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# Implementing a just renewable energy transition: Policy advice for transposing the new European rules for renewable energy communities

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ABSTRACT

The recast of the Renewable Energy Directive (RED II) provides an enabling framework for "Renewable Energy Communities" (RECs) that is being transposed into law by the 27 European Union Member States by June 2021. RECs are majority owned by local members or shareholders who are authorized to share energy within the community, offering the potential to unlock private investment and financing for renewable energy sources and provide social benefits. However, successful implementation and a just energy transition requires the coupling of technological solutions with more open decision making, based on sound analysis, knowledge of engineering, spatial planning, and social science. We argue that financing and ownership models that address renewable energy complementarity, spatial organization of resource potential, demographics, pushback from incumbents, and inclusion of traditionally marginalized groups, are common issues across all Member States that are crucial for the transposition of RED II and a just energy transition. This paper highlights the benefits and challenges of widespread development of RECs, and using examples from the pending transposition process provides policy advice for effective implementation of the RED II with respect to RECs.

## 1. Introduction

Renewable energies (RE) must achieve at least 63% share of the energy system by 2040 to meet both the 2030 Agenda for Sustainable Development, and Paris Agreement targets (United Nations, 2017). Within the electricity system, moving past the current technical observed maximum 20–40% RE (Martinot, 2016) on the grid requires 1) a new energy system logic and architecture, and 2) measures to increase social acceptance of system changes across widespread geographies and different types of stakeholders (Seidl et al., 2019). This article discusses the consequences for the Energy Union of the EU relaunch of the European Clean Energy Package for all Europeans (CEP) (European Commission and Directorate-General for Energy, 2019). The recast of the Renewable Energy Directive - RED II (European Parliament and Council of the European Union, 2018) as part of the CEP was passed in 2018/19 at the EU level. Its rules are embedded in those of the 2019 Internal Electricity Market Directive (IEMD) and Regulation (IEMR) (Jasiak, 2018). Product of a decade long learning process, the updated directive establishes several new binding targets for the EU for 2030 (Solorio and Jörgens, 2020), such as at least 32% of EU's gross final energy consumption sourced from RE, at least 14% of transportation fuel from renewable sources by 2030, and an increase by 1.3% annually of the share of RE in the energy supplied for heating and cooling. The RED II, in addition to the CEP's provisions on common rules for the internal market for electricity, energy efficiency, governance, buildings' performance and risk preparedness, is a key instrument for achieving the EU's 2030 and 2050 climate targets, updating its energy policy. It also introduces policy frameworks for new and existing market and system

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actors that facilitate the further deployment of RE and encourage the necessary private and public investments based on market signals.

If effectively implemented and transposed into national law, the RED II has the potential to accelerate a more just and sustainable energy transition by facilitating the widespread implementation of "Renewable Energy Communities" (RECs). Under the RED II, RECs are majority owned by local members or shareholders, entitled to produce, store and/or distribute energy, supported by an "enabling framework" (detailed in Section 2), and authorized to share energy within the community. They are part of the rapidly evolving sector of locally-focused distributed energy ownership often referred to as "community energy". The sector is diverse with various interpretations of what a "community" is, how decision-making power is distributed, who receives project benefits (i.e. in the form of direct electricity benefits, financial returns), and the motivations for the project (Hicks and Ison, 2018). In general, to be defined as community energy, initiatives have some form of inclusive, participatory decision-making, a "local" focus, and motivations for operation that go beyond profit maximisation, all criteria that were also included in the RED II. These criteria are intended to spur rapid societal transitions to a new energy system by encouraging public uptake of, and support for, sustainable energy by broader publics in a way that avoids a reconcentration of political power and wealth in the hands of a small number of energy companies. Community energy is a fundamental departure from the centralised, profit maximisation-focused model of electricity generation and distribution that exists in most advanced economies (Burke and Stephens, 2018).

As countries transpose the RED II into national law, there is significant value in considering the benefits that substantial support of RECs can provide. Research has shown that community energy has the potential to unlock private investment and financing for RE (de Brauwer and Cohen, 2020), provide social benefits (Burke and Stephens, 2018), and maximize efficient use of the grid (Koirala et al., 2016). It can increase public acceptance and installation rates of RE, while creating diversified revenue streams and green jobs (Hoch et al., 2019). By enabling community participation in RE development, as well as redistributing the financial and political benefits of energy asset ownership, RECs have the potential to contribute to the democratization of RE access and benefits. These dynamics have been addressed in academic literature by work on "energy democracy" (e.g. Szulecki (2018)).

Although the deadline for the 27 Member States of the European Union to transpose the new rules of the RED II into national law was June 2021 it is expected that the process will last for the next few years. Against this background, this paper highlights the benefits and challenges of widespread development of RECs, and provides policy advice for effective implementation of the RED II in EU member states with respect to RECs.

## 2. Renewable energy communities: definition and enabling framework

In 2015, the European Commission issued two Communications: "Delivering a New Deal for Energy Consumers" and "On a New Energy Market Design" (European Commission, 2015a, 2015b). Their message was that the three pillars of future consumer energy policy would be consumer empowerment, smart homes and networks, and data management and protection. The Commission explicitly emphasised the role of *prosumers* (European Commission, 2015c) and thus advocated for both reducing energy costs through self-generation and consumption, and expanding the consumer's role through intermediation and collective participation schemes. Consequently, when developing the new market design, the European Commission's identified priorities were (1) (variable) RE promotion and deployment, (2) market integration and (3) putting consumers "at the centre of the future energy system" which includes making them self-consumers and (co-)owners (European Commission, 2015c). Here it should be recognized that the attractiveness of RE in general is assessed on the wholesale market, where renewables compete with other generation sources while the attractiveness of self-consumption depends on retail prices (Welsch, 2017); the challenge is thus how to frame a consistent policy to incorporate prosumers, be it individuals, municipalities or SMEs, as central actors linking RE with self-consumption.

To qualify as a REC and benefit from the RED II "enabling framework", the new governance model of the RED II outlined in Table 1 must be met (not to be confused with the Energy Union Governance Regulation adopted in 2018). A fundamental component of the new legislation is the "active consumer", embracing both consumption and production of RE (i.e. "prosumership"). Pursuant to Articles 21 and 22 RED II, "renewable self-consumers" have the right to consume, sell or store RE generated on their premises (i.e. "prosumage" when prosumption includes storage). The new EU Clean Energy Package legal frame, alongside individual basic energy rights of European citizens, also introduces the above rights for citizens collectively organised in energy communities with a separate and distinct legal personality, i.e., in RECs. Members of RECs have the privilege of sharing electricity, and other forms of energy, between members or shareholders, even when using the public grid. Key aspects to qualify as a REC include geographic proximity of the members controlling the REC to the RE installations and the heterogeneity of members, whereby no single shareholder owns a controlling stake. Geographic proximity of controlling members ensures that local stakeholders are beneficiaries, while the heterogeneity of members upholds the autonomy of the REC collective from individual members.

Additional to the mentioned basic energy rights as prosumers, RECs benefit from a specific "enabling framework to promote and facilitate their development". The RED II refrains from specifying the contents of this new "enabling framework" leaving the competence to define its content to the national legislators. However, the RED II sets three guiding implementation principles, namely (i) facilitating RECs competition on equal footing with large-scale players; (ii) taking into account specificities of RECs when designing support schemes; and (iii) providing public authorities with regulatory and capacity-building support and helping them to participate directly (see recital 71 and Art. 22 RED II (European Parliament and Council of the European Union, 2018). This provides clear direction to legislators on what they must do, but not how to best achieve the required outcomes. Yet, as the motivation for community energy initiatives to qualify as a REC pursuant to RED II depends to a large extent on the attractiveness of the preferential conditions defined in the "enabling framework" we expect large differences across the EU 27.

The new governance model (Table 1) has far reaching implications because the success of citizen-owned energy has, to date, depended upon variable support from national governments. While some jurisdictions have created conditions for REC diffusion, others have maintained regulatory or financial barriers to limit community energy expansion (Brisbois, 2020b; Burke and Stephens, 2018). The RED II REC

**Table 1**
The new governance model for energy communities under RED II (adapted from Lowitzsch et al. (2020)).

| Criteria | Renewable Energy Communities pursuant to Art. 2 (16) RED II |
|---|---|
| Eligibility | · Natural persons,<br>· Small and medium sized enterprises,<br>· local authorities, incl. municipalities; |
| Primary Purpose | "Environmental, economic or social community benefits for its shareholders/members or for local areas where it operates, rather than financial profits"; |
| Membership | Voluntary participation open to all potential local members based on non-discriminatory criteria; |
| Ownership and control | · Effectively controlled by shareholders or members that are located in the proximity of the RE projects that are owned and developed by the REC;<br>· Is autonomous (no individual shareholder may own more than 33% of the stock). |

governance model is intended to ensure that the economic, social and environmental benefits of energy market participation are equitably available to EU citizens.

RECs directly benefit from the "Just Transition Fund" of the "European Green Deal" (European Commission, 2019a,b), explicitly geared towards smaller-scale RE projects (European Commission, 2020), as well as from the European Structural and Investment Funds (European Commission, 2014). However, when clarifying and transposing the "enabling framework" for RECs and the corresponding programs of the European Structural and Investment funds dedicated to RE projects, national and regional legislators need to respect the rules for admissible State Aid (European Commission, 2019a,b; Schön, 2016). To avoid conflicts with these rules, in analogy to the established principles for fiscal and tax incentives for cooperatives (European Commission, 2016), preferential treatment should be tied to the following requisites with respect to a REC's local controlling shareholders or members: (a) the REC acts in their economic interest; (b) their relations are not purely commercial, but are linked to their local individual RE energy supply; (c) they are actively involved as prosumers in the local RE project; and, (d) they are entitled to equitable distribution of the results of economic performance.

## 3. Focus: transposition concerns in relation to RECs

RECs are specified in the RED II but are not the only possible form of energy communities as European energy law allows other private law initiatives (Jasiak, 2018). Instead of decreeing a uniform legal form for RECs, the European legislator has decided for an opt-in mechanism when adopting the new rules of RED II providing the possibility for community energy initiatives to qualify as RECs if they wish so. The result is a market-based approach where only communities finding the REC model useful will use it. Incumbents, usually defined as those with central roles in existing, centralised energy systems, may still set up their own energy "communities" to enable the technical benefits of distributed energy siting. However, to qualify as a REC and benefit from the "enabling framework" and the privilege of energy sharing, the governance model in Table 1 must be complied with. For incumbents, using this model will come at the price of control (i.e. not more than 33% ownership). More commercially-driven models that do not provide the benefits of democratic participation and decision-making, or a redistribution of profits to retail investors, like limited partnerships or silent partnerships, thus compete with RECs.

Confusion over the difference between RECs (Table 1) and other local or "community" energy models can lead to suboptimal policy outcomes that do not capture the range of benefits described above (Devine-Wright, 2019). The scale at which RECs are deployed in practice will depend upon (i) the attractiveness and coherence of the RED II "enabling framework", and; (ii) the elasticity of the underlying business model to allow for the participation of, or cooperation with, professional actors from the energy sector. Policy makers should be clear about the differences between RECs and other types of energy communities to ensure policy coherence.

The EC BRIDGE's "REC task force" has outlined the wide variety of possible RECs and stressed the importance of REC function (e.g. generator, aggregator) and context (e.g. social, institutional) for the choice of both legal vehicle and financing sources involved (Hannoset et al., 2019). In a similar manner, the Asset Study (Tounquet et al., 2020) stresses the interrelatedness between functional context and the business/financing model of RECs. The flourishing movement of energy communities, many of which emerged long before the passing of the CEP, show a broad variety of patterns involving different combinations of (innovative) organizational and contractual arrangements, (local) identities and (common) interests depending, amongst other factors, on geography (Lowitzsch, 2019). The implementation of RECs is influenced by each of these factors but it is the combination of them in a particular setting that may be hindering or facilitating. The geographic, technological and cultural diversity of RE-projects, in combination with this interdependency, lead to complexities that preclude "one size fits all" solutions, even within a given country. However, while "identity", "interest" and suitable technology are deeply rooted in geographies and cultures, there is elasticity in how organizational and contractual arrangements are developed (Baigorrotegui and Lowitzsch, 2019). This is reflected in our guidance on potential financing and business models.

To address the complexities of implementation, we discuss four key socio-technical issues important for policy makers responsible for transposing the new rules to consider: to (1) encourage RE "clusters" that support resource complementarity between RE amongst a range of actors to minimize costs and maximize benefits of RE integration; (2) consider relationships between the spatial distribution of RE potential, community density and demand, and demographics with the aim to maximize both social acceptance and investments in RECs; (3) anticipate input and pushback from incumbents to ensure effective implementation of new policies; (4) encourage inclusion of gender diversity, vulnerable consumers and low-income households to ensure a just, and socially accepted, energy transition. In our discussion of socio-technical issues, we recognise that individual Member States have their own complex path-dependent traditions of RE and social economy. Addressing these complexities requires developing financing and ownership models that reflect both the technical and the social requisites while being sufficiently adaptable (Roby and Dibb, 2019). To illustrate this challenge, we subsequently compare two financing/-business models that are consistent with the RED II governance model for RECs. As Member States are currently transposing and revising laws, and the revision process will continue beyond the June 2021 deadline, we provide relevant examples from first adopters.

## 4. Key socio-technological issues for the transposition of RED II with regard to RECs

The presentation in this section follows a common structure, that is, a) key definitions, b) benefits, c) challenges, d) experiences and e) policy recommendations.

### *4.1. Address complementarity, heterogeneity and proximity simultaneously*

Complementarity, the asynchronicity of power production amongst RE, is an optimal technical and economic solution for the integration of RE onto the grid (Hoicka and Rowlands, 2011). Complementarity means using a variety of different variable RE at the same time to smooth out power production. Low power production from one source can be compensated by power production from other sources. Successful uptake of RE requires technological innovation and interventions that, due to the nature of RE, depend upon space, time, contrast and complementarity.

The many benefits of complementarity include improved grid stability (Xinshuo Zhang et al., 2018), increased network capacity to integrate variable renewable power (Sun and Harrison, 2019), and reduced system costs for energy storage (Ramirez Camargo et al., 2019a). Prioritizing complementarity serves to decrease not only required RE generation capacity, but also the storage and backup requirements. This holds for clusters scaled at residential levels (Ramirez Camargo et al., 2019a), for industrial consumers with a constant demand (Ramirez Camargo et al., 2019b), and for entire countries (Schmidt et al., 2016). Further optimization can occur when energy systems address heat, cooling, transport and electricity demand jointly. For example, heat pumps that input electricity and output heat can be an optimal complement for electricity surplus from variable renewables, and they can be combined with district heating networks, or heat and power installations (Lund et al., 2014).

The main technological challenge to the exploitation of these energy sources is that of balancing geographically-dispersed, intermittent RE

with demand. In terms of implementation, it is not yet clear how to encourage complementarity of RE by multiple actors in a RE cluster in policies that promote RE, including RED II. Although complementarity has been studied extensively with regards to energy system optimization and RE integration, there has been little to no analysis of policies that encourage complementarity (Haley, 2014). While there is an emerging literature on multi-actor grids and decentralization (Ghadi et al., 2019; Grosspietsch et al., 2019), there is limited knowledge about how to encourage multiple actors as prosumers and producers on a localized grid to provide complementary RE (Wolsink, 2012). Social science literature on decentralization recognises that social actors should be involved in decision making of shared, small scale RE systems. Furthermore, it promotes technical flexibility, but does not specifically address complementarity (e.g. Brisbois, 2020b). Despite the lack of research into enabling policy, legislators still need to consider how to build capacity for and incentivize complementarity among actors who produce and consume renewable power in a REC, in order to capture techno-economic benefits.

The initial Italian transposition of REC rules of RED II (Italian Republic, 2019) highlights these issues. The current incentive design unintentionally hinders complementarity among RE and inhibits RE clusters. In Italy, legal entities established as RECs are limited by size and by date of entry into operation. The size limit of 200 kW of RE limits the combination of RE, for example the integration of wind power, and restricts heating systems (Borroni et al., 2020). By restricting projects to those entering into operation after March 1, 2020, potential RECs are inhibited from adding onto existing RE installations implemented prior to this timeframe. Furthermore, an incoherence in the incentive system puts existing energy communities with RE plants already in operation before March 2020 – according to the new regulation, these do not qualify as RECs – at a disadvantage vis-a-vis to RECs established after March 1, 2020. In practice, a new energy community that (also) includes older installations will lose various incentives provided over time for its individual members. In particular, photovoltaic systems in the form of on-site exchange ("scambio sul posto", a net metering arrangement) will not have access to the new collective incentives provided for RECs. This may result in the RECs not including older installations that would complement the new RE plants. Although the rationale of the legislator to avoid cross subsidies is understandable, the Italian example demonstrates the importance of specifically allowing for RE clusters that include complementarity and the benefits they confer.

Sociotechnical innovation in RE can be implemented alongside RECs to maximize both grid and social benefits. RECs can be deployed with "RE clusters" (Fig. 1) that address the technical challenges to RE uptake (Lowitzsch et al., 2020). RE clusters are composed of bi-directional energy flows, interconnectivity amongst a range of actors on a system, elements of flexibility (e.g. storage, demand response), as well as complementarity of RE (Lowitzsch et al., 2020). The CEP encourages interconnectivity, bidirectionality and flexibility, but it does not explicitly encourage complementarity amongst RE. Support for integrated spatial and energy planning at the local scale should help exploit complementarity between multiple sources and technologies (Ramirez Camargo and Stoeglehner, 2018) for RECs.

### 4.2. *Proximity and energy sharing*

Proximity of REC participants to a REC's production installations affects their eligibility to be controlling shareholders as well as the type of RE availability in that specific geographic location.

Proximity rules ensure that local stakeholders are beneficiaries of a REC but they also affect technical and spatial conditions for participation. Due to geography, RECs in urban areas can specifically benefit from their high energy demand density and the demographics of potential investing members. The aggregation of a high number of individual demands in a relatively small area enables the creation of efficient multi-carrier (i.e. heat, cooling and electricity) RE clusters that use waste heat capture and provide flexibility services, such as demand side management. RECs in rural areas with low energy demand and with available

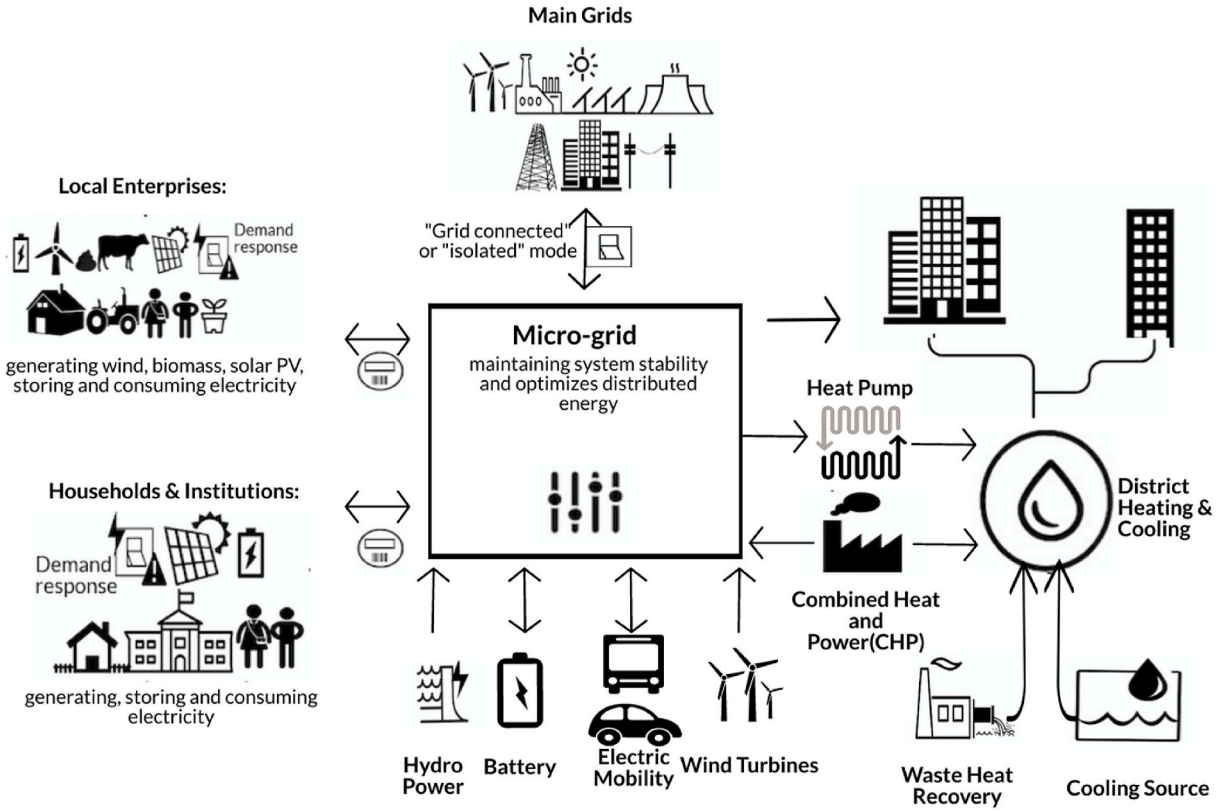


**Fig. 1.** Possibilities for Renewable Energy Clusters (source: adapted from Lowitzsch et al. (2020)).

space for the installation of RE plants can become net energy producers. The EU is one of the most densely urbanized regions globally (UN Habitat, 2016), and urban areas house most of the opportunity for financing and investment compared to rural areas. This is important since consumer co-ownership of RE tends to be financed both by communities of place – people bound together by their common location like a village or neighbourhood – and by communities of interest – people who might be geographically distant but who coalesce due to common energy interests (Baigorrotegui and Lowitzsch, 2019). Projects funded by communities of interest tend to adopt RE technologies that are chosen based on market or incentives, are grid connected, and often installed by international, large-scale companies and therefore standardized and scalable, i.e., mainly singular RE sources (Baigorrotegui and Lowitzsch, 2019). Projects funded by communities of place tend to be off-grid or micro-grid, and tailor made to the local RE potential and energy needs (Baigorrotegui and Lowitzsch, 2019).

Defining proximity too narrowly could disqualify urban or rural projects that spread over a large territory comprising various RE. Large single-sourced RE projects like a community-owned wind park may also require financial and organizational participation beyond a single municipality (Creamer et al., 2018). In both cases, members too far away from individual RE installations would be excluded from the circle of controlling shareholders affecting both the heterogeneity criteria of membership and complementarity of RE. Furthermore, considering complementarity, both urban and rural projects involving more than one RE source will not necessarily be built close to each other due to planning law requirements and availability of suitable sites. For example, minimum distance rules for wind power means it will be far from roof-top solar. Under narrowly defined proximity, these projects could be disqualified as RECs, denied substantial funding as RECs, and deprived of the privilege of energy sharing, a requisite to tap the potential of RE complementarity. A related problem concerns the conditions under which electricity sharing within the REC should be allowed with regard to the grid architecture.

Member States are already adopting different approaches to these challenges. For example, the Portuguese law 162/2019 of October 25, 2019 (Portuguese Republic, 2019) explicitly calls for a case-to-case approach in assessment of proximity. The Austrian draft law 58-ME XXVII GP of September 16, 2020 (Republic of Austria, 2020) allows for the medium voltage grid as the upper limit while distinguishing grid fees depending on whether low ("Lokalbereich") or medium voltage ("Regionalbereich") is used. Some early laws, such as the cited Italian law from 2019, restrict electricity sharing to metering points on the same low voltage grid behind the same transformer station, presumably to address capacity concerns of grid operators. However, the result is to inadvertently prevent potential members of a REC from joining just because they are not located on the same lower voltage grid. In dense urban settings, two sides of the same street may be behind different transformers. In this way, the REC requirement of openness to all potential local members based on non-discriminatory criteria and the principle of equality in European law are violated.

Transposition of the proximity criterion for RECs requires careful calibration as it affects both heterogeneity of ownership (i.e., the number of potential financial investors (see Table 1)) as well as the RE cluster configuration (i.e., type of RE, complementarity, and use of the grid). Legislators should define the proximity criterion so as to ensure ownership and governance criteria are met, but also that RE cluster installation types are not unduly limited. At the same time, they must consider how to maintain the ability of REC members to share and/or sell electricity to each other. A flexible definition of proximity, depending on the spatial organization of a REC, can help to balance motivations with geographies of energy supply and demand, urbanization trends, and demographics of investment, with heterogeneity of REC membership. The terms "proximity" and "local area" should be contextualised, adapting them to what is nationally and regionally appropriate.

### 4.3. *Powershifts - anticipate pushback from incumbents*

Political power is the ability of actors to have their interests realized in political settings. Those who dominate key economic sectors are often well placed to realize their political goals (Fuchs, 2007). Decentralization has the potential to shift the balance of political power that shapes energy decision-making (Brisbois, 2020a). At present, electricity market ownership across the EU is largely centralised in the hands of a relatively small number of public or private generation companies. The shift in market ownership implicit in the RED II is both politically and economically significant. It will lead at least to some reorganisation of control over energy systems and associated financial benefits, and the political influence that comes from controlling societally essential resources (Burke and Stephens, 2018).

Successful implementation of the RED II will disrupt ownership patterns in energy markets. At least some fraction of market share will be distributed amongst large numbers of new REC members. We take the position that the anticipated changes in ownership structure imply greater social, environmental and economic good for all (Raworth, 2017). While incumbents may seek the minimization of economic or political disruption, broader economic participation is crucial for the active engagement of the European citizenry (Lowitzsch, 2019). This perspective is supported by literature on "energy democracy" which extensively reviews the positive political impacts possible from an opening up of energy system ownership to a wider range of actors (see Szulecki (2018) and Burke and Stephens (2017)). There are already emergent examples of community ownership and prosumership creating the conditions for broader democratic engagement (e.g. Greenberg and McKendry (2021)).

Many incumbent policy and regulatory actors now recognise the potential of an energy system characterised by a non-trivial contribution from RECs - as evidenced by the approval of the RED II at the EU level. However, they have concerns related to the technical and financial capacity of new actors, the infrastructure investment required to enable decentralization of the grid, equality of opportunity for citizen participation in RECs, and general provision of secure energy supplies (Johnson and Hall, 2014). Many incumbent commercial actors have, to date, actively opposed the diversification of electricity ownership because it will reduce profitability (Brisbois, 2020a; Hess, 2016; Lee and Hess, 2019). However, these incumbent actors hold the technical and institutional knowledge required to ensure smooth functioning of the energy system. A key challenge for REC diffusion is thus that it requires cooperation between incumbent actors and new community interests.

The ability of RECs themselves to defend their interests and engage politically is growing (Brisbois, 2020a). However, there is real potential for co-optation or perversion of the intent of the RED II by those with an interest in maintaining the political and economic status quo. Forms of local energy, owned and controlled by incumbents, can reap the technical benefits of decentralization but miss out on the myriad socioeconomic benefits of community energy models. This would be a missed opportunity, and would jeopardize the success of the energy transition by hampering public acceptance (Devine-Wright, 2019).

Political pushback against diversification of ownership can take many forms. It includes easily visible activities such as direct lobbying (Brisbois, 2020a), attempts to influence public opinion through the media (Lee and Hess, 2019; Rosenbloom et al., 2016), and legal challenges against enabling policies (Hess, 2016). The central role of incumbent companies in energy systems also means that they are able to influence the transposition of the RED II in ways that can be hidden or invisible. For example, influence over technical regulatory code panels can be used to set rules detrimental to RECs (e.g. Lockwood et al. (2017)). Control over data on grid capacity has also been used to limit both RE and REC penetration by claiming grid constraints where there are later shown to be none (Stokes, 2013). Policy makers seeking to reap the benefits of RECs will need to proactively develop plans that support and defend these initiatives.

While there is a threat of co-optation by vested interests, restricting design options for legal and financing models to prevent abuse of RECs by incumbents may also hinder their implementation on a broader scale. For example, the Greek law on Energy Communities from early 2018 (Hellenic Republic, 2018) is one of the first codifications of REC, which was passed before the RED II. Anticipating the new RED II rules for RECs, the Greek legislation limits the legal form of qualified RECs to that of cooperatives (REScoop and ClientEarth, 2020). This narrow approach rules out other types of legal forms, which limits the variety and reach of RECs.

To ensure the intent of RED II is preserved, it will be important for policy makers to commit to technical, political and institutional capacity building for REC members (Berka and Creamer, 2018). Actors should also be empowered to participate in local energy planning processes to help enable complementarity of RE in and amongst RECs. To ensure a level playing field for RECs, there is a need for enforcement of disclosure rules to ensure open, transparent and accessible technical data from operators who may make arguments that this data is proprietary (Brisbois, 2020b; Stokes, 2013). The RED II opens up new energy governance dynamics as it is inclusive of the wider range of energy actors. It may be helpful for policy makers to begin to think of energy systems as multi-level and increasingly participatory. This will enable policy approaches that clearly allocate roles and responsibilities, and sufficient funding (Gastil and Richards, 2013), considering the capacities of different actors. It may also be appropriate to consider direct democratic mechanisms like citizens' assemblies that attempt to compensate for political power imbalances when making important system decisions (e.g. grid modifications, creation of regional energy system coordination bodies) (Ferejohn, 2008; Gastil and Richards, 2013; MacArthur, 2016).

Finally, as the Greek example demonstrates, transposition is a balance between ensuring democratic mechanisms and principles, and allowing sufficient elasticity with regard to the form of REC incorporation. Therefore, national legislators should take into account the functional context of RE projects and reward their social and local benefits by targeted incentives in the enabling framework.

### 4.4. *Energy justice - design for inclusion*

Community energy projects are often presented as a strategy for tackling energy poverty - understood as inadequate levels of access to essential services like heating and lighting (Bomberg and McEwen, 2012). They are also viewed as one possible vehicle for pursuing energy justice, or providing "… all individuals, across all areas, with safe, afford-able and sustainable energy" (McCauley et al., 2013).

The RED II rules regarding prosumership are consistent with principles of energy justice and, if effectively transposed and taken up, should contribute to improved justice outcomes. The RED II states that RECs should be "open to all potential local members based on non-discriminatory criteria". At the same time, failing to simultaneously address energy justice issues can erode public confidence and reduce support for the energy transition (MacArthur, 2016; Wyse and Hoicka, 2019).

REC projects may not equally progress benefits or participation for everyone (Creamer et al., 2018), even with the careful definition of RECs in RED II. Outcomes depend on who plans and executes RECs, and how they do it (Berka and Creamer, 2018). Ignoring justice concerns can aggravate poverty and non-participation, entrench gender biases (Jenkins, 2019), and thus fail to optimize the projected social and economic benefits from RECs. Impoverished households should be enabled to participate in and benefit from projects, rather than only those with higher socio-economic status. Prosumership, an important component of RECs, requires access to financing, know-how, and a certain willingness to take risks. At the same time legislation on social welfare transfers require social benefit recipients to have no access to asset ownership or income (Lowitzsch and Hanke, 2019a), prohibiting their participation in (co-)ownership of RE installations.

Those with poor housing conditions and irregular employment already struggle with changes in domestic energy infrastructure, such as energy efficiency refurbishments (Buzar, 2007). More changes in the regulatory frameworks and uncertain future benefits may also discourage participation (Devine-Wright, 2019). For these reasons, legislators should distribute prosumption benefits equally across social groups. This will facilitate social acceptance and political support for the transition itself (Fuller, 2017; Middlemiss and Parrish, 2010). Socio-cultural aspects of gender and race mediate access to REC benefits (Kumar, 2018; Petrova and Simcock, 2019). The average 16% gender pay gap (Eurostat, 2019) in the EU means that women have less income to invest as capital in RECs. Across Europe, women have invested less in and own smaller shares of RE cooperatives than men (Fraune, 2015; Lapniewska, 2019). Energy poverty is shown to exacerbate existing gender inequalities. RECs, despite existing demographic trends, offer opportunities for empowerment and the reconfiguration of existing gender relations (Petrova and Simcock, 2019).

An example of an innovative inclusive approach for the transposition of RED II is the French law on energy and climate of November 2019 (French Republic, 2019). In addition to defining the compliance criteria for RECs, it also defines by law the legal entity implementing a social housing project as a potential REC. The law also defines the residents of these buildings as REC members by default. In this way, the French legislator has implemented an opt-out model for social housing RECs that accelerate participation of the residents. It remains unclear to what extent the new members also share in the ownership of the REC. The idea to link RECs to housing projects is also taken up by the Austrian legislator in the September 2020 draft law (Republic of Austria, 2020) that explicitly acknowledges co-owner associations according to the 2002 Condominium Act as vehicles for RECs.

The capacity of marginalized communities must be addressed directly by participatory and public engagement activities (Smith et al., 2016; Wyse and Hoicka, 2019), and in policy development. Rather than a one-size-fits-all plan, RED II policy mechanisms should be flexible enough to respond to the socio-economic capabilities and needs of different communities, including potential risks and opportunities and how they can be respectively mitigated and enhanced. To specifically address this, ancillary rules should accompany the transposition of RED II. For example: (a) provide target incentives for RECs that effectively include vulnerable groups; (b) exempting investments in RECs from the necessity to liquidate one's assets when applying for means-tested social transfers; (c) allowing direct energy subsidies for vulnerable consumers to be capitalised as a lump sum to join an existing or set up a new REC (Hanke and Lowitzsch, 2020).

## 5. Financing and ownership models

Accommodating the above socio-technical considerations requires appropriate business models. The appropriateness of any given REC business model depends on context. This includes the socioeconomic and demographic profile of the participating community, the overarching governing and legal frame, capacities, and the physical resource potential. Business models for RECs require (i) sufficient elasticity to include different types of co-investors; (ii) allowance for a fair division of responsibilities and benefits between them; and (iii) respect for RED II governance requirements.

This section compares two business models that - in contrast to that, e.g., of limited partnerships - are consistent with the governance requirements for RECs in the RED II (summarised in Table 2), and that will allow RECs to fulfil their technical and socioeconomic potential: The co-operative model (prevalent across existing RECs and therefore discussed in less detail), and the Consumer Stock Ownership Plan (CSOP), a business model specifically intended to support engagement of low-income households in joint ventures.

The co-operative model has been very successful across Europe for the development and diffusion of small-scale RECs. The model is defined

**Table 2**
Comparison of consumer ownership models with regard to the RED II aims.

| | Cooperative | Trusteed scheme like e.g., CSOP | Limited Partnership |
|---|---|---|---|
| **Eligibility as REC** | Yes - prevalent in mid-size projects; lead by cooperative principles | Yes - designed for heterogeneous co-investors; voting rights proportional to shares; not suited for small projects | No - violates "autonomy" criterium; prevalent in large investor-led projects |
| **Involvement in decision-making** | Direct: "one member one vote"; general assembly is the highest decision-making body | Indirect/two-tier: Trustee exercises rights for consumer-shareholders for day-to-day decisions; only crucial decisions voted on first and then represented by trustee on board | Very limited: right to information; restricted control rights for consumer-shareholders; |
| **Inclusiveness** | Members contribute commitment and capital. A low share price usually facilitates entry | Financing technique based on leverage; only symbolic capital contribution; no day-to-day personal involvement required | Very limited: Consumers exclusively contribute capital; leverage not foreseen, savings required |
| **Transferability of shares** | Transferable with restrictions; entry into commercial register | Freely transferable; low transaction cost; only trusteeship agreement is altered | Requires managerial consent; entry into commercial register; |
| **External management** | Not possible; managers elected by and from general assembly | Trustee controls management board; can hire external expertise | General partner (usually Ltd.) manages project can hire external staff; |
| **Compatibility with existing municipal/ conventional investment models** | Emergent with challenges remaining | Full compatibility | Full compatibility |

by the co-operative principle of 'one member, one vote' regardless of the number of shares held. Compensation for co-operative managers is usually capped, and profits from operations are allocated under agreed-upon terms. Co-operatives pursue economic or social community benefits for their members and contribute to the development of their communities by sourcing and investing locally. They can give equal or greater priority to social or environmental outcomes, if they so choose. In contrast, the main objective of business corporations is profit for their shareholders. Co-operatives therefore have more leeway in defining operational priorities.

Co-operative models present some challenges. They often rely on a significant amount of volunteer labour from members. This can result in capacity and stability challenges (Tarhan, 2020). They also tend to be risk-averse, limiting participation in larger-scale projects which may have overarching benefits (Herbes et al., 2017). With respect to the heterogeneity of co-investors in RECs, for example, when co-operatives partner with municipalities, the necessity of representation of their officials on management and supervisory bodies has been reported as an obstacle (Lowitzsch and Hanke, 2019b). This is because all members of cooperatives are elected by and from the members' general assembly and cooperative law generally does not acknowledge a right of delegation. Co-operatives also require upfront capital for membership. This is a barrier for lower income segments of society and means that the benefits of REC participation are predominantly experienced by already privileged segments of society (Yildiz et al., 2015), and are not gender diverse (Fraune, 2015; Lapniewska, 2019).

There remains a need for business models that guarantee open entry to RECs, including for low-income households and consumers threatened by energy poverty as postulated by the legislator (compare Art. 22 para 4 (f) RED II), while ensuring representation of municipalities or other co-investors like SMEs on supervisory bodies. The Consumer Stock Ownership Plan (CSOP), facilitates entry of those without capital, time or expertise (Lowitzsch, 2019). A CSOP (Fig. 2) is a business model that employs an intermediary operating company and facilitates the involvement of individual consumers as investors through a trusteeship. The trustee is an independent fiduciary (a physical person or a corporate entity which may also be in turn a cooperative) installed, in the case of RECs, by the local community. The trustee represents the consumer-beneficiaries.

CSOPs are particularly suited to situations where citizens lack upfront capital. The CSOP can buy into existing installations, or invest in new RE plants and may use external financing, thereby achieving the benefit of financial leverage. To address the lack of access to capital, the operating company is authorized to borrow funds for the acquisition of shares in the RE plant on behalf of the energy consumers. Revenues from the sale of the energy produced are used to repay the acquisition loan assumed by the CSOP. Once this debt is amortized, revenue is distributed to the consumer-beneficiaries. In this way, citizens with low income are enabled to repay their share of the acquisition loan from the future earnings of the investment.

Since the operating company is usually a privately held corporation with limited liability, CSOPs are also attractive for (local) commercial investors. Different than cooperatives, voting rights are proportional to shareholding. The REC governance model, required by RED II, is already enshrined in the statutes of the operating company. This means that there are 33% and 51% shareholding limits to ensure that no one actor is able to control a disproportionate amount of decision-making power. It also means there are restricted rules for sale between shareholders, or to outsiders.

The two-tier level of rule setting "corporate statutes - fiduciary agreement" makes it possible to include objectives unusual to the corporate world. For example, the company statutes can contain stipulations on board composition (such as gender or income diversity), or on financial assistance for acquisition of shares to specific groups. The individual fiduciary agreements may contain gender-oriented rules for sale. This is an important lever as there are arguments for gender diversity in leadership in the renewable energy sector to bring about both energy democracy and energy justice (Allen et al., 2019; MacArthur et al., 2020), as well as organizational effectiveness (Pearl-Martinez and Stephens, 2016).

The trusteeship is designed to protect the interests of consumer shareholders while rendering co-investments attractive to other partners. Representation by a trustee makes the consumers' voting behaviour predictable while still ensuring meaningful participation in decision-making. The fiduciary agreement, negotiated at CSOP inception, defines which decisions are retained by the consumer shareholders, and which are delegated to the trustee. It also defines the rights and obligations of the consumer beneficiaries. As a rule, decision-making for day-to-day tasks is left to the trustee jointly with the other shareholders of the REC. This provides stability because it ensures that consumer shareholder participation does not affect the management of routine, day-to-day operations. Strategic decisions are voted amongst the consumer shareholders. These votes are then represented via the trustee on the board of the operating company. Benefitting from a stronger position relative to the other municipal or corporate co-owners in the CSOP, the consumers can avoid fragmentation of their voting rights.

The compatibility of the CSOP model with municipal and more commercially-oriented investments comes at the price of moving away from the one-member-one-vote principle of cooperatives and accepting

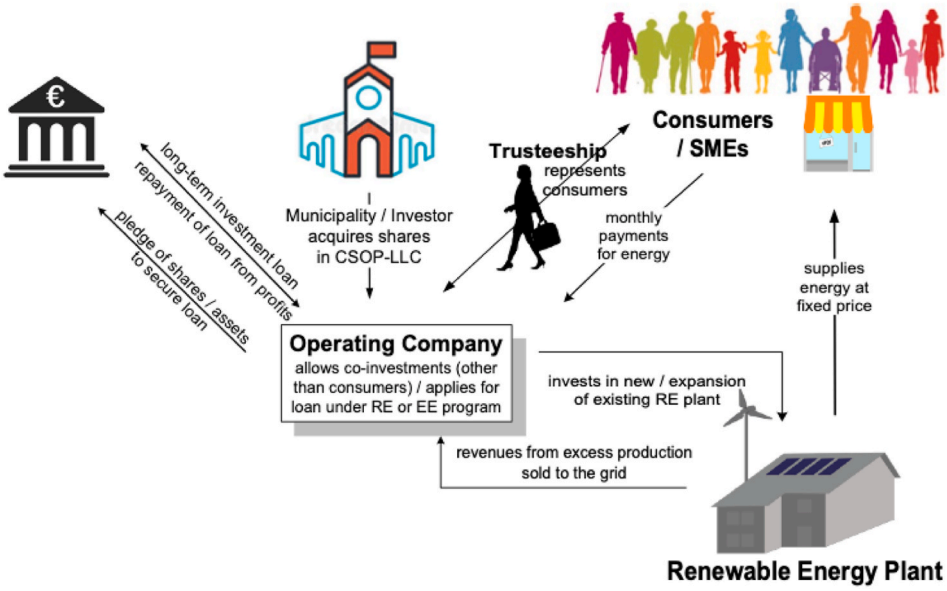


**Fig. 2.** Structure of a Consumer Stock Ownership Plan as a legal form for RECs.

voting rights proportional to shareholding (see comparison in Table 2). However, as a trusteed scheme, the CSOP compensates this possible imbalance by ensuring that consumer shareholding is consolidated and that local shareholders will effectively control the RECs. A downside of the CSOP are the additional costs associated with the trusteeship which, nevertheless, can be offset to some extent by reduced transaction costs. However, CSOPs are not suited for small projects and require a minimum size to justify the two-tier decision-making process.

Last but not least, the possibility of involvement of professional actors from the existing energy sector ensures that required expertise and experience is available to allow the REC to implement the more complex elements of RE clusters. This concerns the balancing of responsibility, flexibility options and storage when various RE are involved. The capacity of a REC to become an aggregator and/or to engage in demand side management, and scale the projects, are all important to profitability and improving the economic feasibility of RECs. This is because the reduction of load peak demand can be rewarded with reductions for grid fees but requires a certain minimum size (see e.g., in Germany paragraph 14a of the Electricity and Gas Supply Act (Federal Republic of Germany, 2020). Allowing for maximum heterogeneity of co-investors - not *a priori* excluding the incumbents - can therefore also encourage complementarity between RE.

## 6. Conclusion

Different Member States pursue different priorities when transposing the RED II, in particular with a view to the anticipated role of RECs in the Energy Transition. Therefore, while the RED II (and the IEMD) provide a common framework, it is already clear from the current transposition process that the rules for RECs differ to a wide extent depending on geographic, cultural, economic and political factors across the EU. We have argued that there are a number of general issues to be considered in every Member State that would support the scale-up of RECs. Reviewing academic literature on socio-technical factors, we discuss how geographic dispersion, and temporal variability of RE potential, push-back from incumbents, and problems of representation and inclusion in community energy projects will affect successful transposition of RED II. Policies will ideally build upon the coupling of technological solutions with attention to social and political factors, based on sound analysis and knowledge of engineering, spatial planning, and social science. These settings and factors need to be reflected in the business and financing models, which can be considered a more flexible element of the process, because they are less determined by geography. To illustrate this, we reviewed two examples of business and financing models, namely co-operatives and CSOPs, that allow participation in RECs in different contexts.

In summary, while the current RED II goes some way toward supporting all of the issues discussed, more specificity is required. In light of the diversity of the 27 EU Member States, taking into account the path dependency of sociotechnical settings, one-size-fits-all approaches are not the solution. Although exchange of best practice between national legislators is needed, it should be stressed that applicability at the national level to a large extent depends on regional priorities. For example, Central Eastern European countries that focus on municipal-led RE cluster projects that are also meant to contribute to the renewal of outdated energy infrastructure have different needs from countries with a strong grassroots RE cooperative movement like Germany or Italy. Organizational and contractual arrangements must be designed appropriately, to provide elasticity outlined to the business models, as outlined here. While co-operatives have been the most frequent legal form for energy communities to date, the CSOP model has been highlighted as an alternative for situations where upfront capital is limited, membership is heterogeneous, and citizen members are in the minority and need advice to ensure representation vis-a-vis other institutional shareholders (e.g. SMEs and municipalities). CSOPs are also useful where projects are designed to be scalable.

The transposition examples from Austria, Greece, Italy and France exemplify the broad range of possibilities and limitations of implementation by national legislators. As transposition continues, we recommend exchange of best practice between Member States on the elements we have highlighted above. This is vital to tailor the “enabling framework” to the most suited (regional) business models, while meeting the challenges of ensuring efficient and complementary installation of RE clusters.

In conclusion, as key aspects of our policy advice, we propose that rules are transposed:

- **To encourage complementarity amongst RE sources** in particular via specific incentives as part of the “enabling framework”. Prerequisite is to encourage multiple actors as prosumers and producers on a localized grid; this in turn requires additional efforts and thus

additional incentives that need to be harmonised with existing ones; furthermore, capacity limits should be avoided.

- **To contextualise the interpretation of "local" and "proximity"** in such a way as to account for complementary of generation potentials and consumption requirements in urban versus rural areas. Legislators are confronted with the challenge to strike the balance between simplified rules that are easy to apply and tailored solutions that require additional administrative and time effort; a way out of this dilemma could be standard rules with the possibility to apply for exemptions if certain criteria are met.
- **To specifically support energy/electricity sharing** as a new option for RECs that supports complementarity of load profiles and RE with equitable and fair rules concerning, e.g., grid fees. Here in particular restricting electricity sharing to the low voltage grid is a trap to avoid as it would arbitrarily set who can join a REC and thus conflict with the principle of "openness of membership" for RECs and more generally that of equality in European law.
- **To ensure that incumbents are enticed to cooperate with RECs**, but without allowing them to co-opt the intent of diversified ownership. Therefore, national legislators should keep the legal framework flexible with regard to the eligible legal vehicles while taking into account the challenge that the heterogeneity of co-investors of RECs poses. At the same time the participation of incumbents as minority stake co-investors should be facilitated, for example, via CSOPs.
- **To ensure that business models and policy designs allow for the full participation of disadvantaged and vulnerable communities.** Ancillary rules to the RED II should provide target incentives for RECs that effectively include vulnerable groups; at the same time vulnerable consumers should be supported directly, for example, by exempting investments in RECs from the means-test for social transfers and/or allowing direct energy subsidies for vulnerable consumers to be capitalised as a lump sum to join an existing or set up a new REC.

## CRediT authorship contribution statement

**Christina E. Hoicka:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Jens Lowitzsch:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Funding acquisition. **Marie Claire Brisbois:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Funding acquisition. **Ankit Kumar:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft. **Luis Ramirez Camargo:** Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition.

## Declaration of competing interest

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.

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