensive. Renewed interest in 1990s as onshore wind roll-out proved problematic due to societal opposition Government orders feasibility study into experimental OSW farm in mid-1990s – receives go-ahead in 1999 Unexpectedly, private project developers request licences to construct additional OSW farms outside 12-mile zone Moratorium on new licence applications for construction of OSW farms, pending design of new tender system Parliamentary consensus about spatial planning decision (PKB) for 1st (government-proposed, explicitly experimental) offshore farm (OWEZ) Environmental impact assessment for 2nd (commercial) offshore farm (Q7) accepted by government Government issues tender for concession to construct and operate OWEZ A Shell/Nuon consortium is awarded OWEZ concession Energy Report: Ministry of Economic Affairs (EZ) sets goal for 6 GW in 2020. Supported by NGOs Council of State overrules conservation society & coastal community residents' objections to PKB for OWEZ Council of State rejects proposal for concession system for licensing future farms (reason: insufficient substantiation of selected areas) Renewable production stimulation scheme (MEP) replaces failed demand-guided subsidy (REB) Consortium We@Sea gets funding for research aimed at applying experiences with OWEZ to future farms OWEZ and Q7 are granted a 10-year-guaranteed kWh production subsidy through the MEP scheme Moratorium on applications lifted: first-come first-served licencing procedure for Round 2 New moratorium due to unexpected high number of applications. MEP production subsidy nixed for OSW Central Planning Agency (CPB) concludes investing in OSW is not societally profitable in short term EZ now in favour of controlled, phased deployment of 6 GW goal (no-regrets strategy) Construction of OWEZ begins Moratorium on applications for Round 2 licences lifted OWEZ begins supplying electricity to the grid & construction of Q7 begins MEP subsidy scheme unexpectedly terminated Department of Public Works (RWS) continues to evaluate licences. Some controversies over rejections. Government announced new, capped, production subsidy scheme (SDE) to replace uncapped MEP Government announces subsidies for Round 2 through SDE & promises to replace licence system with concession system (appointing strategic areas) for Round 3 (aimed at realizing the 6 GW goal) Q7 begins supplying electricity to the grid (completing Round 1)
2001	First UK offshore wind farm located in Blyth started operating (developed by consortium involving E.ON UK Renewables, Shell Renewables, Nuon UK, AMEC; capacity: 4 MW) Crown Estate awards 13 leases for OSW farms (Round 1) Government announces a series of capital grants for OSW farms with consented projects receiving grants of up to £10 m	
2002	British Wind Energy Association (BWEA) organises first annual Offshore Wind Conferences	
2003	Crown Estate announces a second round of OSW licences located further out at sea with a capacity to host 6 GW of OSW by 2010	
2004	E.ON commissions its Scroby Sands 60 MW OSW farm	
2005	Vattenfall commissions its Kentish Flats 90 MW OSW farm	
2006	Research Council funding for SUPERGEN Wind Energy Technologies Consortium made available (2006–2010 and 2010–2014; combined funding: £7.38m)	
2007	UK government signs up to EU 20-20-20 targets which subsequently act as a strong driver for renewable energy policy	
2008	Crown Estate launches the Round 3 licensing process by identifying nine strategic zones within and outside UK territorial waters for OSW development with a capacity of 25 GW Carbon Trust launches Offshore Wind Accelerator (2008–2014) providing funding for R&D and demonstration projects (£41.5 M) Government introduces 'banding' of Renewables Obligation (RO), significantly increasing deployment incentives for OSW (from 1 to 1.5 ROCs/MWh) UK Offshore Energy Strategic Environmental Assessment (SEA) identifies up to 33 GW of offshore wind capacity in UK waters Climate Change Act sets legally binding carbon emission reduction target of 80% by 2050 and establishes Climate Change Committee An EPSRC funded doctoral training Centre for wind energy research is established at the University of Stathclyde (£5.8 m) The Energy Technology Institute launches an offshore wind programme worth £40 m of funding, including for a test rig at NAREC DECC publishes an OSW demonstration call (£27 m)	
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2010	Inventive for OSF deployment revised (to 2 ROCs/MWh) upwards given increasing costs of OSW Climate Change Committee suggests an 'important role' for OSW as part of the least cost path for decarbonizing the power sector Crown Estate announces the successful Round 3 developers and sets up a 'Offshore Wind Developers Forum'	SDE tender won by German Bard Gruppe for Gemini OSW farm (acquired by Dutch developer Typhoon in 2011) New Minister of EZ alters SDE: OSW is out. Stated reason: focus on renewables roll-out, for which OSW is currently too expensive New EZ policy line announced: government stimulation of bottom-up (industry) initiatives in 9 pre-defined sectors ('top sector policy') Unallocated budget from SDE tender awarded to Eneco's Q10 OSW farm proposal Energy Report (EZ) views OSW as long-term option: focus on stimulating innovation aimed at cost reduction 'Green Deal Offshore Wind' between wind sector representative NWEA and government OSW designated one of 7 'key areas' in Top Sector Energy At EWEA wind energy conference, Dutch OSW sector celebrates the 'birth of Dutch offshore wind'
2011	DECC publishes Renewable Energy Roadmap in which it expects OSW to reach a capacity of 18 GW by 2020 and over 40 GW is seen as possible by 2030 DECC sets up an 'Offshore Wind Cost Reduction Taskforce' to develop a credible strategy to reduce OSW costs to £100/MWh by 2020 DECC and Scottish government announce business investment grants for offshore wind manufacturing (£60 m for England; £70 m for Scotland) DECC and the Technology Strategy Board announce 'Offshore Wind Component Technologies Development and Demonstration Scheme' (£15 m) Three proposed OSW projects in Scotland are cancelled due to local opposition	
2012	The government's Technology Innovation Needs Assessment concludes that	Offshore Wind Innovation Contract signed

Table 2 (continued)

United Kingdom	The Netherlands
<p>“offshore wind is a commercially available, proven technology”</p> <p>Offshore Wind Developers Forum commits to sourcing 50% of OSW project content in the UK</p> <p>Technology Strategy Board sets up ‘Offshore Renewable Energy Catapult’ (£50 m)</p> <p>ETI and EPSRC funded Industrial Doctorate Centre in Offshore Renewable Energy established at the University of Edinburgh (£6.5 m)</p> <p>Siemens receives planning permission to build OSW manufacturing plant in Hull, and Gamesa signs a Memorandum of Understanding with Forth Ports to build a manufacturing facility</p>	<p>FLOW becomes organising the Top Consortium for Knowledge and Innovation (TKI) for Top Sector Offshore Wind</p> <p>New government’s coalition agreement continues recent offshore wind policy</p>

#### 4.2.2. Framing niche developments as improvements in costs, performance and efficiency

In both countries, we found evidence of networks of actors trying to obtain support for the further development of OSW to enable learning (Junginger et al., 2005), which would make the technology cost competitive in the future. For example in the UK, academics, technology developers as well as public sector bodies set up to provide innovation funding were pushing to channel resources into R&D to make offshore wind competitive with other low carbon electricity options. Several initiatives aimed at reducing the costs of OSW were funded, including the Carbon Trust’s OSW Accelerator, the Energy Technology Institute’s OSW Programme, the Technology Strategy Board’s Offshore Wind Component Technologies Development and Demonstration Scheme (Kern et al., 2014). Public funding for wind research remained low until the mid-2000s. Since then, as Halliday and Ruddell (2010: 2) point out, “The volume of R&D in the UK is now rising, prompted by the drive for efficiency improvements and overall cost reduction”. Funding was not only provided for R&D but also a testing infrastructure for large turbine designs was put in place at the National Renewable Energy Centre with the help of public funds. Also the drive towards ever-larger turbines is argued to improve the economics and the efficiency of OSW (see below). In response to criticisms about high offshore wind costs the Prime Minister insisted that while renewables are low carbon, they also need to become low cost (ENDSreport, 2012). A DECC civil servant confirms: “We have maintained our commitment to the industry but we have also, as we have for all renewables, insisted that we want to see concrete action on cost reduction” (interviewee 13).

In The Netherlands, the current policy paradigm concerning innovation (i.e., the Top Sector Policy) is perhaps even more explicitly geared towards realizing cost reductions which are seen as pivotal for roll-out (interviewees 16, 19). Agreements to this effect, such as the Offshore Wind Innovation Contract and the Green Deal Offshore Wind have been made between virtually all Dutch offshore wind sector actors and the government, which adopts a facilitating role (e.g., promising to remove regulatory barriers, and supporting and co-funding initiatives by firms aimed at innovation for cost reduction) (interviewee 19). In both countries, it is relatively uncontested that offshore wind not only has potential (“when we find that offshore wind is a global success, it’s cradle will have been in the southern North Sea” (interviewee 17)) but is inevitable as well: “given a structural decrease in energy consumption combined with the desire for a sustainable energy system, offshore wind is unavoidable” (interviewee 16). In addition, actors in both countries assume that funding innovation geared towards cost reduction is relatively cheap compared to deployment subsidies.

#### 4.2.3. Arguing and promoting that OSW will be competitive under conventional criteria and that no radical changes are required

The last two subsections already showed the importance of arguments that offshore wind will need to become competitive in electricity markets. In addition, we found evidence in both countries for claims that no radical changes to current systems are required for offshore wind to ‘work’. In the UK case, several interviewees pointed to the shared sense developing

across actors over time that in order to fit alongside conventional power stations and to be economical, offshore wind had to be bigger (interviewees 3;5;7;8;9;10). To deliver on this expectation public research projects such as SuperGen as well as industry R&D focussed on scaling up wind turbines to very large sizes (interviewee 7;11). Technology experts expect the trend towards larger turbines to continue (interviewee 4;5;7;13). Even as far back as in the 1980s some actors (e.g., the Central Electricity Generating Board) took some interest in developing ‘offshore wind power stations’ (interviewee 12); favouring a configuration which fits into existing centralised electricity systems. Even with currently very high costs, the government’s advisor on climate change (the independent Climate Change Committee, CCC) concluded that “there is an important role for offshore wind as part of the least cost path for decarbonising the power sector” based on the expectation that costs will significantly fall in the future (CCC, 2010).

In The Netherlands, thinking has developed along similar lines. Dutch 1970s offshore wind studies spoke of ‘power plants’ in the North Sea (Van Staveren, 1974) based on very large (and highly speculative) 10 MW turbines, while in the mid-1980s, the Dutch contribution to an IEA-funded offshore wind research programme consisted of a conceptual design for a gigawatt ‘offshore wind energy plant’ using (then-speculative) 3–4.5 MW turbines. “In the late 1980s, the idea started to take hold that if you wanted to go large-scale with wind, you had to go offshore simply because there’s insufficient room onshore” (interviewee 16). Since then, the logic of a concentration of multi-megawatt turbines organised in ‘parks’ or ‘farms’, dictated by the technical and economic challenges of offshore construction, has become the default standard in thinking about, and implementing, offshore wind: “to replace conventional electricity generation, you have no choice but to deploy large turbines in large quantities close together, so that you only have to run one cable to shore, and can operate it as a power plant” (interviewee 17). This contrasts with its onshore counterpart, where ever since the late 1970s the focus on large-scale centralised wind farms was criticised by e.g., the appropriate technology movement, who, under the maxim ‘small is beautiful’, favoured small-scale (kilowatt) decentralised wind energy (Verbong et al., 2002). Once the Dutch goal of implementing 6,000 MW of offshore wind power came into focus, it was also argued that no substantial modifications to the Dutch electricity grid were required. For example in 2003, an ECN study concluded that extending the Dutch grid by constructing new offshore substations was unnecessary as it would offer no economic advantages over connecting individual parks to the existing grid in much the same way as conventional power plants are (Herman and Pierik 2003). Similarly, the ‘Connect 6000’ research project, initiated by the Ministry of Economic Affairs, concluded in 2004 that ‘fitting’ offshore wind into the existing grid would not be prohibitively expensive: up to 3,000 MW there would be no extra costs, and between 3,000–6,000 MW costs would be around 300 million EUR (Ummels et al., 2007). Such claims can clearly be interpreted as part of a ‘fit-and-conform’ strategy where the socio-technical configuration of OSW is aligned with the existing design of electricity systems (large scale, centralised generation).



Overall, the analysis shows that the narratives used by OSW proponents in both countries across these three indicators are very much similar and focus on claiming that large-scale offshore wind parks can play a vital role in future electricity systems without major changes, but that temporary support is required until costs have come down and the technology becomes competitive. An important difference seems to be that in the Netherlands public deployment support has been argued to only return after future cost reductions are achieved through innovation support programmes (Energie, 30 November 2010). Not all agree with this strategy, however: “The current strategy of ‘once it’s cheap enough, we’ll start building’ is not going to get us there. In essence it’s the same mistake as in the 1980s and 1990s [referring to the loss of the Dutch onshore wind industry]: let’s focus on innovation, while others solve the problem [of costs]. Then once they do, we’ll jump on board. It’s not a choice that advances an industry” (interviewee 16).

#### 4.3. ‘Stretch-and-transform’ empowering

Alongside the narratives and actions by actors which can be interpreted as part of a ‘fit-and-conform’ strategy of offshore wind advocates, the analysis also finds evidence of narratives and actions which signify the existence of attempts at ‘stretch-and-transform’ empowering.

##### 4.3.1. Framing the niche as embodying widely desired sustainability criteria such as ecological or social benefits

In the UK offshore wind was presented as an important part of the solution to the problem of how to meet renewable energy and climate change mitigation targets, mitigate concerns about a pending ‘energy gap’ and simultaneously creating new manufacturing jobs in the UK in times of recession (Kern et al., 2014). For example wind industry proponents argued that “At a time when climate change climbs to the top of the political agenda, wind energy continues to be the only advanced technology ready and able to deliver renewable power on a large scale” (Real Power, 2006: 2). After agreeing to the challenging EU targets of 15% of all energy to come from renewables, several UK government publications argued that OSW “will play an important part in meeting Britain’s renewable energy and carbon emission reduction targets as well as improving energy security by 2020 and beyond” (BIS and DECC, 2009: 20; DECC, 2009). Offshore wind was presented as a clean, large-scale alternative to fossil-fuel based power stations which has climate change and environmental benefits but also contributes to other policy agendas and societal benefits such as providing low carbon industry jobs and mitigating energy security concerns. These claimed benefits provided a basis for legitimising changing the selection environment in favour of renewable energy through instruments like the Renewables Obligation or the Electricity Market Reform.

In the Netherlands, the Ministry of Economic Affairs’ 2003 renewable energy production subsidy (MEP) can be seen as a measure specifically aimed at changing the selection environment to empower renewable energy sources (including offshore wind) based on environmental considerations: it was an open-ended scheme that levelled the playing field by ‘subsidising away’ the estimated production cost difference between various renewables and conventional electricity production technologies (interviewees 17, 19, 20). Subsidising offshore wind through MEP was, however, politically contested: economic liberal and conservative parties framed OSW as “tinkering on the edges” (Forum, 2005) and dismissed it as being too expensive (Nieuwsblad Stroom, 2004). An unexpectedly high number of notices of intent for offshore wind park construction filed by market parties fuelled these arguments, which led the Secretary of State for Transport, Public Works and Water Management (VW) to once again temporarily suspend the licencing procedure (the moratorium on which had only been lifted some six months earlier), and for the Minister of Economic Affairs to cancel the (open-ended) production subsidy scheme for offshore wind. The (renewed) moratorium was lifted again in 2006 and

the government announced a new, capped production subsidy system (SDE) in 2007 which, it promised, would also be used to stimulate offshore wind deployment: it committed to 450 MW of offshore wind capacity in Round 2, to be allocated through an SDE tender (interviewee 17). The budget was increased to 950 MW in 2009 as part of an economic stimulus package: the remainder of the 6000 MW goal would be subsidised in a step-wise fashion through SDE. However, in 2010 the Minister drastically altered the SDE production subsidy scheme again at the expense of offshore wind: in the resulting SDE + scheme, instead of differentiated cost-of-production estimates for different renewable sources, a single (and much lower) amount was set for all renewables (interviewee 17). The Minister stated that “[w]here the previous SDE focused on two goals, roll-out and innovation, I want to focus SDE + on an efficient roll-out to make headway in achieving the target of 14% renewable electricity in 2020” (Energie, 30 November 2010). Offshore wind had no place in this, as it was too expensive to compete (interviewees 17, 19): “SDE + is not a beneficial system for offshore wind, which is outcompeted by cheaper alternatives” (interviewee 17). Nevertheless, OSW was not off the policy agenda: the subsequent government’s 2013 coalition agreement mentioned it specifically as a technology that would require support, and also increased the 2020 sustainable electricity target from 14% to 16% and “if we want to realize 16%, then the more expensive options have to be on the table again, as well” (interviewee 19). Indeed, the new conservative-liberal Minister of Economic Affairs recently called OSW “indispensable” for realizing this target, and announced his willingness to earmark part of the SDE + budget specifically for OSW. A major 2013 national energy agreement set the 2020 target back to 14% again, but added a specific OSW goal of 4450 MW in 2023 (SER, 2013). These episodes show how contested (and therefore temporary) measures to change the selection environment in favour of OSW technology were and how politically important cost concerns are which suggests a dominance of a fit-and-conform strategy on the part of the government.

Whereas Dutch governments have moved increasingly towards a fit-and-conform strategy for OSW, Dutch OSW operators continue to frame project results also in terms of ecological and sustainable values. The OWEZ wind park website, for example, emphasizes that “marine life benefits from first Dutch offshore wind farm”, a claim they substantiate with results from a five-year monitoring programme (interviewees 16, 17) mandated by the government as part of the licence for this explicitly experimental OSW farm ([www.noordzeewind.nl](http://www.noordzeewind.nl)). Moreover, they emphasize that the farm generates enough renewable electricity for 100,000 homes, and argue that in doing so, it contributes to making the electricity supply more sustainable. The argument is that because of these ecological and social benefits dedicated subsidies for OSW, changing the electricity market selection environment in its favour, are appropriate. This stretch-and-transform framing of the project’s results, however, is not shared by all. In the 2010 parliamentary elections, for example, conservative leader and current Prime Minister Rutte famously argued that “wind turbines do not run on wind, but on subsidies” (interviewees 19, 20). This sentiment was echoed in his government’s offshore wind policy, which was aimed at achieving substantial cost reductions before roll-out.

##### 4.3.2. Arguing for the need for (and attempts at) achieving institutional reforms to enable to wider deployment of sustainable innovations

The UK case study reveals evidence of a number of institutional reforms that were enacted to enable the deployment of offshore wind as a sustainable energy option. Proponents of OSW had long lobbied the government for changes in renewable energy policy frameworks (such as the Renewables Obligation) and for other institutional reforms which would benefit OSW (Kern et al., 2014). The most important change to the selection environment is the Electricity Market Reform the UK government has recently undertaken (Baker, 2016). This represents a radical overhaul of the electricity markets rules in order to incentivise low carbon generation by introducing long-term feed-in

tariffs for a number of large scale options including offshore wind, carbon capture and storage and nuclear. These so-called contracts-for-difference guarantee investors an above market price for the electricity generated for 20 years. In this way the electricity market rules institutionalise support for OSW deployment. This change in rules has made a major difference to the economics of offshore wind projects according to interview evidence (interviewees 6; 8; 9).

Another important example of empowering processes is the change of rules implemented under the EU Third Energy Package. This EU policy did not allow offshore wind developers to build and operate transmission cables connecting the wind farm to the grid (because of the separation of generation and transmission for competition reasons). Several interviewees mentioned this rule as an obstacle to investment in offshore wind because any delay in the construction of the transmission infrastructure brings a risk in terms of lost income for the project developer. Following pressure, the regulator of the electricity and gas markets Ofgem addressed this concern by changing the rules and allowing the 'generator-build option' (Crown Estate, 2011: 5). In the words of a government minister: 'we had to get Ofgem to stop being pedantically market driven' (cited in: Toke, 2011: 528) which helped to address industry concerns (interviewees 6; 8; 12). This is a clear example of where rules were changed in order to empower offshore wind.

A third example is a change in the planning rules for Round 3 projects in order to streamline the process. Special procedures were set up for big wind farms and offshore wind farms were also given precedence ahead of other considerations including the allocating of Natura 2000 conservation sites (Toke, 2011: 528). This was following industry concerns that planning processes were cumbersome and were introducing delays (interviewees 3; 6; 8; 12).

The networks of advocates advocating these changes included the utility companies with an interest in offshore wind (like Centrica, Vattenfall, SSE, RWE, E.ON), specialised project developers (like Mainstream Renewable Power), potential investors, trade bodies like RenewablesUK, environmental groups such as Greenpeace, the Royal Society for the Protection of Birds, Friends of the Earth and the WWF and the Crown Estate. The analysis also revealed that there has been an increasing formalisation of public-private networks with initiatives such as Offshore Wind Developers Forum and DECC's Offshore Wind Cost Reduction Taskforce being set up. The Offshore Wind Developers forum is a network of developers to jointly discuss and solve problems facing the industry. It was set up by the Crown Estate in 2010. A manager from a utility company sees the forum as very helpful in terms of 'having a united position as an industry' (interviewee 6). These networks were again broadened by the recent interest of several turbine manufacturers to set up production facilities in the UK as well as financial investors increasingly finding the UK attractive because of the market potential (interviewee 1). Overall, the argument is that over time a coalition of powerful and resourceful actors emerged which boosted the credibility of and channelled resources into offshore wind. Formal networks centre around key public organisations as well as incumbent energy regime actors (including energy companies such as DONG and Statoil, several of the 'big six' utilities dominating UK electricity markets, and key established manufacturers such as Siemens, Vestas, and Alstom). Toke argues that the political strengths of the UK renewables lobby is now comparable to that in Germany since the 1990s as by and large it is the energy majors who are doing the investing (2011: 529) which we argue enabled very effective stretch-and-transform empowering.

In contrast, in The Netherlands various attempts were made at 'stretch-and-transform' institutional reforms to enable the deployment of offshore wind as a sustainable energy option, but these attempts were less successful. Dutch policy makers planned to draft policy for offshore wind based on experiences with a first experimental, near-shore park (OWEZ). An unexpected application by project developer E-connection for a licence to construct an additional park outside the 12-mile zone (Q7) was granted, but led to a "completely unclear legal

situation" (interviewee 19) in response to which the government simply "taped the mailbox shut" (interviewee 17). Additional OSW farm location applications by developers Nuon, Eelop, Greenpeace and E-connection (interviewee 19) were then faced with a moratorium on applications for licences in 2001, pending an institutional reform that would empower the broader roll-out of OSW: the design of a system of permits for construction of farms. The applicants formally objected, but also joined forces to regularly talk to the government about what such a system should look like, in an attempt to "convert the running lawsuits into something more constructive" (interviewee 19). The result was a concession system, whereby strategic zones for OSW construction would be designated by the government, and interested parties would receive a concession. In such predefined zones, environmental criteria could be included, the various users of the North Sea could be consulted, and their interests could be weighed. A concession would be a requirement for filing for a licence to construct under the Law on Public Works (Wbr). Yet when the design for a concession system was complete, it was overruled by the Council of State on several grounds, e.g., that the justification for the chosen zones was insufficient (interviewee 20) and that it favoured large energy companies over small project developers (interviewee 19).

Independent developers as well as Greenpeace argued that it would be a mistake to go back to the drawing board: the continued absence of a licence policy was scaring away potential developers and investors to e.g., the UK, and it would result in a stagnation of offshore wind deployment after the commissioning of the two 'Round 1' parks (Nieuwsblad Stroom, 2004). Also several members of parliament argued for moving quickly so as not to completely lose momentum and give firms the chance to apply for licences based on current policy instead (Nieuwsblad Stroom, 2004). For example, Samsom (Labour, opposition) argued to "forget about the concession system, [because] on the basis of current legislation [meaning Wbr] it is already possible to hand out licences with which investors and developers can get to work immediately" (Verslag algemeen overleg, 15 juni 2004, 29575, nr. 3). The concession system would take long to re-develop, and market players wanted to proceed. In addition, the Department of Public Works "didn't want to create the impression that development had to wait for the government again" (interviewee 20). When the government lifted the moratorium on notices of intent to construct offshore wind parks in early 2005, it announced that licencing would take place on a first come first served (FCFS) basis instead. The industry "strongly advised against the FCFS system" (interviewee 16), feeling that "destruction of capital was built into the system" because of overlapping applications (interviewee 16). And indeed in retrospect, applicants reflect on this licencing process as "horribly drawn-out" and "inefficient" (interviewees 17, 19) and the Department of Public Works, too, "is not happy with the fact that 12 licences out of which only 3 initiatives might be realized (...) we have done a lot of work for nothing (...) and will do everything to prevent this in the future" (interviewee 20). Back then, the move towards a more 'fit-and-conform' strategy was already criticised by those who argued that an FCFS process was only suitable for more mature and stable industries (Zeelenberg 2006; COD 2005). Ten joint environmental organisations argued that "(...) offshore wind is no business for the free market. Wind parks require financial support and careful spatial planning. This is a government's task: it should stimulate offshore wind in a predictable fashion and take charge of the locations of wind parks" (Stichting De Noordzee 2005: 6). As a result, Dutch wind energy sector representative NWEA lobbied the government for a strategic location policy involving all potential stakeholders, using the British system as an example, for the future Round 3 (NWEA, 6 August 2008). Indeed, in 2009, the government published its 'National Water Plan 2009–2015', which laid out the key points of the nation's water policy. In terms of OSW, it announced that for the future Round 3 it had chosen for a concession system instead of the current system: it would appoint a small number of strategic 'wind energy areas', large enough in principle to accommodate 6000 MW, within which it could give



exclusive permission to market players to develop OSW parks and within which it could deny non-OSW projects: “the government is taking initiative by designating areas for development (...) and designing a system which perhaps couples licencing more strongly to subsidization” (interviewee 20). Although the concession system can be seen as an institutional reform that empowers further offshore wind implementation, this move back towards a more ‘stretch-and-transform’ strategy has not yet produced results, as there is currently still a moratorium on applications (interviewees 17, 20) and Round 3 is expected to open in 2015 at the earliest: “pending this new system that we’re all waiting for, you can’t apply for a licence and you can’t apply for subsidies. Currently, Dutch offshore wind is, although not dead, certainly lame” (interviewee 17).

The analysis of ‘stretch-and-transform’ empowering of offshore wind in the two countries shows that while the narratives used to promote the technology (part of a sustainable future, environmental and social benefits including growth and new jobs, key to tackling climate change) were partly similar, in the UK a powerful coalition of actors (incl. public sector bodies, the Crown Estate, developers, turbine manufacturers, etc.) managed to create enough political momentum for important changes to the selection environment, whereas in the Netherlands this was much more contested and actors disagreed about the right way forward and the government drifted towards a ‘fit-and-conform’ strategy insisting on cost reductions first.

#### 4.4. Key differences between the UK and NL

One key difference between the developments in the UK and the Netherlands is the prominence of climate change and renewable energy goals within energy policy making in the UK, which provided a favourable context for empowering activities of offshore wind advocates. Especially in the most recent period, the 2009 Climate Change Act has institutionalised very ambitious climate change targets in law (80% reduction by 2050) and climate change has also been institutionalised within a combined Department for Energy and Climate Change (DECC), arguably giving this consideration more weight within energy policy compared to the previous institutional set up. This contrasts with what in the Netherlands has been called a “low sense of urgency” about climate change by the government (Nieuwsblad Stroom, 2004; Trouw, 21-7-04) which provided a much more ‘unfriendly’ context for OSW advocacy. Indeed, for the centre-right coalition (CDA/VVD/LPF) that had come to power in mid-2002, integration, terrorism and safety were dominant themes, and renewable energy subsidies were cut down severely (Köper, 2012). In response, three existing wind energy branch organisations (Dutch Wind Energy Association NEWIN, consisting of individuals and organisations in the wind energy sector, FME Wind Energy Group, consisting of manufacturers and subcontractors, and the association of independent wind turbine operators PAWEX) joined forces in a network organisation called De Windkoepel to lobby for policy change, though attention was mostly focused on onshore wind in those days (Agterbosch, 2006; interviewee 19). In spite of this and similar efforts, for the subsequent coalition (CDA/VVD/D66) that came to power in 2003, climate was not a key issue either: the Minister of Housing, Spatial Planning and the Environment (VROM) delegated climate policy completely to her Secretary of State who failed to re-prioritise it, while the Ministry of Economic Affairs (responsible for energy policy) was primarily focused on the full liberalisation of the energy market in 2004 and on redesigning the failed sustainable energy demand subsidy scheme into a new open-ended production subsidy (Köper, 2012). The argument is that the higher salience of climate change in the UK and the more pressing perception of urgency of the renewable energy targets (esp. after the EU 20-20 targets were agreed in 2007) made it easier for proponents to position offshore wind as a solution to this problem and achieve significant policy support for the deployment of OSW (e.g., by providing two ROCs) and in terms of achieving favourable changes to the institutional

frameworks. Recently though, there have been controversies in the UK about the relative importance of the climate change and renewable energy targets and the Treasury is actively promoting investments in oil and gas exploration through tax credits. However, now there is a strong constituency centred around offshore wind (see next point) who lobbies in favour of keeping the protective measures in place.

A second striking contrast between the two cases is the role of the Crown Estate in the UK in terms of brokering and facilitating the empowering of offshore wind (also see Kern et al, 2014). Offshore wind farm operators ‘rent’ a piece of the seabed from The Crown Estate, which sees itself as a ‘proactive landlord’ that is involved in a variety of supportive actions in the offshore wind sector. Far beyond simply agreeing contractual terms for developers to use the seabed, the Crown Estate works very closely alongside developers, helping them with consenting, co-invests together with project developers up to the point of consent and developed a new Zone Appraisal and Planning process hoped to reduce risks to project delivery and to accelerate the programme. The Crown Estate is also active in developing a UK supply chain for example by organising supply chain events to inform UK companies about commercial opportunities brought by the offshore wind sector which draws new actors and resources into the niche. The Crown Estate is also managing the Offshore Wind Developers Forum, is part of the Offshore Wind Cost Reduction Taskforce and has recently published its own analysis of how to reduce offshore wind costs. This active and forward-looking engagement of the Crown Estate has been praised as a “visionary, bold step which has moved the whole industry on” (interviewee 5) and has been heralded as really making a positive impact on where offshore wind is today (interviewee 8). Over the period under study, the Crown Estate has been highly involved in nurturing work (e.g., engaging in learning about cost reduction potentials; working closely with and investing alongside developers), as well as shielding and empowering work (e.g., as a source of expertise for the government and other public bodies; increasing legitimacy of the niche by helping to develop a UK supply chain). Conceptually, this role can be interpreted as what Hughes (1979) has called a ‘system builder’ who related ‘everything to a single central vision’ (that offshore wind should play a key role in the future UK electricity supply), reached out beyond their special competences and played an entrepreneurial, system building role. Not only is this type of actor absent in the Dutch case, but also some of the functions it fulfils (e.g., having a commercial interest in the exploitation of the resource) do not exist in the Netherlands: the Dutch seabed is not ‘rented out’ by the state to project developers as it is in the UK.

In The Netherlands, the actor whose role in relation to offshore wind most closely resembles the Crown Estate is the Department of Public Works (Rijkswaterstaat), in that it is the public body responsible (amongst its other mandates) for managing and maintaining the North Sea (interviewees 17, 20, 21). In that capacity, it evaluates and grants permits to construct OSW parks. This is where the similarities end, however: as a result of the licencing procedure design for Rounds 1 and 2, Rijkswaterstaat has necessarily adopted a reactive role (evaluating and facilitating initiatives by market players) instead of the Crown Estate’s more proactive role. Moreover, as the Ministry of Infrastructure and the Environment’s executive agency, Rijkswaterstaat only actively works on offshore wind intermittently, i.e., when a development round is opened up: “politicians decide what we work on, and currently offshore wind is on hold” (interviewee 20). Rijkswaterstaat sees offshore wind as a political choice in a matter (i.e., energy policy), something which is outside its mandate (Deltares, 2011: 17–18): “Honestly, we don’t care if the whole operation makes economic sense or not. If someone comes to us for a telecom cable, they don’t have to produce a business plan that shows it’s profitable. You want a cable, you get a cable. This is the route, we can discuss it, but if you want to deploy it, you go ahead. And for offshore wind we have the same attitude: we aim to please” (interviewee 20). This prevents the continuity that results from the Crown Estate’s permanent commitment to creating revenue from the seabed: the only Dutch actors with a continuous

interest in lobbying for and facilitating offshore wind are sector organisations and initiatives such as NWEA and FLOW. In short, some of the functions that the Crown Estate fulfils are absent in The Netherlands, whereas others are spread out amongst different (types of) actors, which results in less coherent and effective offshore wind empowering.

#### 4.5. Discussion

The analysis shows clear evidence of narrative strategies of networks of actors aimed at both ‘fit-and-conform’ and ‘stretch-and-transform’ empowering in both countries. Offshore wind advocates in both countries tried to portray support for the technology as temporary and argued that OSW will fit well into existing centralised electricity systems (see 4.2). The evidence around the proposed indicators for ‘stretch-and-transform’ empowering was much more chequered: while in the UK advocates succeeded in portraying OSW as a key component of a sustainable energy system and achieved important changes in the selection environment, this was much more contested in the Netherlands (see 4.3). As a result, empowering strategies in The Netherlands have shifted from a position of both ‘fit-and-conform’ and ‘stretch-and-transform’ strategies being utilised to an almost exclusively ‘fit-and-conform’ strategy over the period under study. Initially viewed as “necessary for urgent reasons of great public gravity”, offshore wind deployment fell victim to alternating political support and opposition, exemplified by an intermittent series of fundamentally different renewable energy subsidy schemes which inspired little confidence to invest. In recent years, empowering has been decidedly ‘fit-and-conform’ in nature, with support measures being geared towards offshore wind becoming competitive under conventional selection environment terms before any roll out can occur. As such, offshore wind in The Netherlands is currently under pressure to become competitive on the more narrow techno-economic criteria of the existing energy system compared to the broader sustainability values that originally prompted the ‘flight offshore’: unless these criteria are met and cost reductions materialise, deployment will not be (financially) supported by the government. Offshore wind has to some extent become emblematic of a more ‘hands off’ policy approach.

Conversely, in the UK ‘stretch-and-transform’ empowering has been more successful. Environmental values in the form of climate change and renewable energy targets were institutionalised through the Climate Change Act which provided ‘room to manoeuvre’ for offshore wind advocates. Policy instruments like the Renewables Obligation and other changes (like the Electricity Market Reform) were (re-)designed to encourage generation of low carbon electricity. While initially offshore wind profited little from the RO, empowering work resulted in offshore wind being awarded two Renewables Obligation Certificates per MWh produced, which inclined actors more favourably towards investments in offshore wind. Offshore wind has increasingly become a realistic solution to uncertainties and tensions (e.g., the energy gap) experienced by regime actors. So, how was it that in the UK, these institutional changes were forthcoming while this did not succeed in The Netherlands?

For this, we have turned to the actors behind the narratives. As Smith and Raven (2012: 3031) argue, “reforming institutions or creating new institutions requires power, expressed through the mobilisation of material and nonmaterial resources, and collective action capable of shaping norms, standards and routines in transformed regimes”. In the preceding section, we have already pointed to the presence of a powerful and resourceful actor, which is present in The UK but absent in The Netherlands. The Crown Estate is a global actor (in terms of the distinction between local and global niche actors) which acted as an offshore wind ‘system builder’ in the sense that it has the trust of other actors and was financially and politically powerful enough to mobilise resources and facilitate a coalition of powerful private and public actors interested in offshore wind (see Kern et al., 2014). By making public–private offshore wind networks more robust and facilitating

wider and deeper relations between actors, this provided a power base capable of driving or reinforcing institutional changes, which created favourable conditions for large-scale roll-out. Such interest alignment (also resulting in relatively formal actor networks including private and public actors) with a strong power base were absent in the reproduction of similar narratives in the Netherlands. Apart from this key difference regarding the role of the Crown Estate, the types of actors involved in discussions around offshore wind in both countries were very similar and some actors are identical. Actors in the Netherlands struggled to create powerful global actors able to affect institutional reforms, partly because of disagreements between actors about ways forward (conflicts between large developers and independent developers and Greenpeace; party politics).

Methodologically, it is important to more clearly define indicators for identifying ‘fit-and-conform’ and ‘stretch-and-transform’ empowering. We argue that the indicators suggested in Table 1 could be further refined. For instance, analysis needs to pay closer attention whether the main narrative advocates tell about the desired configuration of the technology involves a radical, longer term transformation of the existing regime (incl. the existing institutional structures), rather than just ‘wider deployment’ of the technology in the case of ‘stretch-and-transform’, as currently stated. This includes new indicators about institutional change.<sup>1</sup> In addition, rather than applying the ‘fit-and-conform’ and ‘stretch-and-transform’ categories to isolated processes and support measures (which might be difficult to locate in either), we argue that this analytical judgement should be made on the basis of an aggregate picture of the involved actors, i.e., the direction of development resulting from the combined activities of the actors, including antagonistic actions. We argue that such an aggregate analysis will provide insights into whether any particular technology is shaped more towards fitting in with the existing regime versus trying to produce more radical, transformative change.

#### 5. Conclusion

This paper analysed the development of offshore wind in the UK and the Netherlands. We sought to explain the divergence between rapid deployment of the technology in the UK in recent years and the stagnant developments in the Netherlands in terms of Smith and Raven’s (2012) concept of empowering. Our paper makes three contributions to the literature on socio-technical transitions.

First, the paper analyses offshore wind developments in two countries, a technology which has received relatively little attention so far. The analysis traces the offshore wind developments in the two countries and explains the divergence in terms of deployment: While advocates in both countries pursued both ‘fit and conform’ as well as ‘stretch and transform’ strategies, only in the case of the UK were the latter successful and led to significant OSW deployment. This difference is mainly attributed to the existence of a system builder in the form of the Crown Estate as well as the salience of climate change and renewable energy targets in the UK.

Second, our paper explores the explanatory utility of the protective space concept and especially empowerment. The analysis shows that while ‘stretch-and-transform’ and ‘fit-and-conform’ are useful conceptual categories, the empirical evidence shows a much more messy picture in which the different narratives and the networks utilising them are not so clearly separable. The same actors often pursue both strategies simultaneously, or different actors disagree about how to best empower a niche and might also change their tune over time or depending on the audience they are addressing. One of the difficulties in distinguishing between the two strategies empirically lies with the nature of offshore wind technology. Given the large scale, centralised configuration of offshore wind emerging in the two countries studied,

<sup>1</sup> We would like to thank one of the reviewers for alerting us to this issue.

the difference between ‘fit-and-conform’ or ‘stretch-and-transform’ is small in the sense that relatively minor changes in the selection environment might lead to the widespread diffusion of OSW but will not structurally change existing electricity systems. In contrast, our earlier analysis of empowering of solar PV (Smith et al., 2014 and Verhees et al., 2013) showed a much larger difference between the two strategies in part due to a (perceived) larger variety of possible technological configurations.

Our findings also indicate that Smith and Raven (2012)’s empowering framework which focuses analytical attention primarily on actors, their networks and the narratives they articulate, fails to sufficiently capture how different institutional settings shape the possibilities for empowerment work. For example, the institutionalisation of concerns about climate change in the UK’s DECC keeps this issue on the agenda even during times when other concerns dominate public discussions.

We therefore suggest an amendment of the framework: it seems necessary to take into account the institutional set up within which empowering work is enacted, as the institutional framework shapes and constrains actors’ room to manoeuvre (Kern, 2011; Fuenfschilling and Truffer, 2014). Smith and Raven (2012: 1032) have already hinted that this requires a conceptual integration of how empowerment is “taking place within the context of a historically privileged regime, which holds the authority to arbitrate and the power to provide protective support”. Future work should therefore pay more attention to how institutional contexts such as regime rules constrain and provide room for empowering strategies of niche advocates and which kinds of processes enable the building up of a sufficient power base to challenge dominant rules. Such a conceptualisation could build on Fuenfschilling and Truffer (2014) who distinguish between different degrees of institutionalisation of regimes and suggest that the strength of a regime can be assessed by empirically identifying the degrees of institutionalisation of its core elements. A change in institutional logics or a situation where the degree of institutionalisation of core regime elements is weak(ening), can be hypothesised to provide scope for the empowerment of niches. For example, the UK’s institutionalisation of climate concerns in the Climate Change Act and in the Department for Energy and Climate Change can be interpreted as an example of de-institutionalising an institutional logic exclusively focussed on market efficiency, which weakened core regime elements (such as the previous commitment to technology-neutral policies) and provided ‘room to manoeuvre’ for OSW advocates. Such a combined framework brings together attention to the niche formation processes (including the creation of protective spaces through shielding, nurturing and empowering) as well as the institutional (regime) context (analysed as institutional logics and looking at processes of institutionalisation and de-institutionalisation) which partly shapes these processes and can also be shaped by them. These ideas are in line with Fuenfschilling and Truffer’s suggestion to “analyse the different forms of institutional work used by actors to transform or maintain the institutional setting and ultimately the course of the transition (2014: 786)”.

Third, the findings are also relevant to the debate around the national focus of many transition studies (Markard et al., 2012; Raven et al., 2012; Wiecek et al., 2015). By conducting a cross-country comparative study, we show that despite the highly international nature of the offshore wind sector, attempts by multi-national companies active across different jurisdictions to empower deployment led to different outcomes in different countries. Therefore we argue that a conceptualisation of protective space as being rooted in particular national jurisdictions can still be valid. This reinforces the point made above about the importance of different institutional settings. A key question for further research is how different scales of innovation become (dis)connected, i.e., how international networks and institutions become entangled with national and local ones, which kind of tensions are produced in such entanglements and how those are explanatory in understanding how sustainable innovations are (dis-)empowered.

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## Appendix A. Interviewees

### *Semi-structured, expert interviews in the UK*

- 1 Representative of Energy Technologies Institute
- 2 Representative of Technology Strategy Board
- 3 Senior Official from Department of Business, Innovation and Skills
- 4 Member of Department of Energy and Climate Change’s offshore wind taskforce
- 5 Engineering Manager at wind energy technology company
- 6 Strategy and Stakeholder Coordination Manager at a large utility company
- 7 Commercial manager at a renewable energy centre
- 8 Manager at renewable energy developer
- 9 Former DONG employee involved in economic and financial evaluations of offshore wind
- 10 Senior researcher involved in wind energy research
- 11 Senior researcher involved in wind energy research
- 12 Professor involved in wind energy research; also involved in European Wind Energy Association
- 13 Senior Official from Department of Energy and Climate Change

### *Semi-structured, expert interviews in the Netherlands*

- 14 Offshore wind park design manager at marine contractor
- 15 CEO of offshore wind turbine producer
- 16 Senior development manager at energy company
- 17 Head of offshore wind business development at energy company
- 18 Researcher at environmental science institute
- 19 Director of multiparty offshore wind consortium
- 20 Offshore wind licencing manager at Department of Public Works
- 21 Policy advisor for department of Public Works (informal interview)

### *Unstructured, ‘key informant’ interview with experience in both countries*

- 22 Former senior manager at international oil firm with experience in offshore wind projects both in the UK and the Netherlands

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