



Renewable energy for sustainable rural development: Synergies and mismatches

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ABSTRACT

Energy transition is increasingly regarded as a promising opportunity for the economic development of rural areas. This possibility is associated with the siting and (co-)ownership of decentralized (small-scale) renewable energy facilities. The underlying productive link, however, has been taken for granted, rather than conceptually and practically cultivated. Thus, while renewable energy-based rural development has been stated as a desired by-product of energy transitions, its potential has remained largely unfulfilled. This review aims to illuminate the ambiguous interplay between renewable energy and rural development in the context of the current trajectories of the energy transition. In doing so, we first examine different ways renewable energy may contribute to rural development and explore how the synergetic conflation of renewable energy and rural development has played out in Denmark and Scotland, as two countries that have forged ahead with renewable energy in rural areas. Second, we draw on the different experiences in the two countries to critically discuss policy-related mismatches that hamper a more efficient contribution of renewable energy to rural development, and sketch out some thoughts about the need to bring rural matters and rural communities into the discussion if the synergies between energy transition and rural development are to be taken seriously.

1. Introduction

In recent years, rural areas have become significant battlegrounds for the implementation of energy transitions. Not only are they meaningful as the location for the siting of renewable energy (RE) facilities, but they also hold a great potential for the creation of significant synergies for sustainable rural development (RD) (e.g. Benedek et al., 2018). Hence, at the overall policy level, the development of RE has received explicit acknowledgement as a promising means for advancing RD and supporting rural economies (OECD, 2012; ECA, 2018; IEA-RETH, 2016). In particular, the EU policy framework for RE has stated the desire to foster RD through the designation of specific funding programs (ECA, 2018) and focus areas (ENRD, 2014). Policy documents identify potentially positive impacts of RE on RD; the Renewable Energy Directive (RED) and its recast RED II include references to the opportunities renewables may have for employment and regional development, “especially in rural and isolated areas” (ECA, 2018, 18). Similarly, several evaluations and supranational policy briefs indicate that RE projects can be developed in a way that benefits local interests and sustainable RD (IEA-RETH, 2016; OECD, 2012; Nordregio, 2017). In order to maximize the

economic benefits of RE deployment for rural areas, the evaluations generally underline the need for an approach to RD that is well adapted to local conditions and focuses on the competitiveness of rural areas.

However, while policy strategy papers claim and envision positive effects of RE-based rural development, it is less clear as to how these are reasoned and realized, and how they relate to the current political-economic conditions of the energy transition. An overall finding from international evaluations suggests that most countries have not developed strategies for linking RD and RE (OECD, 2012; Pedrolí and Langeveld, 2011; EESC, 2016; ECA, 2018). An EU audit straightforwardly concluded that synergies between RE policy and sustainable RD remain mostly unrealized (ECA, 2018). Similarly, other studies raised the observation that RE does not automatically translate into RD (Pedrolí and Langeveld, 2011; OECD, 2012, 3; IEA-RETD, 2016; Taylor, 2019). For example, an OECD report concludes that the productive linkage of RE production and RD in terms of economic development, job creation, human capital, infrastructure, and rural empowerment cannot easily be taken for granted and instead requires a complex and flexible policy framework, a long-term strategy, and a realistic appreciation of the potential gains from RE deployment (OECD, 2012).

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Although several international evaluations identify deficiencies, a comprehensive overview and theoretical reflection on this broader realization has so far been neglected. Moreover, these evaluations have omitted a more critical consideration of the fundamental socio-material conditions that shape RE-RD synergies – the capitalization of the renewable energy market.

In this review we aim to shed more light on the link between RE and RD based on a critical appraisal and discussion of policy initiatives in Denmark and Scotland. Both countries have been forging ahead with deploying RE facilities in rural areas, despite different historical paths. In our approach, we reviewed policy papers, white papers, and governmental strategies and guidance, and brought them together with academic findings from energy transition research in Denmark and Scotland, particularly related to wind energy. Based on the insights from the two countries and inspired by critical theorists, mainly McCarthy (2015) and Polanyi (1957), we elaborate on economic, social, democratic, and planning-related mismatches that may hamper the desired synergies, and then sketch out suggestion for how to bring RE and RD together more fruitfully.

In the following conceptualization of the interplay between RE and RD policy initiatives in Denmark and Scotland, we first critically theorize how the articulation of synergies between RE and RD can be understood as disembedded socio-ecological fixes of capitalist crisis tendencies (McCarthy, 2015), and how the synergetic relationship has been reasoned in research. We then delineate how the relationship between RE and RD has played out in Denmark (1974–2019) and Scotland (2009–2019). We subsequently discuss a number of mismatches that are likely to hamper the productive synergies and sketch out potentials for bringing RE and RD together.

2. Synergies between renewable energy and rural development as socio-ecological fixes

An approach to understanding how the conflation of RE is reasoned to be a means to tackle climate change and initiate RD is reflected in the notion of socio-ecological fixes through energy transition (McCarthy, 2015). Critical scholars (e.g. Castree and Christophers, 2015; Ekers and Prudham, 2015, 2017) have drawn on David Harvey's (1981, 2001) concept of 'spatial fix' when elucidating the relationship between environmental change and the capitalist mode of production, as well as the internal ecological contradictions of capitalism, the so-called second contradiction. This contradiction refers to the tendency of constant growth to exhaust its finite resources and to create socio-ecological externalities (e.g. pollution, climate change). Harvey (1981, 2001) then argues that economic crises can be temporally and spatially 'fixed' by finding new resources for surplus capital through geographic expansion, investing in infrastructure and creating new spaces of production. The vital search for new spatial 'fixes' and uncommodified elements of nature to maintain accumulation and growth regimes has not only led to uneven geographical development through circuits of devaluation and revalorization, but also generated a separation of the economy from the life context and society, or what Polanyi (1957) terms as 'disembedding'. In turn, the market economy has become an overwhelming force or logic that gradually pervades all areas of life, while market failures and incessant cycles of commodification evoke a dialectic of 'double movements' (Polanyi, 1957) – i.e. attempts to re-embed the economy by counteracting these tendencies (Peck, 2013; Prudham, 2013; Brand et al., 2019). Energy markets can thus be understood as constantly being contested, negotiated, and (re)constructed between the interests of political-economic institutions and socio-economic concerns (Eadson and Foden, 2019), in relation to which a socio-ecological fix refers to the economic strategies to internalize socio-environmental conditions into accumulation processes. Through actively diverting a threat into an opportunity in search of new profitability (Bakker, 2009), solutions to environmental and economic problems become part of the capitalist sustainable development logic (While et al., 2010) – an approach, which

is aligned with the large-scale investments in RE. Such investments can be regarded as a socio-ecological fix to the interrelated environmental and economic crises of fossil-fueled energy production, as a "way to renew accumulation on a more socially and environmentally sound basis" (McCarthy, 2015, 2491) by incorporating and commodifying new elements of nature (i.e. renewable resources). Externalities and problems (e.g. climate change), in other words, create new opportunities for capital accumulation through their subsequent appropriation. This fundamental logic also underlies the argument of RD being spurred by RE. The investment in RE infrastructure is argued to conjoin new lasting (yet always temporary) production and accumulation processes in rural areas, whereby RD appears as one target of the "nested set of fixes" (Ekers and Prudham, 2015, 2441) of RE. In particular, RE is meant to contribute to economic and social RD through: increased employment and operation and maintenance jobs; a revitalization of manufacturing businesses; local entrepreneurship; innovation and new skills and knowledge in local communities; a transformation to more innovative green industries; new revenues for landowners, farmers, and local authorities (through sale of land, shares, and municipal development funds paid for by developers); independence from conventional fuel imports; and, hence, lower and more stable energy bills. This potential is, as stated by the OECD (2012, 1) linked to the situation that "rural areas attract a large part of investments related to RE deployment, tending to be sparsely populated, but with some abundant sources of RE".

In line with the belief that economic and climate crisis tendencies can be fixed through large-scale investments in RE infrastructures, the European Commission has proposed a number of provisions and tools that could enhance positive effects of RE deployment for RD. These comprise integrated climate and energy plans that consider concerns of rural areas, regulations for Member States for deploying synergies from different stakeholders and sectors (COM, 2016), provisions for empowering RE communities and self-consumers (RED II), and support for RE under several funding programs. These provisions aim at a greater involvement of communities, improvement of local acceptance, and unlocking potentials existing in rural areas.

However, whilst RE reflects a new opportunity for revitalizing rural areas and overcoming the uneven development of resource peripheries, the argumentative and practical underpinnings of this synergetic relationship and the meaning of RD in this context have remained obscure. Hence, recommendations seem to mainly adhere to the idea of providing 'fixes' through, and of, a continuous mastery of nature and the market as the primary driver of development, whereas it remains unnoticed how market failures can in turn have adverse social and environmental consequences. In general, both evaluations and policy briefs frequently draw on specific positive cases of mainly small-scale renewables to provide evidence for synergies, and generally refer to *potentially* positive economic impacts without being explicit about the necessary functionalities, prerequisites, and mechanisms for unlocking these potentials and economic effects. In addition, the role of market conditions and support for renewables that have developed into an opposite direction – from guaranteed FiT (Feed-in Tariff) schemes to auction models – remain unquestioned. Similarly, profound democratic premises for a meaningful consideration of rural matters seems to be absent too. In order to understand how RD through renewables may take effect in practice, it is worthwhile to look at how this relationship has been conceptualized in academic research.

2.1. Reasoning socio-ecological fixes and conjunctions of rural development

While there are numerous examples of how (small-scale) RE projects have successfully contributed to the development of rural communities in the Global South through electrification and mitigating fuel poverty (e.g. Wolde-Ghiorgis, 2002; Taele et al., 2007; Urmee and Md, 2016), the examples of a productive link between (utility-scale) RE facilities and socio-economic RD in the Global North is greater. The potential of

exploiting RE for RD is mainly founded in its nature, as decentral and distributed resources abound in rural areas and peripheries where often disadvantaged communities are located. The development of renewables then appears as an economic driver for these areas, whereas a central question revolves around the facilitation of ways and (local) capacities to exploit these resources to the benefit of local communities, in particular, and RD, in general; in other words, how a (re)distribution or channeling of profits towards social and economic development can be enabled. From an academic perspective, mechanisms for social and economic development have been discussed in terms of: a) supply chain benefits, b) community or shared ownership of RE, and c) community benefits.

Local supply chain benefits refer to employment through locally sourced labor and services during the construction and operation of a RE project. However, it has been questioned to what extent local employment and procurement of construction, operation, and maintenance activities are actually feasible for both smaller and larger projects, and to what extent locally sourced labor contributes to long-term RD (Moreno and Lopez, 2008; Ejdemo and Söderholm, 2015; Munday et al., 2011; Callaghan and Williams, 2014). A case study from rural Sweden found that in the absence of community benefit schemes, employment opportunities are very modest and strongly depend on the presence of local manufactures (Ejdemo and Söderholm, 2015). In contrast, a study about very large wind farms in Texas estimated substantial local economic activities during their life cycles, whereas supply chain impacts accounted for more than 50% of generated jobs (Slattery et al., 2011). Local and regional income streams during the operation phase, without financial participation of local stakeholders and community benefit schemes, are usually limited to tax revenues, lease payments for landowners, and job opportunities for local businesses.

Community ownership of renewables has been widely argued to bear the greatest potential for RD due to the expectation of all revenues being retained and reinvested locally in initiatives that contribute to social, economic, and environmental enhancements of rural communities. In general, it is presumed that the bigger the proportion of land and facility assets owned by a local community are, the bigger the proportion of profit flowing back into the community (Callaghan and Williams, 2014; Taylor, 2019). However, empirical findings substantiating these claims have so far remained rather limited, and the actual processes through which positive local impacts are generated through community ownership are not well understood (Slee, 2015; Berka and Creamer, 2018). Moreover, RD through ownership of renewables by individual or collectively organized landowners or land lease payments by external developers to landowners, is seemingly dependent on the goodwill of landowners to invest their income in the wider rural economy. A recent study from Spain showed that limited lease payments were innovatively employed by rural landowners to initiate activities for local economic revitalizations (Copena and Simon, 2018). A survey from the US also indicated that economic benefits from utility-scale wind farms were achieved through reinvestments of landowner payments (Mills, 2017). In addition to economic effects through the generation of revenues, greater community involvement in, or ownership of, RE projects can also create social benefits, such as building new capacities and skills, increased community spirit, identity and cohesion, independence, and empowerment (Haggett and Aitken, 2015).

In contrast, community benefits consist of financial payments that are directly diverted to communities near a RE project. Large external developers have come to routinely provide various forms of community benefits (Kerr et al., 2017; Rudolph et al., 2018), mainly in the UK, but these have yet to be transformed into significant tools for further economic development of rural areas (Munday et al., 2011). Community benefit streams commonly take the shape of community funds, through which regular payments from (external) developers to local communities are arranged. Yet, the establishment, administration, and distributional design of benefit funds can be challenging and conflictual tasks (Markantoni and Aitken, 2015; Devine-Wright and Sherry-Brennan,

2019). Thus, economic effects of community benefits, as well as revenues acquired through (co-)ownership, strongly depend on how they are utilized, i.e. how and where profits are re-invested (Phimister and Roberts, 2012).

In summary, from an international policy level, RE is supposed to promote RD through a revitalization of the rural economy by means of new accumulation regimes and greater community resilience through empowerment via energy production. RD through RE is predominantly understood in economic terms, whereas economic development can also entail opportunities for social and environmental development. In this paper we challenge the alleged simplicity and naturalness of this proposition. As the evidence for RD in some areas is limited or still developing, there is an urgent need for scrutinizing the extent to which policies and underlying mechanisms are capable of fulfilling and facilitating this desire, particularly regarding legislative, economic, and democratic requirements.

In order to heed a Polanyian injunction to juxtapose national rationales “within a reflexive spatial-relational frame and to place local economic practices [...] in conversation with extra-local others” (Peck, 2013, 1562), we now turn to a historical outline of central political initiatives steering the interplay of RE and RD in Denmark (1974–2019) and Scotland (2009–2019).

3. Denmark

“There is no local benefit in the national energy policy. There is no local economy tied up to the wind turbines, and in the end we take our citizens hostage, when we set up wind turbines in their backyard.” (Mayor, Abenraa Municipality, in Sommer et al., 2017)

Denmark is regarded as a pioneer in energy transition. The historical significance of Denmark is closely associated with the early emergence of initiatives for collective ownership of RE in rural areas, in particular, wind energy. Wind energy gained momentum in Denmark at the beginning of the 1970s in response to issues of energy security, a strong dependence on oil imports, and a societal aversion to the political ambition to advance nuclear energy. The early evolution emerged from the successful interplay of a rural grassroots movement consisting of cooperatively organized rural communities, NGO's, scientific support, and consistent state funding (Moe, 2015). During the 1970s and 1980s, small-scale household-based wind turbines were replaced by cooperatively organized wind turbine projects, which resulted in the vast majority of renewable energy facilities being owned by wind turbine guilds (Vindmøllelaug) in rural areas by the end of the 1980s (Christensen, 2013). As part of the state support strategy, the Danish Government created a number of incentives to support the decentralized development of RE and local ownership: local residency requirement, partial reimbursements for wind turbine purchases, tax reductions, and generous feed-in tariffs (Meyer, 2007; Mendonca et al., 2009; Petersen, 2018). This not only provided for a necessary stability for niche innovations, but also allowed rural dwellers to mitigate the declining economic significance of agricultural production (Svendson, 2004) and diversify their income from land assets, thus, manifesting the economic embedding of RE in rural areas.

However, from the early 1990s, technological advancements that loosened requirements for local ownership and fixed feed-in tariffs made the development of wind farms more lucrative for regional utilities and commercial actors (Mey and Diesendorf, 2018). Larger RE facilities and shifting ownership structures increased the share of RE in the energy supply, but also increasingly detached RE from its grounding in the rural economy and hampered local support (Christensen, 2013). Policies continued to change when the liberal-conservative government reduced financial support for wind energy projects in 2001 (Sovacool, 2013; Mey and Diesendorf, 2018). Conjecturing the maintenance of a striving industry without subsidies, this maneuver effectively led to a halt in the installation of further capacities, whereby more than 15 years of

political consensus on Danish energy policy was renounced (Christensen, 2013). The energy market liberalization put more focus on well-heeled commercial actors, abandoned rules for collective ownership, and sought to replace a large number of smaller wind turbines with a smaller number of larger turbines (repowering). Læssøe (2007) has characterized these changes in the Danish energy policy as narrowing down the approach to environmental problems and strategies with little or no attention to the social and cultural dimensions, and as a promotion of technical initiatives instead of more encompassing strategies.

While the wind energy sector gained new traction through a re-establishment of stable feed-in tariffs with the Renewable Energy Act 2009 and an uptake by commercial developers, new cooperative and locally embedded wind farm projects had almost entirely disappeared in the aftermath of the liberalization of the energy market (Christensen, 2013; Petersen, 2018). In order to counteract increasing local resistance and protest and a further detachment of the revenues of RE from the rural economy, this act introduced four compensation and benefit schemes to stimulate local involvement and acceptance of new wind energy projects on land (Tegner Anker and Jørgensen, 2015). These included: a) *compensation* for losses of property value near wind turbines, b) a mandatory offer of 20% *co-ownership* shares in the vicinity of a wind farm project, c) a *green scheme* to enhance local recreational values through payments per turbine to the municipality, and d) a *guarantee fund* to support community groups in preliminary investigations for local wind farm projects. While only the *green scheme* and to some extent the *guarantee fund* can be regarded as attempts to directly reconnect RE with structural issues of rural areas, the co-ownership scheme tends to benefit individuals who can afford to buy shares.

In addition to the RE Act 2009, there have been efforts to ensure a thorough involvement of citizens and other stakeholders in the planning process (Local Government Denmark et al., 2009), which mainly included the consideration of public responses during Environmental Impact Assessments (EIA). A national planning guide highlights a ‘good process’ and suggests to “create a space for a constructive and active participation with room for all types of opinions and ideas for the projects” (Local Government Denmark et al., 2009, 5) through citizen meetings and written consultation responses.

Despite these policies and initiatives, there has been no indication of diminishing protests against the siting of wind farms. On the contrary, intensified local objections refer to issues of rural decline and development, including the unequal and unfair distribution of revenues and profits from wind energy projects and lack of a genuine democratic involvement (Hvelplund, 2013; Clausen and Rudolph, 2019). Citizens have complained about lacking opportunities to express their real concerns within the existing participatory procedures and have criticized that wind energy developments do not visibly contribute to the local economy (Rambøll, 2013; Sommer et al., 2017; Concito, 2018). As rural matters have increasingly become the core of conflicts over wind farm developments, rural communities have started to fight for alternative business models. Such models involve greater community ownership and would allow for a profound re-integration of renewable energy in the rural economy (see Clausen and Rudolph, 2019), thereby, reflecting the recognition of distributional injustices. The scarcity of available land for wind farms in some areas has led to screenings of peripheral and marginalized areas by developers in order to lease or buy land and even demolish properties to make space for wind turbines (Rudolph and Kirkegaard, 2019; Clausen and Rudolph, 2019). A backlash to this practice has manifested in the aspiration of alternative ownership models where wind turbine profits would not only be distributed to individual shareholders, but also contribute to the local common good (Krog et al., 2018, 3). Such models include a mix of local ownership and

trust ownership, where local citizens become members of the co-operative together with local foundations.¹ While such projects have mainly been small scale, there have also been attempts to develop mixed-ownership models in order to bid on tenders of large-scale projects. However, initial efforts have so far remained unsuccessful due to the capital-intensive pre-qualification criteria and exclusionary conditions of the tender design (Krog et al., 2018). As argued by Krog et al. (2018, 1), a strong path dependency has led to a conscious or unconscious elimination of projects based on organizational structures that do not fit the definition of large energy companies. This is in line with recent policy developments, in particular, the introduction of tendering schemes for RE that aim for greater cost-efficiency of projects and emphasize the market mechanisms as the key driver for the green transition (Danish Ministry of Energy, Utilities and Climate, 2018).

4. Scotland

“We are committed to maximising the opportunities for local ownership of energy as well as securing wider community benefits from renewables.” (Scottish Government, 2011a, 27)

The evolution of RE in Scotland has taken a different trajectory than in Denmark. The processes may have converged in recent years, but the origin was very different. While the utilization of the enormous potential of renewable resources has gained momentum with the international consensus about the need to mitigate climate change, the ambitious and commercial exploitation of RE has been strongly connected with their socio-economic anchoring in rural areas. Although energy legislation is not a devolved matter, in particular, the design of the support system for RE resides with the UK Government, the Scottish Government has been able to steer its energy transition through operational control over the planning system, financial incentives, and land-use planning (Wood, 2017). This implies that the Scottish Government can support or deny planning consent for certain energy technologies. Specific incentives and higher levels of financial support are drawn from a single electricity market and common UK-wide pool of financial support (Cowell et al., 2017), and these devolved powers have been purposefully applied in order to create the necessary investment stability for various developers of RE projects. On the one hand, the predominantly marketbased RE incentives adopted in the UK have also paved the way for large-scale and commercial projects in Scotland (Strachan et al., 2015). On the other hand, the devolved planning powers of the Scottish Government have been utilized to activate decentralized RE as a means for greater social justice, either through collective control over renewables or community benefits from renewables across the country. Already in 2009, the Scottish Government (2009, 48) stated the ambition “to maximize the benefits for communities from renewable energy, not only in terms of access to locally produced low carbon energy but in terms of social cohesion and economic development.” This was reiterated later in the Renewable Energy Route Map: “the time is right to capitalize on this experience and transform the scale of local ownership, thus allowing communities and rural businesses to take advantage of the significant revenue streams that can accrue from this form of asset ownership” (Scottish Government, 2011b, 4). However, it remains debatable whether the Scottish efforts are an expression of social justice and greater energy democracy with the goal of strengthening remote rural communities or rather reflect a sugarcoated neoliberal agenda (MacLeod and Emejulu, 2014; Van Veelen, 2019). The notion of local empowerment is, in this respect, closely related to the idea of asset-based community development and the idea that the exercise of greater control over local social issues and economic activities provide long-term solutions for rural communities, but it is also a response to austerity

¹ Examples of such completed projects are wind turbines on the island of Æro and in Hvide Sande.

measures and the withdrawal of state funding (Slee, 2015).

Community empowerment found its way into legislation through the Community Empowerment (Scotland) Act 2015 and the Land Reform (Scotland) Acts of 2003 and 2016. The process of land reform promotes community ownership of land and serves to abandon historical injustices anchored in the feudal legacy.² It allows community bodies to purchase land from private landowners to further sustainable development projects that benefit local communities (Hoffman, 2013; Dalgligh et al., 2018). This is based on the premise that greater community ownership of land ensures that income and wealth generated from this land stays within the community and is reinvested for RD activities (Hoffman, 2013). While RE is regarded as well-positioned to generate revenues from new land uses, community ownership and buy-out of land is often arranged and managed through community, development, or land trusts, which are a traditional mechanism for community participation in the Scottish Islands and Highlands region (Rennie and Billing, 2015). In this regard, the Scottish Parliament also created financial incentives and securities that enable communities to invest in and generate income from energy projects, not only to actively participate in the energy transition, but also to exploit RD potentials. A national community energy program comprises two state-funded organizations – Local Energy Scotland and Community Energy Scotland – that provide planning-related support for community energy projects and administer bridging grants and loans for communities to overcome high transaction costs when pursuing RE projects (Markantoni, 2016; Slee and Harnmeijer, 2017). In contrast to community-based projects, another common approach is for land and estate owners to pursue and finance their own wind energy projects, where the revenues are reinvested in land-based businesses rather than in local development, leaving the local population without any gains (Slee, 2015).

In addition to RD intentions through local or shared ownership of RE facilities, the Scottish Government also heightened its expectations of local economic effects from larger commercial energy projects. Besides supply chain benefits, this expectation is mainly anchored in the provision of community benefits, which comprise voluntary payments by commercial developers to communities hosting RE projects (Kerr et al., 2017). The intention is to allow rural communities, and the Scottish society as a whole, to share in the profits from the exploitation of its natural resources (Scottish Government, 2011b). Community benefit payments are usually arranged through benefit funds that are administered by community bodies or trusts that are invested in local development activities that benefit the common good. While the RD potential from renewable energy depends on the foci of re-investments and the magnitude of revenue streams from the project, revenues from collective ownership are meant to outweigh financial gains through voluntary payments (Slee and Harnmeijer, 2017).

However, the future for opportunities for RD through RE in Scotland has been put under threat recently by new challenges stemming from the reform of the UK energy policy, which entails cost reductions based on privileging large energy projects and an abolishment of technology-specific support. The current support system, Contract for Difference, is more centrally organized and strips the Scottish Government of its control over adjusting the mechanism by setting subsidy levels for RE technologies (Wood, 2017). Due to the abolition of technology-specific support and the complete removal of subsidies for onshore wind energy (apart from wind projects on remote islands), the volume of investment in new RE projects has substantially dwindled (BNEF, 2018). This is also likely to have caused disruptions to the community energy sector, which relies on stable conditions and prospects for revenues, not least, to make long-term contributions to the rural economy.

² Over centuries, private land rights had been privileged over collective rights in Scotland and the ownership of land was in the hands of a small minority, e.g. private estates, while the majority of the population provided labor (see Dalgligh et al., 2018).

5. Discussion: mismatches and potentials

In general, the policy development paths of RE in Denmark and Scotland, especially for wind farms, have developed in opposite directions, which had implications for the consideration of structural issues of rural areas. Encouraged by policy incentives, the rapidly growing wind energy sector in Denmark has progressed from local and jointly owned wind turbine projects to large commercial projects steered by professional developers. In Scotland, along with the advent of a commercial utilization of RE, much has been done to encourage the involvement of local communities in the production of RW and profit-sharing from it. While RE has become increasingly detached or ‘dis-embedded’ from its economic anchoring in rural areas in Denmark, legislation and support schemes in Scotland have aimed at an advanced integration or ‘embedding’ (Polanyi, 1957) of RE in the rural economy. Apart from Denmark’s green scheme, the Scottish benefit and community ownership programs appear to be more targeted, yet versatile to take into account and respond to rural matters. This makes them, in theory, better suited to address the interests of rural communities, whereas the current Danish co-ownership scheme favors individuals. There is a general tendency in Denmark to favor individuals, both through contracts with private landowners and individual co-ownership rights, posing a risk of dissatisfaction among the local population. Yet, it is also striking how both countries have (albeit differently) been increasingly influenced by market mechanisms that tend to thwart efforts towards creating synergies between RE and RD.

Based on these brief insights from Denmark and Scotland, we elaborate below about how political-economic underpinnings of energy policies reinvigorating rationales of socio-ecological fixes enable or hamper RD. At first, we discuss some fundamental contradictions within policy approaches and growth-oriented energy transition regimes that, in turn, hamper the productive synergy, before sketching out potentials for bringing RE and RD together.

5.1. (Mis)recognition of international recommendations and social capital

Considering the overall development of RE, it is not surprising that there are no distinct reflections upon the potential synergies between RE and RD in the Danish context, neither from the government nor from municipalities or developers. In contrast, Scottish policies and guidance productively link RE with RD. Regardless of this difference, an acknowledgement of international recommendations is absent in both countries.

Given the historical Danish experience and competencies, the absence of policy efforts to pursue internationally recommended synergies could place Denmark in a leading role. The political neglect to find new approaches for a joint developmental strategy echoes a ‘dismissal’ of social capital in the form of a historically grown ability to anchor processes of societal change in local organizations and forms of cooperation (Chloupkova et al., 2003). The vanishing involvement of organizations independent of incumbent economic interests, described as ‘innovative democracy’ (Mendonca et al., 2009; Hvelplund, 2013), thereby, not only reflects a fundamental change in the Danish wind energy sector, but also the current absence of the historical rural-renewable energy nexus in current Danish energy policy. Instead of taking advantage of historical values and experiences that have inspired other countries (Munday et al., 2011), principles of bottom-up approaches, local democracy, economic equality, and political trust have been slowly superseded in favor of the green growth imperative, i. e. economic growth in a sustainable manner, and a technological-regulative paradigm.

In contrast to Denmark, RD possibilities are articulated in Scotland by combining the path of commercial large-scale RE development with bottom-up approaches, to the benefit of rural areas. Concerning the

latter, renewables are regarded as a means for greater local empowerment and the formation of social capital for rural communities. However, argumentative references to supranational ambitions are also absent. Hence, the articulation of ambitions towards RD in Scotland is founded in the relatively recent push for renewables, the omnipresent renewable resources in peripheral areas, and in the political demarcation towards UK energy policies.

5.2. Ambiguous supranational legislation

In addition to the diverging national political logics, both countries are also affected by international strategies aimed at a convergence of market-based renewable energy governance (Četković and Buzogány, 2016) that are inherently ambiguous or even counterproductive for creating synergies between RE and RD. There is a paradox concerning the countries' abilities to live up to international guidelines, since these recommendations are also counteracted by contrary supranational requirements and impositions. This dilemma is caused by the introduction of new support schemes in Denmark, as requested by the EU, and the abolition of specific subsidies in the UK, both aimed at slackening support for RE projects and prioritizing tendering schemes based on price-sensitive competition. Since this strategy is likely to aggravate the issue of land grabbing in Denmark and hamper the possibilities for integrating RD with renewables, it can be argued that tendering is likely to worsen the situation due to its primary focus on cost reductions rather than the socio-economic needs of rural areas (Lowitzsch, 2019; Grashof, 2019). The substitution of fixed feed-in-tariffs with market-based tenders demonstrates a political desire for large-scale projects. This is likely to further discourage efforts for RD. Unless protective requirements are built into their design, auctions tend to favor both large-scale projects and actors that can diversify risks through broad project portfolios. This, in turn, hints at a formula for a new form of growth, where the economy and not the ecology becomes the primary tool for sustainable development (Nielsen and Nielsen, 2006, 282). However, this raises a fundamental question about the temporality of the synergy with RD; in particular, how the relative infancy of renewable energy and the price competitiveness warranted by state support "provides a brief window of opportunity to elevate forms of community ownership and to utilize surplus wealth [...] for community development capabilities" (Taylor, 2019, 2).

Scotland has also been affected by a UK-wide push towards market-based instruments to support large-scale commercial renewable energy projects, in particular offshore wind, and an abolition of support for larger onshore wind developments. Since changes in the support system for renewables are also likely to adversely affect the community energy sector across the UK (Mirzania et al., 2019), it poses uncertainties about how emerging RD activities can be mobilized and maintained through the establishment of small-scale renewables in the future. Despite stated aspirations to support community energy, the UK government has repeatedly backtracked from FiT schemes, undermining a vital scalable and stable source of long-term income for community RE (Mirzania et al., 2019). Likewise, exposing the profits of commercial developers to fluctuations in the electricity market may jeopardize their ability or willingness to maintain voluntary community benefits, which have become common practice, especially for onshore wind farms in the UK (Kerr et al., 2017).

Thus, recent contradictory reforms in the electricity market and support systems in both Denmark and Scotland create uncertainties as to how RE is able to contribute to RD in the future. While recent legislation has become more discouraging for communities to act as investors, co-producers, or self-consumers, the recast of the EU's RED II strives to develop a framework for increasing consumer (co-)ownership, which may offer renewed possibilities for RD. Hence, for both countries, the direction of RE seems to be governed by the inherently contradictory intentions of supporting community RE within an overall discourse of green growth through socio-ecological fixes that seek to establish

renewables as the solution to environmental and economic challenges (McCarthy, 2015).

5.3. Diverging planning rationales: energy transition goals vs. rural development goals

A trend emerging in both countries relates to diverging planning rationales that separate rather than reconcile energy transition and RD goals. Even if positive impacts of RE for rural economic development are desired, the planning regimes for particular RE facilities in Denmark and Scotland hardly allow for consideration of how they could respond to rural matters and contribute to the rural economy.

In general, the political rationales for planning and developing RE facilities both in Denmark and Scotland are primarily linked to the decarbonization of the energy sector, and not meant to fulfil RD ambitions. As articulated by various scholars (Wolsink, 2007; Agterbosch et al., 2009; Larsen et al., 2018), such a sectorization can be seen as the result of an overall development of European spatial governance that has become more fragmented. A segregation of planning areas also hampers an integrated RE-RD approach due to separate goals within the different authorities, and conflicting political planning objectives may jeopardize the realization of wind energy goals (Wolsink, 2007).

Instead of considering effects of RD, national planning regimes tend to favor large corporate developments by creating a market demand and driving down purchase prices and consumer costs (Taylor, 2019). The wider economic effects of RE projects, no matter how they may be activated or realized, are usually treated as non-material planning considerations, which means that they are not considered as criteria in determining the approval of projects. Although the offer of co-ownership shares is a legal requirement for wind farms in Denmark, they are not considered part of the planning process, and the success of selling shares does not affect the planning decision. Likewise, despite the more favorable political conditions in Scotland, the (voluntary) provision of community benefits or involvement of local businesses or the fact that a RE project is proposed by a community may give the project greater standing in the municipality, it is not solely approved or rejected based on the presence or absence of these features. Hence, whereas the Scottish Government promotes the development of projects with the potential to re-vitalize rural economies through support schemes, there is usually no priority for such projects in local policy or planning frameworks.

5.4. Deficient appreciation of the rural within democratic principles

In addition to the sectoralization of planning goals, social and economic interests of rural communities are not properly addressed in the EIA process, neither in Denmark nor Scotland (Larsen et al., 2018; Smart et al., 2014). Thus, the EIA process often turns into an arena of contestations over environmental and economic disruptions, rather than a democratic dialogue about economic potentials for rural areas. In general, a common critique is that standardized planning procedures within EIA and SIA (Social Impact Assessments) mainly focus on mitigating adverse and disruptive impacts and do not provide sufficient leeway for discussing and enabling positive integrative effects (Larsen et al., 2018). Due to their standardized methods for participation and themes for consideration, they often convey the meaning of democratic legitimacy tools instead of providing a dialogue for a thorough recognition of rural challenges and needs. Aimed at ensuring public approval of RE projects and providing decision-makers with knowledge to make informed decisions, these procedures can be framed as 'closed' public spaces (Gaventa, 2006) that tend to exclude the life concerns, interests, needs, and alternative proposals of rural communities. Without inherent motivations for an appraisal of positive and negative effects, as well as a dialogue of alternatives to the predefined themes and fixed elements in the EIA procedure (Larsen et al., 2018; Cashmore et al., 2019), current policy approaches to public involvement do not allow for innovative

avenues for nurturing synergies for RD.

5.5. Spatial differentiation and socio-ecological fixes

The mismatches related to planning and democratic anchoring of RE in rural areas appear to be closely related to spatial dimensions of structural crises in capitalist economies. As argued by McCarthy (2015, 2495) a large-scale transition towards RE sources may serve as a 'socio-ecological fix' to the crises tendencies, providing both opportunities for reinvigorating capital accumulation (often large-scale, long-term investments in technological installations and infrastructures) and a response to climate change at the same time. In both Scotland and Denmark, there are features confirming this tendency that partly clarify how the efficiency to utilize economic potentials of RE for rural areas has to be viewed, in light of uneven development and spatial differentiation, and partly, how this has been handled differently in terms of supporting versus disrupting potential synergies.

In Scotland, the large-scale exploitation of decentral RE sources has been repeatedly emphasized by the Scottish Government as a potential to reinvigorate and strengthen rural areas by attaching them to the national grid or by granting them ownership of their own energy production. While the establishment of RE in Scotland is promoted as a promising self-sustaining way to empower, fuel, and revitalize peripheral and remote areas, the increased commercial utilization of wind energy in Denmark has resulted in an advanced spatial differentiation of the energy supply, where rural regions in western Denmark gained importance as energy suppliers for urban areas. The advanced marginalization of rural areas has reinforced this differentiation and is in danger of evolving into a relationship of dependency. Hence, the green growth imperative tends to be related to new means of capital accumulation for particular business sectors, rather than a socio-economic integration of rural areas in energy transition processes, as argued in Scotland. Through siting RE infrastructures in rural areas, involving powerful new rounds of investment in rural land and claims on them (McCarthy, 2015), Danish RE development is primarily driven by the urgent need to increase RE capacities, rather than creating synergies with RD. Instead of addressing uneven development and the marginalization of areas, current development practices and individualized benefit schemes tend to manifest rural-urban divides. Hence, utility-scale RE neither taps the potential to support RD nor provides socio-economic 'fixes' for rural areas, but tends to phase out rurality in Denmark (Rudolph and Kirkegaard, 2019). Even more so, individualized benefits have created new tensions between beneficiaries and those bearing the costs, causing mismatches between ambitions and realities that are a significant source of local protests against RE developments (Johansen and Emborg, 2018).

5.6. Ambiguities of scale

The notion of scale is not only relevant in terms of ambiguities at different political and administrative levels (Becker and Naumann, 2017), but also with regard to the size of RE projects and the scope of revenue distribution, as a determining factor for creating synergies with RD. As mentioned earlier, international guidance predominantly exemplifies and draws on small-scale energy projects in order to highlight synergetic potentials for RD. As seen in both Scotland and Denmark, smaller projects can be more easily sustained by communities, and community-owned projects are meant to maximize longer-term income for communities, yet with comparatively smaller total amounts of capital involved. In turn, large-scale projects require, absorb, and bind more capital, which cannot be as easily raised by non-commercial actors, and revenues are proactively diverted to initiate long-term economic effects. However, considering the urgency to decarbonize the energy sector and the market logics of energy transition, there has been increasing emphasis on economy of scale, with a focus on large projects in both national energy policies. This would constitute a need for community

buy-in, partial ownership, or benefit-sharing as future means to generate long-term income for rural areas and revitalize rural economies. Moreover, the creation of synergies would then come down to the questions of how revenues are distributed geographically and how they are fed back into the rural economy. Thus, there is a general discrepancy of scale: while international recommendations predominantly draw on small-scale RE cases to justify RD possibilities, the current political desire is for large-scale developments. This contradiction is reinforced by the structural limits and lack of policy support of innovative community ownership models to bid in competitive tenders for large-scale developments. As argued by Krog et al. (2018, 3), a Danish grassroot-initiated nearshore wind project was somewhat ahead of Danish legislation, which lacked specific provisions for community ownership in RE. This is contrary to proposals at the EU level that emphasize how the possibility of RE-based RD is also a matter of scale, which needs to be examined more thoroughly when synergies are proclaimed. The path dependency of capitalist dynamics seems to constitute systemic challenges of a socio-economic embeddedness of large-scale RE projects in rural communities. Instead of recognizing the need for a new social contract (Devine-Wright, 2019) in matters of locally embedded large-scale development, it favors an economic and spatial 'fix', which, along with the need for green capital accumulation as a response to climate change, seeks to maintain the organizational status quo (McCarthy, 2015).

6. Potentials: bringing the rural into the discussion

Although both national and international policies and practices seem to entail major obstacles to an integrated approach that brings together RE and RD, there are also experiences from Denmark and Scotland that provide some indication of how policy initiatives could make a joint development strategy feasible. In principle, the current condition, with all its complexities and contradictions, would need to open up to an alternative logic that brings rural matters into the discussion.

The Danish historical experience provides evidence of the significance of a more equitable approach to RE development that builds on the common participation of entities with multiple interests in support of combating climate change. It indicates the possibilities of broadening decision-making and ownership rights beyond a small group of stakeholders to wider communities in ways that facilitate a representation, articulation, and deliberation of diverse perspectives and positions in the formation of economic policy. This, however, requires institutional and regulatory mechanisms at national and local levels that promote and foster more decentralized forms of collective involvement and public (co-)ownership beyond small-scale RE developments (Hvelplund, 2013; Strachan et al., 2015; Creamer et al., 2018). Without naively arguing for community ownership as the only path to RD, a consistent political strategy for greater community involvement in project development is a crucial step towards an integrative conflation of rural interests and RE development.

Similarly, recent experiences from Scotland emphasize political willingness and inclination, thereby demonstrating how alternative pathways to RE development can go hand-in-hand with utility-scale developments. RD efforts can be politically steered through certain incentives that foster greater local involvement and provide certainty for a co-existence within a more competitive regime. If a more integrative approach to bringing together RE and RD is genuinely desired, however, it is necessary to take economic, democratic, and spatial conditions into consideration, both at the national and supranational policy levels.

6.1. From growth to place-based principles

Particularly important for synergies is the incorporation, or 'embedding' (Polanyi, 1957), of renewable energy into the rural economy through new forms of local involvement and ownership (Sperling, 2017; Slee, 2015; Callaghan and Williams, 2014). This argument, which

reflects a shift away from a pure economic growth perspective, has not only become characteristic of recent research on renewable energy economy, but is reflected in the recent developments in both Scotland and Denmark.

Several findings from Scotland, not least, have shown that community-owned facilities and revenue-generating projects can stimulate local economic activity and also have a substantial social impact on local communities (Callaghan and Williams, 2014; Munday et al., 2011; Cowell et al., 2012). Working together on energy projects has nurtured local skills, networks, and community confidence (Callaghan and Williams, 2014).

Similarly, recent Danish experiences at a community level provide evidence of an emergent social movement that re-connects rural community involvement in RE projects with possibilities for deep economic and social change (Hvelplund, 2013; Krog et al., 2018; Sperling, 2017; Clausen and Rudolph, 2019). Such projects driven by rural communities themselves reflect their need to re-connect, or embed, RE in rural areas. While questioning the ability of market efforts to recognize local economic contexts, rural community initiatives have unfolded as counter-movements (Polanyi, 1957) to an increased 'disembedding' and detachment of renewables from the rural economy (Clausen and Rudolph, 2019). If taken seriously, it is essential for both national and international policies to help mobilize the potentials originating from communities to improve economic and social opportunities within rural areas. Rather than letting arguments of green growth and the needs of capital alone provide 'fixes' and determine the direction of RD, such a shift would require a place-based approach in which the competitive development of renewables is also grounded in specific rural conditions. This is where national and international policymaking is required to provide meaningful incentives and undertake pro-social interventions.

6.2. Energy democracy

Finally, the uptake of existing RD potentials also necessitates a democratic renewal of (inter)national energy policies. Since limits to public participation have so far thwarted the incorporation of rural matters into the planning of larger RE projects, the process has to be liberated from its legitimizing function. Citizens in rural areas must not only 'be involved' and 'heard' in conflict mitigating procedures, with the goal of ensuring acceptance, but must be empowered to develop and co-shape visions for a sustainable future with RE. Referring to Devine-Wright (2019, 3), this requires a new policy supported social contract involving concerted action in villages, towns, and cities across the globe in ways that address local needs, but avoids insularity. It also necessitates the support of meaningful citizen participation through the formation of a democratic space (Gaventa, 2006) that is open to various aspects of everyday life conditions in rural areas, including visions of how RE may contribute to RD. Questions of energy transition, justice, and economic and social development are not isolated elements, but tightly interrelated (Larsen et al., 2018; Clausen and Rudolph, 2019). Hence, overcoming fragmented and inequitable approaches to energy transition should not evoke any abstract decentralization policy, but instead bring to mind that energy democracy starts from below and has its foundation in people's self-management of their own spheres of life. This also requires an integrated social focus of RE development and alternative interactions between local, regional, and global contexts that reach beyond growth ambitions (and contradictions) of traditional trajectories of energy and planning policy. As argued by Burke and Stephens (2017, 36), a comprehensive agenda for energy transition demands a combination of policy instruments that simultaneously seek to resist dominant energy systems and support their replacements. By combining policy instruments that can destabilize incumbent energy regimes while creating democratic spaces for innovative alternatives, greater energy democracy can engender more profound socio-economic and socio-technical transformations than the isolated efforts suggested by international evaluations.

7. Conclusion

The fusion of RE and RD poses fundamental questions of how productive links can be realized within energy and policy planning regimes that have increasingly favored corporate developments. With this review we have aimed to shed light on the link between RD and RE based on a critical appraisal and discussion of policy initiatives in Denmark and Scotland. An overall finding is, that while the desire for rural areas to benefit from the development of RE has been highlighted at an overall policy level, the concrete policy direction for energy transition has taken a different path. By illuminating the history of RE developments in Denmark and Scotland and by theorizing the often claimed but yet to be clearly implemented synergetic conjunction of RE deployment and RD along the conceptual lines of socio-ecological fixes and disembedding mechanisms, we have revealed underlying mismatches of the relationship of the two domains. We have indicated that energy transition policies and recommendations driven by sustainable development and green growth imperatives tend to take RD potentials for granted but have largely fallen short in unlocking these potentials in an advanced energy transition context. In this regard, and in line with the argument presented by Eadson and Foden (2019, 29), the use of communities in energy policies seems to reflect attempts for socially embedding energy markets, while in reality also marketizing and disembedding community energy.

These obscurities lead to questions as to whether synergies between RE and RD can occur in the context of current policy and political-economic trajectories of the energy transition, or whether these are foiled by the overall contradiction between the political demand for synergies and the actual policy regimes. In general, as the notion of socio-ecological fixes implies, the political approach seems to aim to overcome the economic and environmental crises by reproducing the principles that created the problem in the first place. Surprisingly, critical evaluations of existing policies do not seem to see this ambivalence. However, even advocates of green capitalism (Bosch and Schmidt, 2019) seem to increasingly acknowledge the limits of the market to solve the environmental crisis and address social factors simultaneously, hence, pointing to the necessity of political action to steer just transitions. Thus, an important question concerns the interrelationship between possibilities for RD and the real economic, democratic, and social consequences of RE projects. Generally, there is a need to provide clearer evidence as to how RE projects may contribute to RD beyond the causal relationship of revenues. Considering recent trends towards a renunciation of long-term support mechanisms and the introduction of competitive market mechanisms, it is important to ask about the extent to which RD is tied to a window of opportunity for temporal socio-ecological fixes opened by economic certainty for smaller community-driven RE projects provided by subsidies. The theoretical underpinnings of temporal socio-ecological fixes and historical developments in both countries suggest that a maturing renewables sector and the growing capitalization of RE tends to lead to new circuits of 'disembedding' from the local economy. Thus, there is also a need to explore the rural and local development potential of a maturing RE sector, including possibilities of conjoining RD and large-scale RE developments beyond a mere monetary redistribution of profits to rural communities and individual rent-seeking behavior. Large-scale development would need to go hand-in-hand with a systemic approach and alternative efforts to ensure rural gain. The examples of Denmark and Scotland have shown that the implementation of such a vision is locally desired and possible but requires a policy framework that sets supportive conditions at both national and international levels.

Declaration of competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Laura Tolnov Clausen: Writing - original draft, Investigation, Conceptualization, Writing - review & editing, Resources, Formal analysis, Validation, Methodology. **David Rudolph:** Conceptualization, Investigation, Writing - review & editing, Resources, Formal analysis, Validation, Methodology.

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