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# Legitimation, institutions and regional path creation: a cross-national study of offshore wind

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## ABSTRACT

This paper assesses legitimation as a crucial dimension of industry emergence, addressing the neglect of institutional and political aspects of path creation in economic geography. It investigates how the legitimacy of emerging industries is built up over time and examines differences in legitimation across space. The paper focuses on the evolution of legitimation narratives in the context of national and regional differences in institutions, actors and assets. Based on a cross-national study of the offshore wind industry, the paper argues that cost reduction and value creation have made important contributions to legitimation in addition to climate change and energy security.

## KEYWORDS

legitimation; narratives; multi-scalar institutions; evolutionary economic geography; path creation

JEL D83, Q42, R11, R58

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## INTRODUCTION

The question of how new industries and technologies emerge and develop has attracted great interest in economic geography and sustainability transitions studies (Boschma et al., 2017; Truffer & Coenen, 2012). Recent work in evolutionary economic geography (EEG) is concerned with processes of path creation and regional branching, referring to the emergence and development of new industries and economic activities in regions (MacKinnon et al., 2019a). This research emphasizes the importance of pre-existing local assets and capabilities in shaping path creation and branching (Boschma, 2016). Recently, evolutionary thinking has been extended to questions of environmental and societal transition to sustainability, focusing on varying regional conditions for the growth of green industries (Boschma et al., 2017;


Hansen & Coenen, 2015). Yet, in its preoccupation with technological and knowledge-based aspects of innovation, EEG has neglected wider institutional and political dimensions of path creation (MacKinnon et al., 2019a).

These broader aspects of path creation are addressed by sustainability transition studies which is concerned with the emergence of new technologies that often struggle against the interests of incumbent actors and institutions (Markard et al., 2012). One key concept in this respect is legitimation, which is a prerequisite for emerging industries to overcome their 'liability of newness' (Geels & Verhees, 2011, p. 911) and gain social acceptance and compliance with relevant institutions (Bergek et al., 2008). Studies of legitimation are concerned with the narratives and strategies developed by supporters of emerging technologies and industries (Smith & Raven, 2012). They stress the temporality of narratives in offering both


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reinterpretations of the past and projections of future benefits to attract resources from key stakeholders (Garud et al., 2014). As such, the temporality of legitimation processes has been privileged over their geography in transition studies. Yet, it is important to also consider spatial differences in legitimation given national and regional differences in actor networks, institutional rules and political systems (Markard et al., 2016).

This paper makes two key contributions. First, informed by transitions research, it addresses the neglect of institutional and political aspects of path creation in EEG (Boschma, 2016; MacKinnon et al., 2019a), assessing legitimation as a crucial dimension of industry emergence. While legitimation is the subject of an extensive literature in transition studies (Bork et al., 2015; Markard et al., 2016), it has attracted only limited attention in EEG (Binz et al., 2016). Second, this paper contributes to transition studies by providing a spatialized analysis of legitimation processes (Rosenbloom et al., 2016), outlining the basis of an economic geography of legitimation that emphasizes national and regional institutions, industrial evolution and regional growth paths. These contributions are advanced by addressing two research questions: How is the legitimacy of emerging industries built up over time; and How do legitimation processes differ across space? In addressing the first question, the paper focuses on the advancement of narratives by the advocates of an emerging industrial path, alongside the counter-narratives of opponents. In addressing the second question, it examines how legitimation narratives are articulated across space, focusing on national and regional actors and organizations (Rosenbloom et al., 2016).

Based on a cross-national study of the offshore wind (OFW) industry, the paper focuses on four legitimation narratives: combating climate change, promoting energy security, reducing costs and creating economic value. It argues that the successful legitimation of OFW reflects powerful actors' ability to align key narratives with broader socio-political agendas (Raven et al., 2016). More specifically, while the contributions of OFW to climate change, energy security and economic development are key underlying sources of legitimacy, cost reduction has played a crucial additional role in recent years. The analysis is grounded in the experiences of three Western European countries: Germany, the UK and Norway. While previous studies of the OFW industry have addressed themes of path creation, industrial development and niche innovation (Dawley, 2014; Kern et al., 2014a; MacKinnon et al., 2019b; Steen & Hansen, 2018), this paper makes a distinctive contribution through its analysis of legitimation processes over time and across space.

The remainder of the paper is structured as follows. The next section discusses the work on legitimation narratives, institutions and regional evolution, developing an analytical framework to inform the empirical analysis. The third section describes our methods. This is followed in the fourth section by an overview of the legitimation of the OFW industry that introduces the four key narratives. The fifth section examines the evolution of legitimation

over four periods: experimentation and demonstration, 2000–07; optimism and growth, 2008–10; affordability and uncertainty, 2011–15; and acceptance and normalization, 2016–present. The final section concludes.

## LEGITIMATION AND REGIONAL PATH CREATION

Legitimacy can be defined as 'the generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs and definitions' (Suchman, 1995, p. 573). As this definition indicates, legitimation is about making an entity consistent with the shared cultural beliefs, norms and values of actors within a broader community. It is a vital prerequisite for the mobilization of financial resources and support from investors and regulators (Geels & Verhees, 2011; Markard et al., 2016). The demonstration of technology through product testing and experimentation is an important source of legitimation, particularly in the early stages of development (Bergek et al., 2008).

The process of legitimation is shaped by the actors engaged in promoting and opposing emerging technologies (Bergek et al., 2008; Smith & Raven, 2012). Four areas of agency are identified by Yap and Truffer (2019): societal discourses that articulate visions and expectations; government actors that formulate regulations and policies; industry networks or alliances involved in shaping standards; and individual organizations seeking to develop their internal capabilities. From an EEG perspective, the term 'path advocates' (MacKinnon et al., 2019a) encompasses the actors that support a new technology or innovation, incorporating technology developers, lobby groups, environmental organizations, policy-makers and politicians, and potential users (cf. Raven et al., 2016).

Narratives are a critical dimension of legitimation, referring to the arguments made by actors in public to promote new technologies to key audiences and stakeholders (Smith & Raven, 2012). They can be defined as strategic devices that serve to 'temporally order familiar and unfamiliar material and symbolic resources into one totalizing account held together by a plot' (Garud et al., 2019, p. 189). This temporal ordering involves the contextualization of past and potential future activities, based on both reinterpretations of the past and projections of the future that aim at plausibility and comprehensibility (Manning & Bejarano, 2017). The transitions literature highlights the framing struggles that may erupt between the 'pro-transition' narratives of path advocates who attempt to align emerging technologies with broader socio-political agendas and the counter-narratives of incumbent actors who seek to defend established technologies and undermine the arguments of path advocates (Bork et al., 2015; Raven et al., 2016).

The setting of future expectations is central to legitimation narratives, involving the articulation of a 'compelling chronological account that invites stakeholders to imagine future ... possibilities' (Garud et al., 2014, p.

1479). Over time, however, these efforts may be subject to the paradox of legitimacy if they are threatened or undermined by the failure of a venture or project to meet early expectations, often as a result of broader shifts in markets, technologies or regulations that are beyond the control of its founders (Garud et al., 2014). Such failure can draw the scrutiny of stakeholders, risking a loss of legitimacy. In response to such legitimacy jolts and challenges, path advocates engage in revised forms of storytelling in an effort to maintain or regain legitimacy.

Turning to the economic geography of legitimation, the first aspect is concerned with multi-scalar institutional frameworks (MacKinnon et al., 2019a). Here, our analysis is informed by a modified Varieties of Capitalism (VoC) approach that incorporates subnational institutions in addition to national states (Peck & Theodore, 2007). In particular, we draw upon Schmidt's (2005) distinction between 'simple' and 'compound' liberal market economies (LMEs) and coordinated market economies (CMEs). The state structure is concentrated in a single authority in 'simple' systems exemplified by unitary states, whereas 'compound' ones feature multiple authorities, such as in federal polities.

Second, geography is also implicated in legitimation through spatially uneven processes of industrial evolution. From an industry life cycle perspective, new industries generate a greater range of locational possibilities in their early stages of development, with a multiplicity of regions competing to become centres of investment (Storper & Walker, 1989). These possibilities diminish over time as the industry is consolidated and becomes increasingly concentrated in a small number of locations. There is, however, scope for established centres to be challenged by potential 'latecomer' regions, underlining the non-deterministic nature of this process. Regions seek to break into emerging industries on the basis of their assets (MacKinnon et al., 2019a), with natural resource endowments and spatial proximity to these resources providing critical assets for green growth (Hansen & Coenen, 2015). As this paper argues, regional value creation can represent an important source of legitimacy, providing visible benefits in terms of industrial development, capital investment and employment.

Regional actors seek to foster path creation by mobilizing key assets (MacKinnon et al., 2019a). They engage in a range of legitimation practices, including the articulation of visions and expectations of future regional development and the formulation of related policies to enrol other regional actors and create a sense of collective direction (Steen, 2016). In addition, regional actors often seek to align their own narratives to broader political and economic agendas in order to attract resources and support from national and supra-national institutions (Raven et al., 2016).

Informed by these strands of literature, we construct an analytical framework to inform our analysis of the legitimation of the OFW industry. First, our approach emphasizes the temporality of the legitimation process. Legitimation narratives unfold over time in changing

institutional and political contexts, encountering environmental challenges and jolts that require narratives to be reformulated in order to maintain or regain legitimacy (Garud et al., 2014). Second, we adopt a multi-actor approach encompassing entrepreneurs, large firms, industry associations, government actors and research institutes. Third, addressing the neglect of space in legitimation research, the framework identifies institutions, industrial evolution and regional growth paths as key aspects of an economic geography of legitimation.

## METHODS

While legitimation research is largely dependent on single region- and country-case studies (Markard et al., 2016; Rosenbloom et al., 2016), this paper provides a comparative analysis of legitimation within the same industry across different national and regional contexts. The UK and Germany were selected as the two largest OFW markets in the world that have followed contrasting industry growth paths of market-led growth and industry-led development, respectively (MacKinnon et al., 2019b). Norway provides an interesting counter-case of legitimation based on the absence of a domestic electricity market transition imperative due to its abundant hydropower resources. Accordingly, it has not yet established a domestic market for OFW. From a VoC perspective, the UK is a 'simple' LME, characterized by a limited state, competition and a centralized political structure. Germany is a 'compound' LME, defined by strategic coordination between firms and institutions and a federal structure. Norway represents a 'simple' CME based on a combination of strategic coordination and a unitary state.

Developing an evolutionary approach, we adopted a longitudinal research design as part of an ongoing programme of research on the OFW industry across the three countries (Dawley, 2014; Steen & Hansen, 2018). This involved a coordinated mixed-methods approach across the three cases, informed by over 100 semi-structured interviews (2010–19) with regional and national government actors, industry associations and firm managers and directors. Our collective immersion in the OFW research for over a decade provided a rich set of contact networks, allowing the informed selection of key informants alongside forms of nonparticipant observation at industry and policy events (Karlsen, 2018). Interviews covered key legitimation arguments and rationales, the role of industry associations and regional cluster initiatives, political support and lobbying, market support regimes and industrial development policies. The research also involved the analysis of policy documents, particularly key speeches, statements and press releases by politicians and industry leaders, and media sources including leading national newspapers (e.g., *Die Zeit*, *The Guardian*, *Financial Times*, *Dagens Næringsliv*), industry publication and websites (e.g., 4COffshore, WindEurope, Renewable Energy News, etc.).

The analysis of legitimation activities and narratives began with the extraction of key quotations and statements

**Table 1.** Summary of offshore wind (OFW) narratives.

OFW legitimizing narratives	OFW delegitimizing counter-narratives
OFW is a scalable and proven technology for meeting climate change-mitigation targets	OFW is an inappropriate climate change-mitigation option
OFW enhances energy security through the exploitation of domestic energy resources	
OFW industry is committed to reducing costs relative to other sources of electricity	OFW is a high-cost technology unaffordable to consumers
OFW generates economic value by fostering new national and regional growth paths	OFW reduces economic value by imposing extra costs on industry and undermining competitiveness

from source documents, principally interview transcripts, policy documents, press releases and media reports. The identification of the narratives was informed by our ongoing research on the OFW industry and other studies of renewable energy technologies (RETs) (Kern et al., 2015; Rosenbloom et al., 2016). Key quotations and statements that expressed emergent narratives were carefully selected for each of the three country cases. The extracted passages were examined closely and a set of legitimation activities, arguments, events and contextual factors distilled across the cases. From this, the principal narratives and counter-narratives were confirmed and elaborated (Table 1).

## LEGITIMATION OF OFFSHORE WIND POWER: KEY NARRATIVES

The remainder of the paper focuses on the four legitimation narratives identified by the research, alongside three counter-narratives. These overlap with the narratives discussed by other published research on the legitimation of RETs, resonating with the broader energy trilemma (Kern et al., 2014a; Raven et al., 2016; Rosenbloom et al., 2016). This refers to the three, potentially conflicting, goals of energy policy: addressing climate change through decarbonization, securing the supply of energy and limiting the costs of energy generation. In addition, Schmidt et al. (2019) identify a fourth objective of strengthening the economic competitiveness of energy industries.

RETs face particular legitimation challenges as they require subsidization to render them price competitive with established energy technologies, raising the costs of energy generation for states and consumers since subsidies are publicly funded, often through consumer surcharges (Jacobsson & Lauber, 2006). This challenge has been particularly pronounced for OFW as a high-cost RET (MacKinnon et al., 2019b).

The first narrative, *combating climate change*, is a critical underlying source of legitimacy (Kern et al., 2014a), supported by the broader societal discourse of climate change mitigation (Yap & Truffer, 2019). OFW was identified as a scalable and proven technology (Table 1) (Kern et al., 2015) with leading national and regional politicians presenting it ‘as technology which has the scale to make a big difference’ (Rudd, 2015) and as ‘a decisive element

in energy transition’ (Schwesig, quoted in Windmesse, 2019). At the same time, the support of RETs has been opposed by incumbent actors associated with the coal and nuclear industries and some conservative and free market politicians and commentators (Butler, 2013; Jacobsson & Lauber, 2006). These critics question the appropriateness of wind power in addressing climate change (Rosenbloom et al., 2016), particularly on the grounds of intermittency, requiring back-up by other sources of non-renewable power (Heaton-Harris et al., 2012; Toke & Lauber, 2007).

Second, the narrative of *promoting energy security* is also evident in the OFW sector in the context of the phasing out of coal-fired power stations, controversies over nuclear power and broader geopolitical concerns over imported energy in a climate of heightened ‘resource nationalism’ (Bradshaw, 2014; Kern et al., 2014b). From this perspective, the growth of OFW is framed in terms of the exploitation of domestic energy resources and the need to reduce dependence on imported fossil fuels. For instance, the former British prime minister and German chancellor both stressed the role of OFW in enhancing energy security as part of balanced electricity mixes (Die Bundesregierung, 2019; Jowit, 2012). Our analysis did not provide any evidence of a counter-narrative to energy security.

Third, a *cost reduction* narrative has emerged largely as a response to a prominent counter-narrative advanced by opponents of RETs (see above) which criticizes OFW as high-cost technology, arguing against its subsidization on the basis of consumer affordability and the transfer of resources to energy developers and utilities (Table 1) (Altmaier, cited in Butler, 2013; *Frankfurter Allgemeine*, 2013). In response, the cost-reduction narrative developed by the OFW industry and governments creates future expectations of lower costs and a diminished need for public subsidy (RenewableUK, 2014; Rudd, 2015).

Fourth, the narrative of *creating economic value* emphasizes the contribution of OFW to national and regional economic development by fostering new growth paths (Table 1). This narrative has been promoted by national governments, industry associations and regional actors who construct expectations of large-scale job creation and investment (Crooks & Harvey, 2009). The counter-narrative of opponents claims that OFW will reduce



economic value by imposing additional costs on industry and encouraging firms to move production to other locations, thereby undermining national and regional economic competitiveness (Butler, 2014; Geels et al., 2016). The remainder of the paper emphasizes the high cost and unaffordability and reduced economic value counter-narratives over intermittency as they are the principal ones mobilized against OFW.

## PROCESSES OF OFFSHORE WIND LEGITIMATION

Understanding legitimation as a temporal process (Bork et al., 2015), we divide our analysis into different periods (Markard et al., 2016). This periodization is based upon the underlying legitimation dynamics of the OFW industry, incorporating the dominant narratives, institutions and policies. Our account of each period is presented thematically, covering the main industry-wide legitimating narratives, key actors and institutions and regional growth paths.

### Experimentation and demonstration, 2000–07 *Industry narratives*

This first period of OFW legitimation covers a relatively lengthy process of small-scale experimentation and demonstration, framed largely by the combating climate change narrative. The high costs of OFW represented a key underlying legitimation challenge, fuelling a counter-narrative from incumbent actors of OFW as a subsidized, high-cost technology (Jacobsson & Lauber, 2006). This argument fed into the parallel counter-narrative of OFW as a technology that would undermine the competitiveness of energy-intensive industries and the broader economy. The limited growth of OFW capacity in this period shaped its legitimation, focusing advocates' narratives upon future expectations of feasibility and value creation in the absence of substantial material benefits such as investment and jobs.

### *Actors and institutions*

Building on earlier institutional arrangements, more elaborate subsidy regimes were introduced in the early 2000s in Germany and the UK (Geels et al., 2016). Advancing the combating climate change narrative, the 'Red-Green' coalition in Germany introduced the Renewable Energy Sources Act (RESA) in 2000, which awarded priority grid access for RETs and set a new fixed tariff for renewable electricity (Geels et al., 2016). In addition to the governing coalition, RESA was supported by environmental organizations such as Greenpeace, renewable industry and engineering industry networks and some regional governments (*Lander*) (Jacobsson & Lauber, 2006). Like its predecessor Feed-in-Act of 1991, RESA was opposed by incumbent electricity industry networks in the shape of the major utilities, along with the Federal Ministry of Economic Affairs and the Federation of German Industries, who advanced the counter-narratives of

unaffordability and reduced national economic competitiveness (Geels et al., 2016).

The Renewables Obligation (RO) was introduced by the UK government in 2002, framed by the combating climate change narrative. Reflecting the UK's neoliberal energy policy paradigm (Kern et al., 2014b), the RO was viewed as a cost-effective way of supporting ambitious renewable energy targets. Its technological neutrality favoured lower cost technologies such as onshore wind and landfill gas (Toke & Lauber, 2007). It was supported by government actors and industry networks, leaving small-scale producers and independents concerned about bias towards incumbent suppliers and more established technologies (Geels et al., 2016).

Despite Norway's lack of a domestic market for OFW, the combating climate change narrative led policy-makers to encourage the electrification of offshore installations by replacing natural gas with wind energy. Consequently, a small number of OFW-related concept studies emerged in the early 2000s (Steen & Hansen, 2018).

The demonstration of OFW technology required the licensing and development of projects. In the UK, the Crown Estate (CE) awarded Round 1 and Round 2 sites, although only six OFW farms were operational by 2007 (Kern et al., 2014a). OFW farms were slower to develop in Germany as project costs turned out to be much higher than expected with grid connection emerging as a major problem (Reichardt et al., 2016). The first plans for an OFW farm in Norwegian waters were published in 2004 as several of the major energy companies started investing in research and development (R&D). Furthermore, Enova (a Norwegian public enterprise) provided financial support for Equinor (formerly Statoil) to develop a floating turbine demonstration off the Norwegian coast.

### *Regional growth paths*

The growth of early OFW projects encouraged regional actors in proximate coastal regions to identify the industry as an economic development opportunity. While national actors largely deployed the combating climate change narrative, regional actors emphasized the creation of economic value at the regional and national scales (Dawley, 2014; Steen & Karlsen, 2014). In the UK, early OFW projects were concentrated in the shallow and sheltered waters off the north-west and east coasts of England, leading to the growth of small-scale support functions in adjacent regions such as Cumbria, the Humber and Kent. In addition, aspirant regions such as North East England targeted OFW, based on related maritime and fabrication-related assets (Dawley, 2014).

The German interior regions of North-Rhine-Westphalia, Bavaria and Baden-Württemberg began to benefit from the growth of OFW activity in this period, based on related strengths in machine manufacturing. At the same time, coastal locations identified OFW as a new market opportunity, led by Bremerhaven which developed an

OFW strategy from 2001 (MacKinnon et al., 2019b). This approach was echoed by Cuxhaven where local and regional actors developed a plan to attract future investment, challenging rival regions such as Bremerhaven and the Humber (Evans, 2020).

## Great expectations: optimism and growth, 2008–10

### Industry narratives

This period was one in which the pace of development accelerated, supported by optimistic expectations about the growth of the OFW wind market and the strengthening of subsidy regimes. The combating climate change narrative gathered additional momentum, alongside growing energy security concerns (Kern et al., 2014b). In addition, the potential of OFW to create economic value emerged as a key theme. In the UK, for instance, expectations were magnified greatly with industry actors ‘talking of forty gigawatt ... [over] the next few decades’ (Government official, authors’ interview, May 2015). At the same time, the German government set an increased target of 10 GW by 2020 (Geels et al., 2016). National government and regional actors identified OFW as a large-scale economic opportunity with then UK Prime Minister Gordon Brown, for instance, stating that this is ‘a new industry where Britain can be number one in the world’, with the potential to create ‘thousands of green jobs’ in disadvantaged regions such as North East England (quoted in Dawley, 2014, p. 3). These arguments were given additional impetus by the short-term legitimacy boost (Garud et al., 2014) provided by the financial and economic crisis of 2008–09, which increased interest in green technologies as sources of future growth and employment (Hochfeld et al., 2010).

### Actors and institutions

The combating climate change agenda in the UK was bolstered considerably by the Labour government’s passage of the Climate Change Act in 2008, which committed the UK to an 80% reduction in emissions by 2050 (Geels et al., 2016). At the same time, concerns about energy security grew after the UK became a net energy importer (Kern et al., 2014b). Leading industry actors, including electricity utilities, turbine manufacturers, energy companies and institutional investors, became increasingly active in supporting OFW development (Raven et al., 2016). Representing a break with the liberal market paradigm, the government raised OFW subsidies by introducing technology-specific banding to the RO in 2009–10 (Kern et al., 2014a). In addition, the CE embarked on an ambitious Round 3 of licensing, based on the development of much larger zones (MacKinnon et al., 2019b).

Further institutional layering of RESA in Germany involved the increase of renewable energy targets from 20% to 30% by 2020 (Bundesministeriums der Justiz, 2009). Speaking at the opening of the flagship Alpha Ventus project in 2010, the Christian Democratic Union (CDU) Minister of Environment stated that wind energy

will ‘play a central role in the future energy mix’ (*Die Zeit*, 2010). Alpha Ventus provided an essential basis for national and subnational government actors, firms and certification bodies to gain experience from the field (electricity utility representative, authors’ interviews, September 2018). Such demonstration projects are an important source of legitimacy, allowing firms and government bodies to test technology and establish standards (Yap & Truffer, 2019).

Influenced by concepts of value creation through industrial diversification and combating climate change through the notion of ‘Norway as Europe’s green battery’, the Norwegian government appointed an energy council (Energirådet, 2008) that recommended a national strategy of exporting electricity to Europe as well as supplying national oil and gas (O&G) installations with OFW power. Consequently 12 different OFW farms were being planned by mid-2008, and expectations were high among industry actors for the development of a domestic market (Steen & Hansen, 2018). The prevailing narrative in this period in Norway was value creation based on diversification from its world-leading petro-maritime sector, set within a societal discourse of ‘life after oil’. This was magnified by the 2009–10 downturn in the petro-maritime sector, prompting industry actors to ask the government to support industrial diversification and value creation through the establishment of OFW demonstration projects (Normann, 2015). The state subsidies required to create a domestic OFW market failed to materialize, however, since the reliance on hydropower meant that the electricity market was already aligned with the climate change and energy security agendas.

### Regional growth paths

Raised expectations of industry growth were reflected in ambitions for regional value creation. In the UK, Scotland emerged as an aspiring ‘transition space’ (Truffer & Coenen, 2012) as the Scottish National Party (SNP) government set some of the challenging renewables targets in Europe (Scottish Government, 2012). The then First Minister Alex Salmond described the waters of Scotland as the ‘Saudi Arabia of marine power’, claiming that a new round of Scottish OFW sites could create ‘several thousand more jobs’ (quoted in Bolger, 2010). Supported by the anticipated growth of the UK market, Scotland signed memoranda of understandings with two turbine manufacturers, alongside several R&D initiatives and support schemes.

The efforts of regional actors to promote OFW in Germany have been assisted by its decentralized structure, providing them with greater authority, resources and political legitimacy compared with the UK outside of Scotland. At the opening of Baltic 1, the chancellor highlighted the local value-creation opportunities OFW provides: ‘I would like to thank all local politicians who always take care of emphasizing the jobs effect and many other positive aspects that this development opens for local authorities’ (Merkel, 2011). In this period,

Bremerhaven reinforced its role as a centre for OFW-related manufacturing and port activities, while Hamburg emerged as the key hub for coordinating OFW activities (MacKinnon et al., 2019b).

### Hard times: affordability and uncertainty, 2011–15

#### Industry narratives

This period is marked by a protracted framing struggle between the pro-transition narratives of combating climate change and creating economic value and the counter-narratives of high costs/unaffordability and reducing economic value (Table 1). While the economic stimulus introduced in response to the 2008–09 crisis provided a legitimacy boost to emerging green technologies, this was reversed from 2010, ushering in an era of austerity which placed acute political pressure on renewables subsidies as consumers faced depressed living standards and rising energy bills (Butler, 2013). Austerity presented OFW and other RETs with a severe legitimacy jolt (Garud et al., 2014) with critics arguing that subsidies were no longer affordable, generating increased uncertainty for developers and investors (Butler, 2013). The high cost of OFW left it particularly exposed, based on a price of about £140/MWh in 2011, around three times the wholesale price of electricity (ORE Catapult, 2015). In response, industry networks and government actors reframed their arguments through a new cost-reduction narrative (Karlsen, 2018). At the same time, energy security remained a major concern, acquiring additional importance as a source of legitimacy for RETs given increased conflict over climate change.

#### Actors and institutions

In the UK, framing struggles emerged within the Coalition Government between the Liberal Democrats' commitment to RETs and the opposition of some Conservative politicians (Geels et al., 2016). Framed by the energy security and economic value narratives, the government's decision to fund a new nuclear power plant and support the fracking of shale gas, inspired by developments in the United States, threatened to undermine the position of RETs in the energy mix (Geels et al., 2016). Political uncertainty was magnified by the protracted transition from the RO to a new auction-based subsidy regime, leading to the cancellation of several OFW projects in 2013–14 (Dawley et al., 2015). Freed from coalition, the new Conservative government cut support for RETs in 2015, particularly onshore wind, and the Energy Secretary argued that OFW 'needs to move quickly to cost competitiveness' (Rudd, 2015).

A reframing of value creation took place in the UK, emphasizing local industrial content alongside job creation. This sought to address a dependence on imported materials with over 80% of the value of some UK installations sourced from outside the UK (Macalister, 2010). The lack of domestic value creation represented a key legitimation challenge in the context of increased political conflict over subsidies. In response, the OFW

industry had to build a domestic 'industrial base in order to secure ... political support' (industry representative, authors' interviews, May 2015). Accordingly, industry networks and government actors set an aspiration of generating 50% of value from domestic content (HM Government, 2013).

The Fukushima nuclear disaster revitalized the *Energiewende* in Germany, leading to the closure of nuclear power stations by 2022 (Merkel, 2011). Yet, a similar framing struggle to the UK emerged between combating climate change and mounting concerns about cost and consumer affordability. In the OFW sector, these concerns were magnified by the legitimation challenge prompted by extra charges for electricity consumers stemming from losses incurred by the transition system operator Tennet as a result of uncoordinated offshore grid planning. In response, the energy minister suggested 'an electricity price brake' for consumers by cutting the tariff, arguing that the *Energiewende* must be 'economically viable and affordable' (quoted in *Frankfurter Allgemeine*, 2013). Although his suggestion was dismissed by the *Bundestag*, the incident created uncertainty among investors. Cost reduction emerged as a narrative in Germany around 2013 in response to these affordability concerns and the 'electricity price brake' debate (Karlsen, 2018; Reichardt et al., 2016).

The new CDU/Social Democratic Party (SDP) government adjusted the targets downwards from 10 to 6.5 GW by 2020 and from 25 to 15 GW by 2030, viewing these as more realistic in light of the modest growth in installed capacity. In addition, the so-called 'acceleration initiative' brought together actors from government and industry to resolve the grid connection problem.

The revitalization of the O&G sector in Norway around 2011 reduced pressures for diversification into OFW. Furthermore, while a joint Swedish–Norwegian Green Certificate Scheme was introduced in 2012, its technological neutrality meant that it failed to provide sufficient levels of subsidy for higher cost RETs such as OFW (Steen & Hansen, 2018).

#### Regional growth paths

In the UK, reduced expectations of market size and increased political uncertainty constrained regional path-creation ambitions. OFW activities were slow to develop in Scotland and North East England with efforts to attract turbine manufacturers proving unsuccessful (Dawley et al., 2015). In Germany, a lack of financial returns and failed grid connections pushed many pioneer firms out of the market and led to job losses in Bremerhaven, Cuxhaven and Emden in 2013–14 (Fröhlingsdorf, 2013). By contrast, the Humber region of England emerged as a key 'transition space', based on the confirmation of the Siemens blade manufacturing plant investment and growing operations and maintenance (O&M) activity (Dawley et al., 2019). Heralded by the UK's energy minister as 'central to our world-leading offshore wind role', the Humber became pivotal to the national

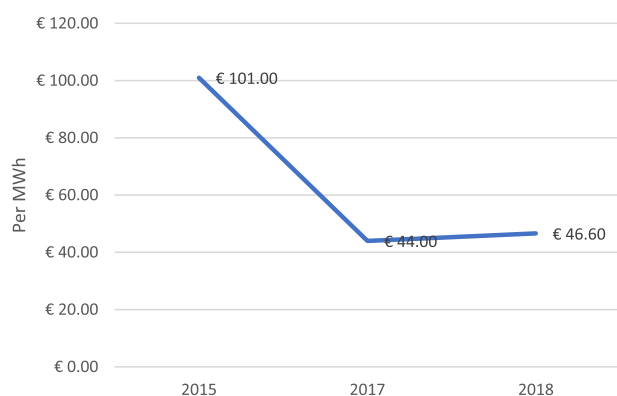


legitimation process through the demonstration of economic value in this disadvantaged region (Hurd, cited in Laister, 2017).

## Socio-political acceptance and normalization, 2016–present

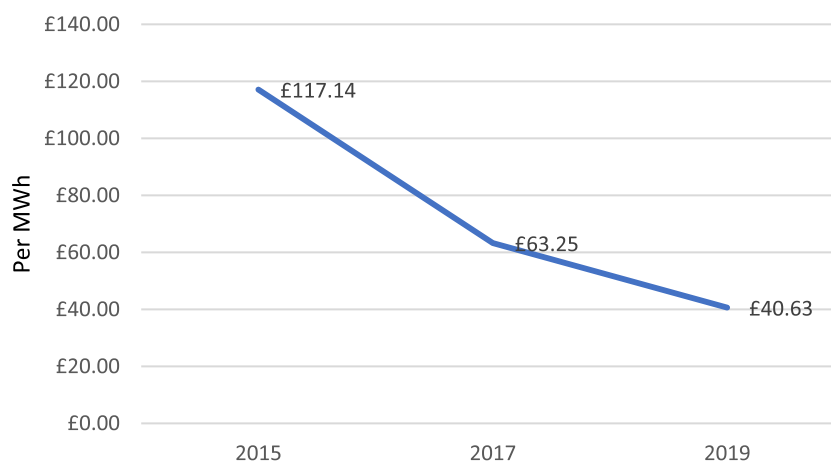
### Industry narratives

This fourth period is characterized by radical price reduction, with the move towards zero subsidy providing OFW with worldwide legitimation. Following the international breakthrough of the Borssele 1 and 2 projects in the Netherlands, subsidy prices fell sharply in both Germany and the UK, with decreases of 54% in 2015–18 and 65% in 2015–19, respectively (Figures 1 and 2). The 2017 auctions in Germany involved subsidy-free bids, although the costs of grid connection are born by the state, unlike the UK. According to *Bundesnetzagentur* president Jochen Homann, ‘the [German] auction has unlocked medium and long-term cost reduction potential, which will lead to a reduction in funding to an extent that had not been expected’ (Homann, 2017). However, the shift from fixed tariffs to competitive auctions has generated uncertainty for developers, with the subsequent



**Figure 1.** Awarded project prices, Germany.

Note: Average awarded project prices per allocation round. Sources: BEIS (2017, 2019); DECC (2015).



**Figure 2.** Awarded project prices, UK.

Note: Average awarded project prices per allocation round. Sources: FuturEnergy (2017); Morris (2015); WindEurope (2018).

reduction in the volume of new installations in Germany prompting the industry to call for clear political signals to address this ‘expansion gap’ (Offshore Wind Energy Foundation, 2020). From an overall legitimation perspective, the achievement of subsidy price reduction and the broader narrative of cost reduction has discredited the unaffordability and reducing economic value counter-narratives. This represents an important step towards the international normalization and socio-political acceptance of OFW as a central component of the future energy mix, in contrast to the recurring political controversies affecting onshore wind (Kedzierski, 2019).

### Actors and institutions

A convergence of national market support arrangements towards centralized auction regimes has taken place between European Union (EU) member states (Fitch-Roy, 2016). This model was initiated by Denmark, followed by the Netherlands, the UK and Germany, bringing national institutional arrangements in line with EU state aid guidelines.

Competitive bidding has stimulated subsidy price reduction, alongside the growing maturity of the OFW sector, fostering technological innovation, economies of scale and standardization in line with life cycle models. Yet, the dramatic price reduction of recent years has outstripped the decrease in underlying costs with the levelled cost of energy for OFW falling by 32% between 2014 and 2018 (International Renewable Energy Agency (IRENA), 2019). This accelerated price reduction seems to reflect leading developers’ drive to expand market share in a rapidly growing electricity generation sector (Afewerki, 2019; OFW supplier, author’s interviews, April 2019).

As we have argued, value-creation narratives create expectations of large-scale employment growth and investment. Overall OFW employment was 23,000 in Germany in 2018 and 7200 in the UK in 2017 (HM Government, 2019; Statista, 2019), reflecting the strength of the manufacturing value chain in Germany. OFW employs approximately 1600 in the much smaller economy

of Norway, where it is limited to exports to European markets and small-scale domestic demonstration projects. In the UK, the inflated job numbers of 2008–11 have given way to more realistic future employment projections (HM Government, 2019), alongside the reporting of performance against the 50% domestic content aspiration. Overall UK content reached 48% in 2017, but was much higher for development (73%) and operational (75%) activities than for capital expenditure (29%), which covers manufacturing and equipment (RenewableUK, 2017).

Falling oil prices and a surge in European OFW market growth from 2016 led to renewed support for OFW in Norway. Attracted by favourable subsidy arrangements, Equinor installed the Hywind floating OFW farm (pilot) in Scotland in 2017 (Afewerki et al., 2019). Subsequently, Equinor started to develop the first full-scale floating project to supply two Norwegian O&G installations, supported by substantial funding from a Norwegian government body. Demonstrating the increasingly broad-based legitimation of the industry, OFW started being actively promoted by industry networks and trade unions, often in unison with environmental organizations. The main narratives these groups articulate are combating climate change (especially powering O&G platforms with OFW) and creating value through industrial development and diversification.

### Regional growth paths

The shift towards zero subsidy facilitates OFW market expansion by reducing support costs for governments and consumers, encouraging regional growth strategies. Yet, while the development of new OFW farms provides further opportunities for adjacent coastal regions to provide services such as O&M, industry maturity and consolidation makes it more difficult for regions to break into the manufacturing value chain compared with earlier periods.

After a period of stagnation, Cuxhaven turned into a leading OFW port and hub for turbine provision with the opening of Siemens Gamesa's nacelle plant in 2018 (Evans, 2020). Referring to the Norddeich O&M port, one respondent described the OFW industry as a 'tremendous job engine in an economically weak region' (developer representative, author's interviews, January 2019). Recently, latecomer regions in eastern Germany have attracted investment as OFW expands in the Baltic Sea. In the UK, the Humber region has further consolidated its position, while proximity to new OFW farms is spurring growth in Scotland and the latecomer region of East Anglia.

## CONCLUSIONS

This paper has shown how legitimacy for emerging industries is built up over time and across space, providing a comparative analysis across spatial contexts (Markard et al., 2016). The principal finding is that OFW technology has gained legitimacy over time. This reflects the ability of powerful government and industry actors to craft

narratives that aligned OFW with the pressing energy policy agendas of decarbonization, energy security and economic competitiveness (Raven et al., 2016). The legitimation of OFW was subject to an intense framing struggle in the 2012–15 period as rising energy bills and austerity created a severe legitimation challenge. Industry and government actors responded by developing a concerted cost reduction narrative that addressed the unaffordability and reducing economic value counter-narratives. While the climate change and energy security narratives provide an underlying basis of legitimacy, cost reduction has made a crucial additional contribution to the legitimation of OFW. As such, this paper adds novel insights to the literature on legitimation by demonstrating the importance of path advocates' ability to adapt and reframe narratives in response to legitimacy jolts and challenges (Garud et al., 2014) which can strengthen the counter-narratives of opponents.

In addressing the question of how legitimation differs across space, the paper has outlined the basis of an economic geography of legitimation. This provides a fuller understanding of the legitimation of emerging industries by relating it to multi-scalar institutions, industry evolution and regional growth paths. The concern with multi-scalar institutions highlights the differences between Germany's 'compound' CME, the UK's 'singular' LME and Norway's 'singular' CME (Schmidt, 2005). Greater political consensus on RETs has been evident in Germany, providing more comprehensive and stable support (Četković & Buzogány, 2016), although the current 'expansion gap' is attributed to a lack of political ambition and clarity (Offshore Wind Energy Foundation, 2020). Government policy has been more unstable in the UK, reflecting the neoliberal paradigm and political controversy over subsidies (Kern et al., 2014b). Yet, OFW enjoys a privileged position in the UK's renewable energy mix, supported by powerful industry and state actors, abundant OFW resources and the curtailment of onshore wind subsidies. State support for OFW has been more limited in Norway, based on self-sufficiency in hydropower. The main form of OFW legitimation is as a diversification opportunity for the petro-maritime sector, addressing the challenge of 'life after oil' (Steen & Hansen, 2018). National institutional frameworks have shaped how key actors have responded to country-specific legitimation challenges as illustrated by the German 'acceleration initiative' and UK domestic content policy. Such cooperation is based on an underlying pattern of industry-government coordination in Germany's CME, while the UK's rapid prioritization of domestic content from 2013 demonstrates its capacity for 'policy learning and strategic adjustment' as an LME (Četković & Buzogány, 2016, p. 649).

An important contribution of the paper concerns its identification of regional and national value creation as a key source of legitimacy, providing demonstrable material benefits in terms of green employment and investment (Hansen & Coenen, 2015), in addition to expectations of future jobs. Here, path creation is bound up with the

broader process of industry evolution as particular countries and regions become specialized in particular types of activities, but may be challenged, at different times, by national and regional downturns in OFW development and the emergence of 'latecomer' regions. More specifically, this paper has argued that OFW's tendency to create employment in peripheral and maritime regions, which often lack alternative sources of growth and investment, enhances its legitimacy.

Distinct forms of regional and national path creation are apparent, reflecting the influence of national institutional frameworks. First, path creation in Germany has occurred largely through indigenous development and diversification from existing industry, compared with a reliance on external investment and imported equipment in the UK (MacKinnon et al., 2019b). In Norway, the promotion of OFW as a diversification opportunity for the petro-maritime sector is aimed at the renewal of existing regional paths as well as the potential creation of new ones (Steen & Hansen, 2018). Second, regional political actors in the 'compound' CME of Germany have more powers to support OFW compared with the UK's and Norway's 'singular' economies, as demonstrated by the extensive industrial and infrastructural initiatives undertaken by regional and municipal governments in Germany (Evans, 2020).

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