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Introducing the lens of markets-in-the-making to transition studies: The case of the Danish wind power market agencement

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ABSTRACT

This paper contributes to a renewed understanding of markets in transition studies by focusing on how unknown things must be 'framed' and pacified in order to be attributed some 'value' that makes them 'matter'. We empirically analyze the making of a market agencement for wind power deployment in Denmark. Using an analytical framework of framing and pacifying, we trace three entangled 'domains of action' associated with the employment of (a) sociopolitical devices to enable the discursive valuation of wind power, (b) economic devices to develop price-setting models for investors, and (c) technical devices to facilitate grid integration, thereby framing wind power as socio-politically, economically, and techno-scientifically 'valuable', respectively. This market agencement has consistently produced concerns (i.e., overflows) requiring constant re-framing. We discuss how the lens of markets-in-the-making can contribute to transition studies. By showing how the domains of action entangle and 'overflow' onto each other, this study demonstrates that the relational lens of socio-technical agencements can help shed additional light on the dynamics and agency of markets in transition.

1. Introduction: framing and re-framing Denmark's wind power market

This paper introduces the markets-in-the-making lens (Callon, 1998, 2021; Çalışkan and Callon, 2009, 2010) to renew the understanding of markets in transition studies. We apply this lens to the historical case of wind power deployment in Denmark, which has had a turbulent history, but which over time has 'succeeded' in several ways. For over 40 years, the market for wind power in Denmark has been in a state of constant transformation to enable consistent investments in infrastructure, from kilowatt-size (kW) to ever bigger Megawatt-size (MW) wind turbines. Denmark set a world record when wind power supplied 47% of the country's total electricity demand in 2019. World-leading wind turbine manufacturers Vestas Wind Systems and Siemens-Gamesa Renewable Energy are located in Denmark, as are Oersted, a renewable energy-focused utility company, and Copenhagen Infrastructure Partners, which enables offshore development and large-scale financing for Gigawatt-size (GW) offshore wind farms.

With its long history, wind power is already a subject that has been well-studied by transition scholars as a successful first-phase transition pathway (Markard, 2018), including exploration of the critical role of subsidies in launching and supporting the wind turbine industry and wind power technology (Jacobsson and Bergek, 2004). Despite the merits of such studies, the issue of how markets are made—constituting continuous 'works in progress' as they produce contestation and require iterative stabilization—has

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not been sufficiently addressed in transition studies. Growing from a combination of social construction of technology and quasi-evolutionary theory (Schot and Geels, 2008), transition scholars have emphasized the importance of users in the adoption of innovations, market phases, and scaling (Dewald and Truffer, 2012) in studies of markets. In addition, the spatial ontology of the multi-level perspective, which is based on a hierarchy of landscape, regime, and niche (Geels, 2004; Geels and Schot, 2007), has treated markets as socially embedded in an exogenous institutional and social context of the socio-technical landscape (Geels and Schot, 2007: 401). Transitions are considered 'manageable' and 'governable', with little recognition of the contestation they may produce (Labussière and Nadaï, 2018).

In contrast, the markets-in-the-making lens proposed in this paper focuses on how an initially unknown (i.e., unqualified) object becomes qualified and valued as a '[market] good' for economic exchange, and addresses how the knowledge used to qualify existing market goods becomes stabilized or contested. The question of how objects like fossil fuels, wind turbines, or hybrid electric vehicles become goods for exchange is typically black-boxed in economics. In economics, the analytical focus is on price-setting based on the intersecting axes of supply and demand, and how competitive markets with rational actors lead to efficient resource allocation outcomes for society. Even if externalities are recognized in economics, markets are treated in highly abstract ways where goods, actors, and contexts often are seen as pre-existing. In contrast, the details of how different actors make, contest, and transform markets for specific goods lie at the heart of the lens of markets-in-the-making (Çalışkan and Callon, 2009, 2010).

The markets-in-the-making approach turns economic thinking upside down, and starts with the premise that acquiring the knowledge to frame a good is difficult and costly. Yet, due to uncertainties, the framing of the good itself or the context is not predictable. Framing and overflowing are central concepts associated with the lens of markets-in-the-making, as framing makes stable and predictable worlds for goods. The stable framing of a good can, for instance, create trust in expiration dates for food items, or contractual certainties regarding future deliveries of natural gas or biomass. However, such framings are fragile and may require reframing due to overflowing (Callon, 1998). Overflowing is the sociological term for creating externalities. However, in economics, externalities typically are treated as exceptions, whereas overflows (i.e., effects of economic activity not accounted for) are regarded as the norm.

By starting with the unknown object to be qualified and framed as an exchangeable good, markets-in-the-making studies help to trace the histories of knowledge used to define and frame goods such as 'fossil fuels before and after carbon emissions', 'organic milk', and 'fair trade' coffee. However, the exchange of goods also requires complementary infrastructures to circulate goods where consumers can access them. For example, consumer goods require supermarkets (Cochoi, 2007), wind power requires access to the electricity grid, and a fossil fuel-based car requires an infrastructure for fuel. Besides complementary infrastructures, market framings also work through various regulations such as property rights, labor market rules, and environmental standards. In this way, a markets-in-the-making lens makes it analytically visible that market frames for specific goods are outcomes of concrete happenings produced by creative actors, and such arrangements only exist as long as the relations between these heterogeneous elements are stabilized.

We argue that the markets-in-the-making lens from Science & Technology Studies (STS) can be helpful in understanding whether market goods become contested or stabilized. In particular, the lens can help shed light on the *dynamics* and *agency* of market-making by not treating actors and context as analytically separated. First, it can shed additional light on market dynamics by inquiring into processes that stabilize relations between heterogeneous but entangled 'domains of action', such as regulatory (institutional) frameworks, climate discourses, ownership structures, turbine design, economic price-setting models and grid infrastructures, which would conventionally be treated as distinct domains (or levels). Second, the underlying systems approach and the outsider's ontology in transition studies 'takes as its unit of analysis the overall trajectories, paths, phases, or stages in the development of an innovation' (Geels et al., 2016: 897). This comes with the price of limited attention to *agency*. Indeed, the very conceptualization of 'endogenous enactments of actors and institutions' (ibid.) maintains a distinction between local and global, and thus does not overcome the micro-macro or actor-institution dichotomy of an embeddedness lens.

The risk of overlooking market dynamics and agency is articulated in the call for papers for the Special Issue in Environmental Innovation and Societal Transitions, as limited attention has been paid to the 'roles of actors, the interplay between markets, and the process character of market formation' (Boon et al., 2020). Transition scholars (Geels et al., 2016; Geels, 2020) have called for more focus on agency through an insider's ontology.

Our interest in how actors and devices are organized in attempts to frame and pacify objects to transform them into economic goods informed our research question: *How was wind power in Denmark pacified through dynamics of framing and reframing?* Specifically, we studied three domains of action where market devices framed and temporarily pacified wind power: (a) the socio-political domain, where discursive devices enabled the valuation of wind power and coalition-building; (b) the economic domain, where devices framed the price-setting models for wind power investors; and (c) the technical domain, where devices framed wind power's integration into the electricity grid. We also examined consistent concerns stemming from unforeseen effects (overflows) in each domain of action necessitating frame modification and re-framing. Our findings contribute not only to transition studies, but also to market studies.

2. Theory: framing/pacifying wind power for circulation using market devices

The lens of markets-in-the-making follows the normal understanding of markets in economics and economic sociology, which is that markets enable the production, circulation, and exchange of goods. When a good is exchanged between a seller and buyer for monetary compensation, there is a voluntary transfer of some sort of property rights attached to the good (Çalışkan and Callon, 2010: 3). Not assuming the good to preexist, the focus of markets-in-the making is, however, the *construction of socio-technical resources* that enable hitherto unknown objects to become goods. That is, markets for goods have concrete histories that come into being through the deployment of heterogeneous constituents that help qualify the emerging good with value. For example, in his book, *Carbon*

Democracy, Mitchell (2010) studied how the energy intensity of oil made it so salient to economic development in the United States and Western society that policy intervention with shifting allies involving border-making and pipeline infrastructure became central to the security of national energy supplies. This political oil order and societal dependency on oil as a source of energy to sustain growth (Daggett, 2019) is now threatened by climate change. In this way, the becoming of a good is associated with political, regulatory, and infrastructural constituents that help qualify an object as such. In addition, the global oil system requires competencies and skills embodied in oil company actors, the technical devices and metrological systems they use, and the way techno-scientific knowledge informs them (Çalışkan and Callon, 2010). *Re*-qualifying oil with climate science has made the future of oil uncertain. In this way, goods and markets are constituted through heterogeneous constituents, as demonstrated in a wide range of contexts ranging from a 'neoliberal' market (Miller and Rose, 2008) to a market for clean technologies (Doganova and Karnøe, 2015).

Markets-in-the-making uses the concept of *socio-technical market agencements* to address the dynamics of action. The concept of market *agencement* combines 'arrangement' and 'agency' in order to avoid the social science dualism that draws contrasts between individual and structural dynamics (e.g., micro/macro dichotomies). Market agencements treat agency (i.e., the capacity to act) as distributed, involving human, material, and technical elements (Callon et al., 2007: 3). Distributed action means that people need tools and devices to work, and calculators to calculate (Callon and Muniesa, 2005): carpenters use hammers, saws and nails; IT specialists use computers and software; experts use books; engineers use measurement instruments; and bureaucrats use and produce documents as they engage in policy-making (Miller and Rose, 2008). It is the agencement that brings distributed agencies into existence. For example, private ownership of wind power and solar panels is not naturally occurring in free markets, but requires regulations that enable such ownership (Labussiere and Nadaï, 2018; Kirkegaard et al., 2019). Regulations specify in which forms wind and solar power can come into existence through their relationships to the electricity grid. Hereby, markets are outcomes of devices that are creatively invented by actors. Market devices are endogenously made, modified, and maintained by the same work in *socio-technical market agencements* that give rise to them. Yet at the same time, market devices may simplify or complicate the dynamics of agency, as consequences of using the devices may be unpredictable. Incomplete knowledge and uncertainty are the rules of the game, shaping the dynamics of socio-technical agencements.

The lens of markets as socio-technical agencements has already been applied to inquire into markets in an energy (transition) context (Labussieère and Nadaï, 2018; Mitchell, 2011; Silvast, 2017), including wind power (e.g., Pallesen 2013; Kirkegaard et al. 2019; Kirkegaard 2015; Kirkegaard and Çalışkan 2018; Jenle, 2015). These studies have helped shed light on how the successes (or failures) of market agencements are critical components in the history of all energy technologies, including fossil fuels (Mitchell, 2011), nuclear power (Hecht, 2009), solar power (Coïnte, 2017), and energy security (Jenle and Pallesen, 2017; Pallesen and Jacobsen, 2021).

2.1. Studying framing-as-pacification through market devices

A critical focal point of market making (Çalışkan and Callon, 2010: 3) is how the qualification of an emerging good must be pacified. This means that objects must be framed as having some stable characteristics (e.g., property rights, environmental or climate-related attributes) for actors to be able to value them. The term 'qualities' refers to the multiple economic and non-economic parameters/attributes that can be used to know objects (Callon, 1998, 2002; Çalışkan and Callon, 2009, 2010). This is a radical analytical move because it means that the valuation of an object is the result of action, the work of agencies, and something that is happening to hitherto unknown objects. The 'economy of qualities' 'refuse(s) to ascribe a pre-established status to things, even if the status itself is considered to be multiple' (Çalışkan and Callon, 2009: 388). Thus, things and objects can be qualified—or 'framed' (Callon, 1998)—in multiple ways, and there is a relation between 'qualification' and 'valuation', because known and accepted qualities are used to value an object, as was the case for fossil fuels before and after knowledge about the effects of carbon emissions surfaced.

A successful framing of a good enables it to come into existence by ensuring that its qualities used in valuations 'evolve predictably'. In this way, 'passive goods create an environment whose stability favours organized action and establishes the possibility of entering into cooperative or competitive relationships of exchange' (Çalışkan and Callon, 2010: 5). Stability in a market agencement favors 'organized action', including the capacity of skilled actors to evaluate and calculate the value of goods to consumers, producers, and investors. Without pacifying an object as a good through some stable framing, the uncertainty would be too great. The key question thus centres around *how and through what means economic goods are framed.* This makes the deployment of market devices—in processes of market devising (Geiger and Gross 2018: 1357)—a central part of the analysis. Market devices can be both material and discursive in the ways that they contribute to the construction of markets for particular goods (Muniesa et al., 2007: 2), which means devices produce knowledge or technical equipment that make phenomena visible and actionable in particular ways (Iuel-Stissing et al., 2020). When market devices change, they shift ways of knowing-valuing and may re-(de)vise the market agencement (Geiger and Gross 2018), changing identities and the concerns of agencies.

2.2. Overflowing concerns

Market agencements may frame goods in multiple, variable, and contradictory ways, and being constantly in the making, the framings that make stable worlds for goods are fragile and may be re-framed due to *overflowing* (Callon, 1998). Overflows is the sociological term for externalities, which are effects of economic activity not accounted for. Whereas in economics, externalities often are treated as the exception, the markets-in-the-making approach turns this upside down and starts with the premise that framing is difficult and costly and requires work of many actors. That is, framings are incomplete. and 'a framing is its own inescapable source of the threat of overflows … Overflows mark the emergence of a frame's shortcomings' (Çalışkan and Callon, 2010: 8). For example,

cigarettes are framed as pacified, but negative health effects of smoking 'leak out of the frame', thereby making it fragile. Market frames are thus negotiated and relationally interactive, as they are marked by 'evolving intricacies of agency' (Muniesa et al., 2007: 3), rendering the sources and effects of action uncertain, with the potentiality of contestation or politicization of the existing framing of a market agencement (Callon, 2008). For example, the knowledge of carbon emissions has only slowly been able to transform the market frame for fossil fuels in most countries, and not even reports from the International Monetary Fund on massive subsidies to fossil fuels at COP26 could build a coalition to eliminate such subsidies.

Fossil fuels illustrate how market framings of goods have particular histories characterized by more or less fragility, which in turn can be traced to market devices invented by actors seeking to make and stabilize markets or to disrupt and disturb existing markets. In this paper, we study market dynamics by zooming in on three 'domains of action' involved in pacifying the framing of wind power in Denmark as a market good (Çalışkan and Callon, 2010: 5): (a) sociopolitical devices used in the discursive valuation of wind power and the establishment of coalitions, (b) economic devices used to develop price-setting models for wind power investors, and (c) technical devices used to integrate wind power into the grid.

3. Methodology: three domains of action in the framing/pacifying of wind power

3.1. Research methods

To study the long history of wind power market in Denmark, we used both document analysis (Asdal and Reinertsen, 2022) and first-hand data from questionnaires and interviews from different points in time. Conducting a case study of Danish wind power deployment enabled us to trace complex processes of market-making at specific sites, as case study design helps us to investigate the intricate practices that constitute markets (Eisenhardt and Graebner 2007; Nenonen et al., 2019; Ottosson et al. 2019). The selection of Danish wind power comes from its highly turbulent but also 'successful' trajectory, as it initially encountered heavy resistance from various incumbents, but today has become a dominant renewable energy source.

The large number of actors, devices, and framing-overflowing-reframing processes necessitated data collection from various sources, including primary and secondary data, but also tertiary data such as wind statistics, auction bids, policy documents, and company data. For the primary data, the first two authors conducted semi-structured interviews in Denmark with regulators (the Danish Energy Agency), research institutions (Technical University of Denmark [DTU] Wind Energy, the former Risø National Laboratory for Renewable Energy), wind farm developers (including local cooperatives and private small- and utility-scale developers), a transmission system operator (TSO), wind turbine manufacturers and component suppliers, non-governmental organizations (NGOs), grassroots organizations, and municipal planners. More than 50 interviews were conducted in Denmark in the periods 1987–1990, 2010, 2015–2016, and 2020 to cover the shifting agencies of the market agencement. When consent was given, interviews were generally audio-recorded and transcribed. Interviews were conducted in Danish and English and transcribed. Although we have anonymized the identities of interviewees, we do attribute quotes to specific types of actors. To condense the more than 40-yearlong study, we have only selected a few interview quotes, aiming not to betray our data narratives about phenomena or render specific data and individual observations invisible. To do so, the primary data were triangulated with both qualitative and quantitative secondary data such as Danish policies and climate action plans, academic and industrial journal articles (*Naturlig Energi, Infomedia, Ingeniøren*), scientific papers on wind energy, consultancy reports, and press releases extending from the industry's emergence in the 1970s and 1980s until 2021. This has been possible given the first two authors' approximately 30 years of combined and accumulated research in the field.

3.2. Data analysis: three domains of action of (re)devicing the market

In this paper, we study the framing-pacifying dynamics of wind power. We trace how framings, which are co-produced by market devices, have continuously overflowed, potentially leading to re-framing. We performed data analysis in three phases, allowing for the abductive emergence of the three domains of action. First, we identified key market devices used by different actors to shed light on *framing* processes. This enabled us to categorize three different types of market devices:

- Inscription devices that enabled the discursive valuation of wind power;
- Economic devices used to develop price-setting models; and
- Technical devices used to integrate wind power into the electricity grid.

Second, we traced how these devices framed wind power in different ways—namely, as socio-politically, economically, and technologically 'valuable'. Based on this, and drawing on the theory of market agencements, we developed the analytical framework of three entangled 'domains of action' involved in the framing and pacifying of wind power. Third, we detected how overflows led to an analysis of re-framing dynamics through the constant re-design of market devices. Hereby, we treated the deployment of market devices as an active process of 'devicing' the market, which produces certain agencies within domains of action. Given the extensive account, however, our analysis does not follow each and every device as detailed in many market studies. That is, rather than detailing how one single device pacified wind power, we trace how certain devices became dominant over time while others were marginalized.

4. Results: framing/pacifying and re-framing dynamics in Denmark's wind power market

The Danish wind power market agencement came into existence through multiple initially disconnected agencies and is not the result of foresighted strategic planning by policy makers, grassroots actors, or entrepreneurs as single factor explanations. Wind power was created through the activation of multiple distributed agencies that gradually became entangled and reinforced each other over time. These agencies were co-produced via market devices such as texts, calculations, price-setting and technical experiments that articulated wind power as a potential future energy source (Nielsen, 2001; Karnøe and Garud, 2012, Karnøe and Jensen, 2016, Mortensen, 2018). Over time, technologies, discourses, competences, science, policy regulations, and stakeholder interests underwent a series of transformations.

4.1. Domain of action 1: framing wind power as socio-politically valuable

Domain of Action 1 entails processes of qualifying an unknown object, 'wind power', using discursive market devices. Discourses are not purely cognitive, but often build upon representations that are materially anchored in inscriptions (e.g., in texts and reports) and based on expertise, specific models, and calculative instruments (Latour, 1999). Discursive market devices can affect the mobilization of socio-political coalitions or advocacy groups for/against a good.

In the 1970s and 1980s, wind power faced the challenge of two well-established framings that qualified fossil fuels and nuclear power as preferred energy resources for society. To emerge as a potential renewable energy source in Denmark, wind power needed to be qualified as a relevant and valuable alternative not only to fossil fuels, on which Denmark was dependent, but also to nuclear power. As part of the U.S. Atoms for Peace program, Denmark had been funding nuclear power research since 1955 (Garud et al., 2010), and in 1973, before the first energy crisis, Denmark had created a highly reliable fossil fuel supply. Imported oil comprised 95% of this supply, and provided both electricity and heating to homes, industry, and the public sector (Rüdiger, 2011: 43). In this centralized power system based on coal-fired power plants, the largest challenge seemed to be when and how Denmark would be able to add nuclear power to the system.

In the 1970s, the network promoting nuclear power included political parties across the political spectrum, science, industry, media, and labor unions. These actors promoted and framed nuclear power through discursive devices, i.e. reports describing and performing nuclear power as a) the 'future energy source' which could ensure abundant energy, and b) Denmark's industrial upgrading to produce advanced components for nuclear power (Nielsen et al., 1998). Meanwhile, new reports addressing risks associated with nuclear power began to weaken the frame, and the nuclear coalition of actors such as the Social Democrats and Socialist People's Party began to dissipate. In this context of multiple competing framings of energy sources, renewable energy was brought to the forefront of political concern and debate in Denmark (Jamison and Læssøe, 1990: 90, from van Est, 1999: 70) where 'an environment of many interested actors was engaged, with a lot of diverse agendas' (Interview [INT], Wind Turbine Owners' Association).

The market agencement for renewable energy was associated with co-production of agencies and discursive devices, such as reports published by the prestigious Academy of Technical Sciences (ATV, 1975, 1976), that used calculations and graphs to mobilize the potential of renewable energy and performed the 'alternative energy discourse'. In addition, several scientists drafted an *Alternative Energy Plan* (1976) (Sørensen et al., 1976), which also demonstrated an alternative vision of a future energy system. These discursive market devices fostered imaginaries and framed wind power as a contribution to clean and renewable energy (Nielsen Hvidtfelt, 2001; Kim and Jasanoff, 2009). However, in the context of high unemployment in the late 1970s, wind power was also discursively framed as a source of job creation, industrial development and energy security/independence: 'a lot of the carpenters that worked in the field of wind power were not particularly "green", but they did not want the oil sheiks to decide our energy supply' (INT, Wind Turbine Owners' Association).

Socio-political agencies included local community members, often linked to Denmark's historical cooperative movement of folk high schools, who invested collectively in wind turbines. By the end of the 1980s and early 1990s, wind power had become constituted as a Danish strategic industrial cluster, with high exports as key policy objectives for climate policy (Karnøe, 1991; Garud and Karnøe, 2003; Karnøe and Garud, 2012). Furthermore, while opponents had argued that small-scale wind power was too insignificant to meaningfully impact energy production, the California wind power bonanza during the 1990s provided the argument the red-green political coalition needed to save wind power (Mortensen, 2018).

The push for wind power was further strengthened in 1985 through a ground-breaking agreement between the then red-green majority in the Danish government and the Danish Association of Electric Utilities to install 100 MW of wind power before 1990. Yet, it was only by the early 1990s that a more climate-focused and 'green' policy discourse emerged. A critical device here was the ambitious and influential Energi2000 (1990) report, which, following the Brundtland (1987) report, presented calculations that demonstrated how Denmark would be able to reduce Danish CO_2 emissions by 2005 by shifting from coal, biomass, and natural gas to wind power: 'The overall goal for the national action program is to create the foundation for a 20% reduction of the Danish CO_2 emissions [by 2005]' (Energi2000: 13).

The path to framing wind power as worthy of public investment also involved market devices that could quantify wind's energy potential. The first European Wind Atlas was published in 1989 by the Danish National Laboratory for Renewable Energy, Risø (today, DTU Wind and Energy Systems). Based on a broad mapping of wind speeds 50 m above ground and knowledge of local terrain characteristics, it was possible early on to calculate the estimated energy production (Hvidtfelt-Nielsen, 2001; Kirkegaard and Nyborg, 2021). By transforming 'wind speed' into calculable energy production and potential revenues, the Wind Atlas helped to incentivize wind power development from the perspective of both the Danish state and private investors. The journal *WindPower Monthly (Naturlig*

Energi), first published in 1980, also functioned as a market device, publishing fact sheets documenting the diverse failures and production of each wind turbine in Denmark (Karnøe, 1991). Together, the Wind Atlas and *Naturlig Energi* helped to solidify the framing of wind power as a viable object of investment in socio-political (and economic) terms.

Framing wind power as a valuable public and private investment object was contested and overflowed numerous times, requiring the constant re-framing of the initial framing. Denmark's liberal democracy has involved shifting governments with very different and often contested socio-political valuations of wind power. In general, right-wing political parties have opposed wind power policies, whereas red-green coalitions have created, updated and maintained the policy governance for wind power. For instance, during the 1980s there was a right-wing minority government, but the red-green political coalition was nevertheless able to get majority support for the regulatory governance of wind power. The 1990s began with second mandate for electrical utilities to install 100 MW of wind power, but a return to a center-right wing government (1991–1993) almost stopped wind power development as actors contested the framing by pointing to high subsidies and noise, as well as esthetic concerns for neighbours to wind power infrastructure. With lucky timing from the perspective of those who supported wind power, the right-wing government could not maintain this attempt to dismantle the frame, as they lost power due to a scandal, and a red-green coalition returned as the majority government in 1994. This paved the way for a pro-climate framing of wind power also labelled the 'Auken regime' after Svend Auken, who was a social democratic Minister of Energy and Environment. Denmark made commitments to address climate change at the first UN meeting in Rio in 1992 and the 1995 UN Climate Convention. In so doing, the climate discourse anchored in the *Energi 2000* (1990) plan was re-mobilized, qualifying wind power development and CO_2-reductions with industrial policy cluster effects (*Energi '21*) (Karnøe and Jensen, 2016). In 1998, Auken made it mandatory for Danish Electric Utilities to supplement the 200 MW of onshore wind power capacity to be built by 1999 with 750 MW of offshore wind power capacity by 2005 (Pedersen and Thornbjerg 2014:112). In 2001, the center-right government returned to power. Strongly against 'subsidizing' wind power in the fight against climate change, they mobilized economic reports about 'subsidies and market distortion' to contest the existing wind power market agencement. After the return to a red-green coalition government in 2012, the discourse again shifted from a negative to a positive framing of wind power, as inscribed in the Energy Act (2012), which specified that by the year 2020, 50% of electricity should be generated by wind power, and that Denmark should be CO_2-neutral by 2050. A representative of a former utility said that with this plan, 'we saw an opportunity in engaging with new areas, and here wind energy came up as an attractive [investment object/asset]' (INT, Developer 1).

While CO_2-reductions became increasingly important qualifications, the discursive market devices still included industrial cluster effects: 'The initiatives in the agreement generate green growth until 2020 and take the competitiveness of [wind power] businesses into account' (Ministry of Climate/KEBMIN 2012: 1). However, this framing again shifted with the center-right government in 2015–2019, which pointed to wind power subsidies as a burden (i.e., overflow), as they advocated for 'green realism'. Here, calculations in reports showed that wind power deployment had grown so much that subsidies had increased to 3–4 billion kroner (DKK)/year from 2013 to 2018. Right-wing policymakers and the media thus were able to frame wind power as a burden in the form of extra costs added to consumers' electricity bills (despite both biomass and natural gas receiving subsidies, and a low CO_2 price). This time, however, the reframing of green realism was critiqued by many industry actors, such as the Association of Danish Energy and the Confederation of Danish Industry. These stakeholders, who were formerly against wind power, now stated that Denmark would lose industrial leadership positions associated with the transition to the green economy (Saietz, 2015). In 2021, a new red-green Danish government passed a new Energy Act depicting the construction of two 'energy islands' that could host from 3 GW to 10 GW of wind power capacity. With this 'Mars mission' for Denmark's green transition (Aalborg University and DTU, 2021), the energy islands helped to construe wind power as critical infrastructure to support a below-zero carbon energy system.

Overall, since the 1980s the agencement that framed/pacified wind power as a preferred energy source worthy of socio-political support was contested politically by opposing stakeholders. Meanwhile, even if wind power became a preferred energy source, the 'social acceptability' of wind power was increasingly contested: as wind power development has shifted from small-scale wind turbines to large-scale MW deployment, the financial stakes have increased, marginalizing local community wind farm cooperatives as co-investors. This caused new overflows from local opposition since the 2000s (Kirkegaard et al., 2019), as evidenced, for example, in the National Organization Against Giant Turbines. One of the things that sets the Danish wind power agencement apart from other countries is the 'history of the cooperative movement … People from abroad do not get it because they do not have this tradition of doing something yourself … there, you'd expect others to take charge of it, such as the energy companies, the politicians' (INT, Wind Turbine Owners' Association).

To re-frame the wind power market to include local community concerns, different means have been employed since the late 2000s, particularly with the introduction of four 'social acceptance' schemes in the Renewable Energy Act (2009–2018), which included, amongst other things, a co-ownership scheme obligating wind farm developers to offer members of local communities (within 4.5 km) to buy shares in onshore wind farms equal to a minimum of 20% of the capital value (Retsinformation.dk; Kirkegaard et al., 2019).

In summary, in Domain of Action 1, wind power was gradually framed and pacified through a socio-political discourse that was materially anchored in inscriptions from various policy, scientific and industry documents, coupled with scientific metrics and maps of wind power resources. This happened in competition with coalitions of actors who sought to destabilize the framing by pointing to qualities such as 'subsidy burden', 'market distortion', and 'noise and visual pollution'. However, the socio-political coalition supporting the framing of wind power as a preferred energy source was able to come back despite these contestations. This ability to maintain the socio-political framing/pacifying of wind power as a preferred, valuable energy resource paved the way for subsidies that enabled private investment (see Section 4.2).

4.2. Domain of action 2: framing wind power as economically valuable for investors

In Domain of Action 2, we focus on qualifying wind power as an 'economically' valuable market for investors. To mobilize a market agencement for investing in wind power, price-setting models such as subsidies in the form of feed-in-tariffs (FIT) were instrumental. These instruments helped to economize wind power by enabling actors to calculate a potential return on investment (ROI).

Since the late 1970s, the price-setting models used to incentivize investments in Danish wind power have combined investment subsidies and electricity pricing schemes. The economic models have constructed a peculiar economic structure for wind power that has been modified over the years. In 1976, the first element of the FIT price-setting model was introduced, as electrical utilities were politically mandated to pay a low price per kWh for wind power in the grid (Hvelplund, 2013: 7; Meyer, 2000; Karnøe and Jensen, 2016). In 1979, an investment subsidy scheme was introduced by the Minister of Housing, constituting what has been framed as a 'ground-breaking' policy innovation: 'the 30% subsidy was not meant to support basic development work', but instead focussed on 'creating production opportunities for the Danish industry in such a way that series production could be achieved' (van Est, 1999: 79). The combined effects of a price-setting model for produced kWh of wind energy and a direct investment subsidy resulted in a domestic market that mobilized both wind farm cooperatives and an emerging Danish wind power industry. Indeed, the early installations of wind turbines in 1980 and 1981 paved the way for industrial learning effects that in turn sparked the California wind power 'bonanza' from 1981 to 1985 that enabled Denmark to establish dominance in the wind power market (Karnøe, 1991).

However, the FIT was soon contested by the Ministry of Trade, the media, and the Danish Industry Association, which during the 1980s and 1990s claimed it violated 'free market forces'. The market device of the FIT soon proved overly fragile, involving ongoing re-framing attempts through the 1980s and 1990s as a result of political agreements and public debates (Mortensen, 2018). The FIT was soon critiqued for yielding high profits for the fortunate few who could muster the financial means to invest. The Wind Turbine Owners' Association took an official stance that they did not support subsidies that were too lucrative for investors in order to prevent delegitimization of wind power (INT, Wind Power Pioneer; Tranaes, 2010; Kirkegaard et al., 2020). The fixed investment subsidies for buying turbines were phased out by 1989, with a shift towards a purer FIT-model with economic supplements to the electricity price.

The subsidy concern is an overflow that has long haunted wind power. In particular, the right-wing government used a report from the independent, prestigious Danish Economic Council (Danish Economic Council, 2002; Mortensen, 2018), which compared price-setting models to a theoretical 'textbook' market. In so doing, it concluded that wind power had negative socioeconomic effects due to market distortion. A shift to neoclassical economic expertise and new calculative devices produced new 'realities' of 'what counts and how it counts' (Stark, 2009: p. 5), enabling the discourse against wind power.

The sociopolitical coalition for wind power has increasingly moved to a price-setting device labelled 'market-based' pricing. In 2001, Denmark joined the liberalized Nordpool electricity market, and the Energy Agency replaced the fixed FIT subsidy with price-setting linked to Nordpool market prices, but with a state-guaranteed premium price to attract investment. The first model guaranteed a fixed price for 20 years with a high price for the first 22.000 full-load production hours, and a lower price thereafter. The state only paid a full subsidy if the electricity market price was too low (Kirkegaard et al., 2019; Danish Wind Turbine Owners' Association, n.d.): 'For a long time, politicians have had this idea that it is a very lucrative business, so they would let it be up to the market to steer it, right?' (INT, Developer 2).

The so-called 'contract for difference' model is a competitive bidding auction aligned with EU competition rules, where competition is for the minimum amount of state subsidies investors need on top of the price they get from selling the electricity through Nordpool or private purchase agreements. However, this is seen as a successful re-framing of the subsidy problem, as competition amongst bidders centres around the ability to request the lowest state support/subsidy possible. The gradual detachment of wind power from immediate public support has temporarily de-politicized and pacified the framing of wind power as a viable market good for public investment. Some developers view 'taking it out of the incubator to let it live a commercial, a real commercial life' as a positive thing (INT, Developer 2).

Nevertheless, overflowing continues. With pricing based on fluctuating electricity prices in the Nordpool market and on competitive bidding, investments in wind power have become more uncertain and risky, causing investors to become more cautious (Kirkegaard et al., 2019). According to a representative of a former utility, 'our owners have realized that onshore wind power is a much more risky investment … because here you are dependent on [fluctuating] market prices' (INT, Developer 1).

The higher financial risk has in turn marginalized small-scale actors even further (Kirkegaard et al., 2020). The FIT instrument had helped to incentivize renewable power capacity and generation from local renewable energy sources, whereas competition-based tenders required bidders to have large capital reserves and to be able to withstand the uncertainty and costs of bidding without winning. This caused a contested 'paradigm shift' in the agencement (Kirkegaard et al., 2019): during the late 1980s and early 1990s the domains of action 'fit' together in the sense that relatively small wind turbines of the day (50–250 kW) could financially be handled 'through cooperatives. … Then the turbines got larger and larger, and it became impossible for the cooperatives" (INT, Developer 2).

In Domain of Action 2, the market devices for price-setting that have retained investors and incentivized investments in wind power have been framed, contested and re-framed over the course of 40 years. What is remarkable is that the price-setting models have re-constructed both the peculiar economics of wind power and who can invest in it.

4.3. Domain of action 3: framing wind power as technically qualified through grid integration devices

Domain of Action 3 is structured by market devices that connect wind power to the grid, where electricity circulates as a good. Market agencements are co-constituted by material 'fixtures and furnishings, by elements that allow tracing lines and constituting a territory' across sociopolitical, economic, scientific and technical domains (Muniesa et al., 2007: 3). Connecting wind power to the

centralized electricity system (Hughes, 1983) required both a legal basis for wind turbine operations, as well as technical learning and experimentation.

We follow the technical part of the device for connecting wind power to the grid, as electricity as an alternating current is a 'living material thing' (Bennett, 2010: chp. 2), that only exists in highly sensitive electricity grids at a physically stable frequency (50 or 60 Hertz), known as 'load balance', which is linked to the electromagnetic movement of electrons. Load-balancing requires constant monitoring down to the second. Grids in Denmark cannot function without the transmission system operator (TSO), Energinet.dk, which coordinates all load-affecting entities connected to any given territorial grid. Since the 1960s, the Danish TSO's strategy for ensuring resource adequacy and load-balancing capacity consisted of expanding the Danish grid via transmission lines to Norway and Sweden (later Germany, the Netherlands, etc.). The *Alternative Energy Plan* (1976) thus argued for complementarity between inflexible Danish wind power and flexible Norwegian hydro-power (Sørensen, 1981).

The first legal basis for wind power integration into the grid was established in 1976 in the form of technical guidelines defined by the Danish Electricity Association in response to a political mandate, as utilities were fighting against further wind power integration in the early years. The guidelines made it relatively easy to reach an agreement with the energy company to produce electricity from one's own local turbine. As expressed by a pioneer in Danish power development from the local grassroots, initially, 'there were no problems … but that changed over time as they realized that wind power might destabilize the grid … Back then, they found it interesting because they did not believe it [wind power] would turn in to anything substantial' (INT, Wind Turbine Owners' Association).

Renewable energy advocates and the official energy plan from 1981 projected 10% wind power by 2000, and in 1983, Danish Energy Research and Development (DEFU) expressed concern that the wider use of the 'wind power generation system will be characterized by limited predictability, and frequent and often strong variations' which 'can result in such significant expenses' (DEFU, 1983: 2.a). Production from conventional thermal power plants is highly predictable, and centralized electricity systems were designed to serve the linear principle 'load follows demand' according to daily/seasonal peaks in consumption (Hoogwijk et al., 2006). Connecting wind power to the electricity grid enabled re-use of the grid infrastructure (Hargadon and Douglas, 2001), but power from a wind turbine fluctuates with wind speed and is also an 'asynchronous machine swinging in a synchronous system' (American wind turbine manufacturer, in Kirkegaard, 2019). Thus, attempts by renewable energy advocates to frame/pacify wind power as technically viable were challenged by overflows from conventional power system engineers, who took the physical inflexibilities of large power plants for granted and made the grid hostile territory for wind power (Karnøe, 2013).

Initial framing/pacifying (Silvast and Virtanen, 2019) attempts in Denmark centered around technical innovation in power electronics which enabled wind power to both generate electricity and participate in stabilizing the grid. The first wind turbines from the 1980s featured simple power electronics, which made the risk of destabilizing grid reliability worse. Leading researchers in wind turbine grid integration (Blaabjerg and Ma, 2017) found that 'simple power electronics and fixed rotational speed' meant that shifts in wind speed were directly transformed into mechanical-torque fluctuations, requiring grid frequency to be robust enough to absorb the unidirectional power flow from turbines. Grid integration of wind power required shifts in technical devices such as power electronics and so-called grid codes to frame/pacify wind power as a technologically viable energy source. Because wind power load-balancing must follow wind speed, the resulting fluctuations must be counterbalanced by new technical devices.

According to Blaabjerg and Ma (2017), since 2000, modern MW wind turbines have featured advanced power converter electronics and fully variable rotor speed, enabling wind speed fluctuations to be smoothly converted into mechanical torque and electrical power, and ensuring more efficient turbine operation over a range of wind speeds. This has increased electricity production and revenue at given wind speeds. Moreover, the national and European TSOs specify network codes for operation, markets, and grid connection that enable load balancing through the technical configuration of conventional power plants, solar power, and wind turbines. By functioning as industry standards, the grid codes help ensure the circulation and exchange of wind power (Kirkegaard, 2019). Over time, both power electronics and grid codes have been transformed to accommodate wind power in the grid. Recently, a new blurred boundary between wind turbines and the grid has allowed the TSO to manage power control functions (i.e., 'power inertia', 'power reserve', and 'power quality') inside turbines (Blaabjerg and Ma, 2017).

In the late 1990s, when wind power reached 8% share of Danish electricity generation, a new overflow became known as 'critical excess electricity'. This new term, which was introduced in a report from the Danish Energy Agency (2001), described situations involving high wind power production where the electrical load cannot be consumed within a given area, and where export is the only option to avoid critical system failure. This became also known as 'free excess electricity' and was used by many stakeholders to contest the framing of wind power. However, the physical problem of 'excess electricity' disappeared in 2001 when Denmark joined the Nordpool market and the Nordic TSOs delegated load balancing to a specifically designed market mechanism. Thus, by definition, there can no longer be excess electricity, only too much or too little capacity to meet demand. In 2009, 'negative prices' were introduced to make wind power producers (especially those receiving subsidies) risk having to pay if they bid in high-wind situations, further fine-tuning wind power capacity. With the installed wind power base often generating more than 100% of the demand in Denmark, it has become a critical infrastructure (INT, Danish Wind Farm Developer). When Denmark's neighbouring countries also have high wind power production, cross-country excess electricity is handled by two conflicting strategies: one is to expand transmission lines to other countries, and the other is to stimulate new demand for electricity through the domestic electrification of the transportation and heating sectors, called deep transition (Markard, 2018). According to a large corporate wind farm developer, 'today we think about the intelligent grid, that we need to put the turbines into play with all sorts of things' (INT, Wind Farm Developer 2).

In Domain of Action 3, material technical devices were invented to pacify wind power 'living electricity' as 'frequency' enabling trading via the electrity grid. Such devices include grid codes, connections to hydro-power, flexibility in thermal power plants, storage, demand-side management, and increased generation unit flexibility (Lund, Mathiesen et al., 2015; Kirkegaard, 2019).

4.4. Framing-overflowing and dynamic relations between the three domains of action

The market agencement for wind power market in Denmark has developed over time through the use of a variety of market devices. In Domain of Action 1, the framing of wind power was made socio-politically acceptable through discursive market devices inscribed into plans, reports, maps, etc. that conceptually and calculatively demonstrated wind power's value in terms of domestic clean energy, jobs, industrial development, and climate-friendliness. The socio-political coalition promoting wind power was co-produced with these devices, and the societal value of wind power has been heavily contested throughout its history. In Domain of Action 2, the socio-political approval of wind power was translated into price-setting models that made wind power a viable investment object. The market device of subsidy policies has constantly overflowed, accused of counteracting market forces, producing market distortions and burdening consumers. These overflows have led to ongoing re-framing work through the re-design of price-setting mechanisms, e.g., by moving from the FIT scheme with fixed subsidy price-setting to so-called market-based tendering schemes where state subsidies are less visible. However, the introduction of market-based tendering to overcome critiques of 'subsidies' has reconfigured agencies in the market agencement to the point where small-scale actors feel ostracized. This, in turn, has led to rising local opposition. The marginalization of local communities may be further exacerbated by activities in Domain of Action 3 related to wind power installation and grid integration, where social acceptance as well as shifts in grid management (technical devices, storage, demand-side management, and increased generation unit flexibility) pose challenges to a 'deep transition' and the configuration of wind power as critical infrastructure.

Markets are constantly being framed and reframed in the context of sustainability transitions in and through the dynamics of agencies in market agencements. Framings in one domain of action often overflow to other domains of action, as seen in the case of price-setting models, and marginalization of local actors and the resulting local opposition, which is largely a result of policies calling for deep transition (i.e., MW wind power projects), millions and even billions in financial investments, and liberalized price-setting mechanisms. Table 1 summarizes the dynamics of framing-overflowing-reframing in the three domains of action.

5. Discussion: contributions and future research

5.1. Contributions to market studies: interactions among three domains of action

Our analysis points to dynamic interactions among three domains of action. Socio-political discourses (Domain of Action 1) were anchored in devices that mobilized sociotechnical imaginaries for (or against) wind power, and served as legitimating market devices for the introduction of public monetary support schemes, and consequently for construing wind as an economic asset (Domain of Action 2). Discursive market devices demonstrating concerns about subsidies or local community opposition had the potential to both stabilize and destabilize market agencements. Price-setting in Domain of Action 2 thus was also entangled with the physical integration of wind power into the grid in Domain of Action 3. The analytical framework is illustrated in simplified form in Fig. 1. For example,

Table 1
Framing-overflowing dynamics across three Domains of Action in Danish wind power market.

'Domain of Action'	Market devices	Denmark
Domain of Action One: Socio-political coalition making	*Framing*	'industry development', 'labour', 'climate', 'wind resources'
	Discursive market devices	Reports by Academy of Technical Sciences (ATV 1975, 1976) "alternative energy discourse".
		"Alternative Energy Plan" 1976
		European Wind Atlas (1989)
		Energy Act (2012)
	Re-framing/ pacification	*Energi 2000* (1990)
		Energi '21 (1996)
		Renewable Energy Act (2009) (co-ownership scheme)
	Concerns (overflowing)	Subsidies as price-setting model
		Marginalization of small actors & local opposition
Domain of Action Two: price-setting models	*Framing*	Make wind power economically attractive to investors
	Re-framing/ pacification	Feed-in-Tariff (FIT)
		Auction scheme (national tendering through Contract for Difference)
	Concerns (overflowing)	'Subsidies'
		'Free market'
		'Subsidy burden'
		Marginalization of small actors
Domain of Action Three: Integration of wind power into the electricity grid	*Framing*	Power electronics
		Grid codes
	Re-framing/ pacification	Nord pool
		Negative prices
	Concerns (overflowing)	Grid destabilization
		Wasted resources (fear of curtailment)
Dynamic interaction between Domains of Action		Political climate targets / MW tenders / deep transition in electrified grid => marginalized co-operatives
		Support schemes (negative pricing) – grid connection

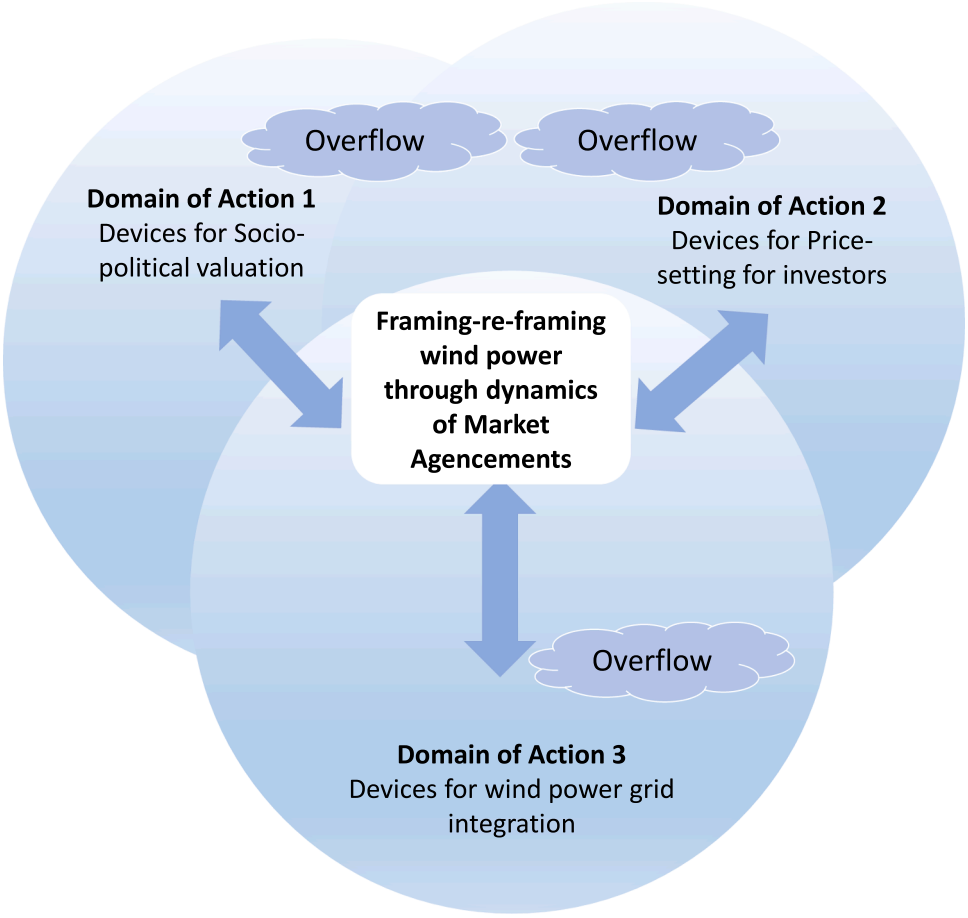

Fig. 1. Entanglement between the three domains of action.

with the introduction of the FIT scheme in the late 1970s, power utilities were obligated to facilitate wind power's technical integration into the power grid and to share the cost with investors, and also had deal with 'excess electricity'. After the Nordpool market design was introduced to allocate production in the grid, negative prices were introduced to ensure grid stability which otherwise would require coerced curtailment. Overall, socio-political imaginaries of deep transition in an electrified grid have been enabled by device-anchored discourses, climate targets, price-setting bidding zones in MW tenders, and technical rules and digital devices that jointly shape market framing. The three domains of action thus have co-produced each other, dynamically (re)shaping agencies through overflows that flow within and across them.

Market studies seldom examine several market devices at play simultaneously. With our analytical framework of three domains of action for the wind power market, our empirical study contributes to market studies, particularly to the concept of market agencements (Çalışkan and Callon, 2010; Callon, 2021). Our analytical framework of entangled domains of action makes our empirical case highly illustrative to shed light on how market devices expand and/or constrain agencies in and/or across domains. The empirical detailing of how market agencements and market devices are linked helps to shed additional light on the ongoing making and unmaking of agencies in energy markets (Silvast and Virtanen, 2019). We urge scholars to explore this avenue of research further in future market studies. Market agencements unfold with framing-overflow dynamics in an entangled interplay between domains of action, where both technical and human agencies develop new identities and shift discursive frames, allowing them to mobilize the past in new ways and imagine new futures (Garud et al., 2010). For example, wind power shifted from being a relic of the past to become not only normalized, but also constituted as the positive future and critical infrastructure of 'energy islands', and with many stakeholders transformed to become supporters of wind power.

5.2. Contributions to transition studies

Our markets-in-the-making lens contributes to two recent movements in transition studies. The first movement is the call to a shift from an outsider's perspective emphasizing typologies, stages, and phases of transitions, to an insider's ontology, making agencies more visible (i.e., Geels et al., 2016; Smith and Raven, 2012). The second movement is the call to open the black box of markets (Boon et al., 2020) to overcome a highly technology-centered approach, thereby facilitating a shift from the 'quasi-evolutionary perspective

on technical change' (Schot and Geels, 2008) to a 'market-as-practices' perspective.

5.2.1. *Opening the black box of markets with an insider's perspective of agency*

Our study shows how the peculiar economics of wind power have been enacted with price-setting devices, suspending prevalent distinctions of protected niches versus the supposedly non-protected mainstream selection environments which are deeply ingrained in the understanding of transitions. With reference to the recent demonstrations of decades-long massive subsidies to fossil fuels (IMF, 2021) it is clear that what we label 'peculiar economics' matters for more than so-called 'protected' renewable energy. From a market agencement perspective, framing and pacification includes how pricing is made with direct and indirect subsidies to both fossil and renewable energy sources (Coady et al., 2015). However, wind power was subsidized from the very beginning, and conventional economic thinking stigmatized it because fossil fuels were presented as 'non-protected' and market efficient. Only recently have the 'peculiar economics' of subsidy-based fossil fuels become evident. Thus, any market agencement and price-setting scheme is an outcome of specific market devices, not 'pure market forces'.

Only an insider's ontology can illuminate how agencies transform market framings from within through re-devicing. The insider's and flat ontology perspective on action has been advocated for transition studies (Garud and Gehman, 2012; Jørgensen, 2012). Through the lens of agencements, individual agency and institutional-regulatory and technical arrangements are not separate, but two sides of the same coin. The capacity of human actors to act is enhanced by technical and institutional arrangements, and this flattens the distinction between agency and structure or context (Callon, 2008). Market devices are co-produced outcomes of active agency and operate from within the economic worlds they attempt to create, not from outside of them (Mitchell, 2011: 244). Thus, as our study shows, 'making wind power valuable' involved action across the three entangled domains of action. Models of price-setting required approval from a sociopolitical coalition, and legal and technical devices enabled wind power electricity to circulate and be integrated in the electricity grid. Different agency coalitions do different things and sometimes change agency positions, and power as dominance and marginalization of agencies is included in our market analysis.

Such a device-agency focus complements the use of narratives and legitimate discourses in the *markets-as-practices* strand of transition studies (Smith and Raven, 2012; Ottosson et al., 2020). Yet, from the market agencement perspective, agencies and discourses are co-produced, and discourses are treated as materially anchored with references to reports (and references to devices used based on technical, economic, climate science, etc.) which make selective effects knowable and visible.

5.3. *Implications for transition governance*

As illustrated in this study, market framings are always 'in-the-making' and incomplete, and may trigger actors' concerns due to overflows. When framings overflow, it is not due to abstracted 'market forces' but to historical, agency-based contestations of market framings that deliberately exclude overflows/externalities. For example, market framings of fossil fuels have only faced minor modifications (a low CO_2 tax or the EU CO_2 market with too many free allowances) despite IPCC calls for urgency. Power, dominance, and marginalization play key roles in making or breaking market framings. Governing sustainability transitions, we argue, necessitates a shift from understanding markets as niches or as mainstream, to market agencements where market devices designate how goods are framed and pacified as legitimate. Becoming a pacified good through discursive devices may lead to extending the market agencement across domains of action in policies and regulations, price-setting mechanisms (e.g., FITs, tenders), and grid codes. Thus, markets do not operate through meta-physical market forces, but through specific market agencements where market devices are involved in shaping the dynamics of framing-overflowing-reframing for any good.

The concepts of devices and framing-overflowing make it possible to identify themes of contestations and/or the black-boxing of the lives of all goods, as in the case of both wind power and fossil fuels. These notions can renew the understanding of markets in calls for transformative change and deliberative governance advocated for transition (Köhler et al., 2019; Schot and Steinmueller, 2018). The market agencement perspective does not propose which market framing or economic expertise-doctrine is more correct, but critically examines who and what are involved in shaping market governance for transitions, while also encouraging reflexive debates among concerned stakeholders. This entails a move away from market formation as (ideological) politics towards empirical inquiry into the constructivist making and breaking of market devices and associated power dynamics (Çalışkan and Callon, 2010; Geiger and Gross, 2018).

6. Conclusions

The starting point for market agencements is that unknown objects must be made known and qualified by relevant market actors who mobilize devices to pacify and frame the objects. The key is that the qualities and worth of goods are variable (Callon, 2021) and that it takes constant socio-material work through market devices to make objects known and qualified as part of their possible pacification and stabilization in market frames Our overall frame of inquiry demonstrates how framing and overflowing dynamics of wind power unfolded across three domains of action involving (a) sociopolitical devices to enable discourse and the formation of socio-political coalitions, (b) economic devices to develop price-setting models for investors, and (c) new technological devices such as power electronics and network codes to enable grid integration.

The role of state governance is critical in forming the peculiar market economizations of all energy technologies, whether in socalled 'mainstream or niche markets (Coady et al., 2015) However, the markets-in-the-making approach addresses the work of agencies and devices that make the specific framings of market agencements. The outcomes of such processes are not given, but involve agencies across politics of regulation, lobbying, expertise and science (with regard to economic considerations, climate, the energy

system, etc.), measurement instruments, NGOs, etc. In this way, the lens of market agencements offers an insider's perspective by shedding light on the details of making and breaking market devices and associated capacities to act for agencies. The markets-in-the-making lens opens up new avenues for research and critique of markets in transition studies with regard to how existing and new regimes are constantly made and remade through market devices that co-produce agencies.

Declaration of Competing Interest

We no conflictual interests with stakeholders in relation to the research or manuscript.

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