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Empowering Vulnerable Consumers to Join Renewable Energy Communities—Towards an Inclusive Design of the Clean Energy Package

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Received: 15 February 2020; Accepted: 25 March 2020; Published: date

Abstract: The unequal distribution of costs and benefits of the energy transition is a challenge for energy justice and energy policy. Although the empowerment of consumers to participate in renewable energy communities (RECs) has great potential for a just energy transition, vulnerable consumers remain underrepresented in RE projects. The recast of the European renewable energy directive obliges the European Member States to facilitate the participation of vulnerable consumers and support their inclusion in its *"enabling framework"* for prosumership. However, the type and specific design of corresponding measures remains unclear. Against this background this article investigates consumer empowerment in a vulnerability context. In particular we stress the need to understand how vulnerability affects participation in RECs to inform both policy makers and practitioners on its specificities and restrictions for the *"enabling framework"*. To prevent the inclusion of vulnerable consumers in RECs from remaining an idea on paper lawmakers need to be made aware of the implications for a consistent *"enabling framework"*. We argue that both individual vulnerable consumers as well as RECs need incentives and support to boost RECs' capacity to include groups that until now remain underrepresented.

Keywords: renewable energy community; vulnerable consumer; consumer empowerment; energy transition; energy justice; Clean Energy Package.

1. Introduction

Over the past five years, the European Union launched a new design for the Energy Union introducing common rules and new forms of cooperation between the various actors with the adoption of the so-called Clean Energy Package (CEP) in 2018/19 (a package of measures that the European Commission presented on 30 November 2016 to keep the EU competitive as the energy transition changes global energy markets). In the European Green Deal the European Commission (EC) proposes a "new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy" [1]. To comply with its international commitments under the Paris Agreements the EU promotes a comprehensive energy transition, promoting renewable energy (RE) and entailing a more decentralised energy system with consumers becoming producers of the energy they consume, that is, prosumers. The rationale behind incentivising energy prosumership is triggering private investments for the development of RE installations while assuming more energy efficient behaviour [2,3]. The recast of the renewable energy directive (RED II) [4] as well as the internal electricity market directive (IEMD) [5] promote this new role of consumers as prosumers of (renewable) energy both as (1) individual and/or jointly acting self-consumer, and (2) organised in citizen energy communities (CECs) and renewable energy communities (RECs). To boost the deployment of RE the RED II further obliges Member States to introduce an "*enabling framework*" to allow RECs competition "*on an equal footing*" [4] (Recital 26) with

established actors on the energy market and enshrines the protection and empowerment of vulnerable energy consumers. Both the European Green Deal as well as RED II promote the inclusion of vulnerable consumers in RECs as a form of consumer empowerment and a means to fight energy poverty. Art 22 para. 4 RED II specifies:

> "4. *Member States shall provide an enabling framework to promote and facilitate the development of renewable energy communities. That framework shall ensure, inter alia, that:*
>
> *(a) unjustified regulatory and administrative barriers to renewable energy communities are removed;*
>
> …
>
> *(f) the participation in the renewable energy communities is accessible to all consumers, including those in low-income or vulnerable households;*
>
> *(g) tools to facilitate access to finance and information are available;*
>
> *(h) regulatory and capacity-building support is provided to public authorities in enabling and setting up renewable energy communities, and in helping authorities to participate directly;*
>
> *(i) rules to secure the equal and non-discriminatory treatment of consumers that participate in the renewable energy community are in place."* (emphasis by the authors)

Above catalogue stipulates the minimum requirements of the *"enabling framework"* while EU lawmakers have left room for other support measures (*"inter alia"*). In the National Energy and Climate Plans (NECPs) all European member states outline respective national energy frameworks, policies and measures to comply—inter alia—with the Union Climate and renewable energy (RE) targets. According to RED II Art 22 para. 5, "*(t)he main elements of the enabling framework (...) and of its implementation, shall be part of the updates of the Member States' integrated national energy and climate plans and progress reports (...)".* The NECPs shall thus include the design of an "enabling framework" inter alia enabling the participation of vulnerable households including possible tax incentives and exemptions from levies. In consequence prosumption should provide tangible benefits in form of lower energy costs, additional revenues and local economic development [6]. In the context of this paper we focus on the design of a socially just energy transition and the promotion of RE and therefore focus on RECs as foreseen in the RED II.

In this context, the European Commission (EC) promotes consumer empowerment by providing access to information and extending consumption options e.g. in form of facilitated supplier switching or engaging in RE prosumption [7]. At the individual level this includes the need to choose among consumption/prosumption options requiring individual cognitive capacity to process relevant information [8]. Moreover, prosumership requires the willingness to take risks, access to financing as well as time and know-how [6]. While national policies promote prosumership as a central element of the energy transition, only those fulfilling these requirements can acquire their own RE installation and thus benefit from the "*enabling framework*" and its subsidy schemes. Those who do not—mainly vulnerable consumers—not only do not benefit from an "*enabling framework"* but carry the increased burden of rising grid tariffs, levies and energy costs [9]. While those well off can benefit from prosumption more than 50 million people in the EU cannot afford an adequate level of energy consumption and live in energy poverty [10] detrimental to their personal wellbeing and to notions of equity and justice [11].

This unequal distribution of costs and benefits of the energy transition has increasingly become subject of debate not only in academic literature with a focus on energy justice [12] and energy poverty [13] but also in energy policymaking at the European level. While the CEP promotes their participation in RECs as a key factor to overcome energy poverty the European legislator does not specify how to achieve this aim. As will be discussed in detail the empowerment of vulnerable consumers to become prosumers is linked to energy poverty mitigation. However, the current member structure of existing RE projects for instance in Germany [14] points at a need to facilitate the empowerment of vulnerable consumers who currently remain underrepresented in RE projects.

2. Research Question and Approach

Against this background this paper seeks to answer the following questions:

1) How is the empowerment of vulnerable consumers to be conceptualised in the Energy Union and which form should it take? Individual empowerment in form of consumer empowerment has been frequently discussed in contemporary energy policy discourses. The transposition of the "*enabling framework*" in the context of RED II as a central element of the empowerment of vulnerable consumers has great potential yet the question of how to achieve it and with which concrete measures remains open.

2) What are the main barriers for empowerment in a vulnerability context? To develop a concrete policy approach for collective empowerment of vulnerable consumers in RECs we review existing literature concerned with the dynamics vulnerability and inequality produce especially in the energy context. We discuss energy vulnerability as a multidimensional form of deprivation against the background of discriminating systems. We then link insights from behavioural economics on how vulnerability impacts decision making with the discussion of empowerment and its barriers.

3) Which of the identified measures in particular with regard to participation of vulnerable consumers in RECs can be included in the RED II "*enabling framework*" when transposing the directive into national law? In the light of the discrepancy between the stated political aims and the lack of concrete policy measures it is crucial to make suggestions to lawmakers for the transposition of RED II into national law until June 2021. Therefore, we briefly revise the current versions of the NECPs as well as policy documents from the European Commission to understand the state of play both at the EU and national level. While it is beyond the scope of this paper to provide a comprehensive policy analysis it outlines central considerations any policy approach must take into consideration to facilitate the inclusion of vulnerable consumers. Taking into consideration the most important restrictions previously identified we formulate policy recommendations. In this way concrete ancillary measures to facilitate the participation of vulnerable consumers in RECs and thus their active inclusion in the energy transition can be developed.

Section 3 firstly gives an overview of EU empowerment policy in the context of prosumption. Secondly, it discusses energy prosumption both as a form of consumer empowerment and a means to mitigate energy poverty. Thirdly, it addresses the challenges (energy) vulnerability poses as a structural context affecting individual behaviour and describes the multidimensional aspects of its context. While we mostly rely on theoretical literature—where suitable—we also refer to practical examples and the experience of the ongoing Horizon 2020 research project SCORE (Supporting Consumer Ownership in Renewables (https://www.score-h2020.eu) which amongst others also pursues the inclusion of vulnerable consumers. In the last part of this section we illustrate the advantage of collective approaches drawing on empirical evidence from the reactivation of unemployed in Spanish Sociedades Laborales. We argue that the participation of vulnerable consumers in RECs as a form of collective empowerment has benefits beyond individual empowerment. Based on Section 3, Section 4 discusses policy proposals for collective empowerment approaches to facilitate the participation of vulnerable consumers in RECs. As the description of the "*enabling framework to promote and facilitate the development of renewable energy communities*" in Art. 22 para 4 RED II that all MS need to implement focusses on financial incentives and obstacles we emphasise these aspects in our discussion. However, the enumeration of the elements of Art. 22 para 4 RED II is not exhaustive and therefore also other possible measures, among which incentives and framing are included. Section 5 concludes.

3. Consumer Empowerment in a Vulnerability Context—Inclusion in RECs

3.1. The EU Energy Context

The word "empowerment" entails "em", a prefix used to form verbs such as "to make" or to "cause to be", and "power". Thus "to empower" is to make or cause power [15]. Hence, empowerment is defined as "the act or action of empowering someone or something: the granting of the power, right, or authority to perform various acts or duties" [16]. Empowerment, for the powerless, involves a bottom up process whereby they transform from passive or reactive subjects to positive actors [15] in their own lives and thus on the energy market [17]. Empowerment plays a role beyond individual participation in that it determines social cohesion and thus peace and prosperity. Through empowerment, the formerly powerless become capable individuals who are willing and able to take ownership and responsibility for their own choices, decisions, and actions in society or on markets. They thus are accorded basic social rights, respect and dignity. Material resources, information and knowledge are developed and made accessible. As a result, individual opportunities increase [15] and vulnerability decreases.

In contrast to this universal view on empowerment as a social process, consumer empowerment at the European level is informed by the slogan "the consumer at the heart of the energy market". It constitutes the EU energy policy approach and enshrines the active role consumers should play on the energy market [7]. Consumer empowerment and protection (firstly introduced with the second energy liberalisation package in 2003) have a prominent place in EU energy policy making. Here, in contrast to the above outlined concept of empowerment as a social process, consumer empowerment is limited to a market-based approach. This entails two elements, that is, related to the process access to relevant information and related to the output a wider choice of consumption options [7]. As consumers are empowered to receive more information for a greater quantity of consumption choices competition between producers on the market increases. This should in turn increase market efficiency and maximise the end consumer's welfare [8]. Thus, access to relevant information becomes the basis for pro-active decision making of (energy) consumers to e.g. switch suppliers which in turn should increase individual utility on the energy market.

This approach of consumer empowerment in form of enabling and incentivising individual consumers to be active on the market becomes problematic when certain groups among which vulnerable consumers remain passive irrespective of existing incentives. Additional protection measures are needed triggering political and social welfare interventions on the market which may be adversely impacting market liberalisation [8]. Consequently, consumer empowerment is in some cases extended to, in other cases in conflict with consumer protection measures. An example are energy bill subsidies to protect vulnerable households from energy poverty, which stand in conflict to the market-oriented approach of competition.

With the CEP, this market-oriented empowerment approach is now deepened to include prosumership in this active consumer role: As part of the CEP, RED II fosters the new role of the consumer in a "*consumer-centred clean energy transition*". Extending existing rules that are strengthened (e.g. the right to switch providers in the IEMD), RED II promotes the empowerment of "*renewables self-consumers to generate, consume, store, and sell electricity without facing disproportionate burdens*" [4] (Recital 66). This in turn "*provides opportunities for renewable energy communities to advance energy efficiency at house-hold level and helps fight energy poverty through reduced consumption and lower supply tariffs*" [4] (Recital 67). The empowerment of consumers to become prosumers is the outcome of a comprehensive *"enabling framework"* entailing the provision of information as well as facilitative administrative and regulatory elements. With regard to RE in heating and cooling MS shall further "*ensure the accessibility of measures to all consumers, in particular those in low-income or vulnerable households, who would not otherwise possess sufficient up-front capital to benefit."* [4] (Article 23). The underrepresentation and apparent passivity of vulnerable consumers among prosumers is thus a question of the process dimension of consumer empowerment and highlights the need for re-alignment between measure and individual need.

3.2. Prosumption as A Form of (Collective) Consumer Empowerment in RED II

Prosumption in combination with an "enabling framework" (which may include, e.g., simplified administrative and regulatory requirements, lower levies and taxes) reduces the costs for energy consumption and provides an additional source of income through the sale of excess production to the grid [6]. As every kWh not self-consumed is one potentially sold it also has a positive impact on consumer behaviour and increases energy efficiency (EE) [3]. Thus, RE generation for self-consumption through increased EE decreases energy usage [3]. Given that RES have reached grid parity prosumption decreases energy costs which in turn reduces payments for energy potentially positively impacting household income. Prosumership also triggers a learning process and increases knowledge of RE [3]. In addition to these effects, participating in a RE project may provide access to social groups other than one's primary group when enshrined in a collective scheme like, e.g., a RE-cooperative or a consumer stock ownership plan (CSOP). Given that the socio-cultural context shapes among others, habits, values and norms which in turn have an impact on individual behaviour [18] this is of particular importance for vulnerable households to overcome systemic disadvantages (e.g. higher rates of unemployment, lower education) and social isolation but also boosts the mentioned learning process. These interactions are summarised in Figure 1 illustrating how prosumership can contribute to mitigate two of the major challenges vulnerable energy consumers face on a daily basis, that is, low and precarious income and high energy costs.

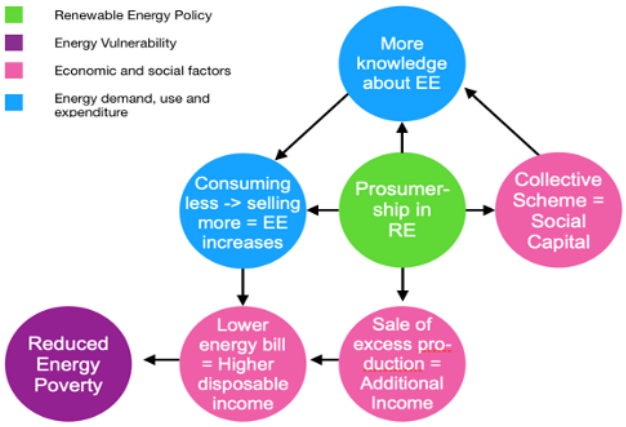

Figure 1. Mitigating Energy Vulnerability (Source: authors' own illustration).

Providing vulnerable consumers with access to the "enabling framework" which includes subsidy schemes to engage in prosumption has energy justice implications as well: The benefits prosumption offers as a result of certain policies should be distributed equally to all social groups in turn increasing social acceptance and political support for the transition itself [19,20]. However, prosumership as mentioned requires a number of prerequisites including access to financing, know-how, a certain willingness to take risks [21]. Especially if one has limited experiences as a (co-)owner the prospect of long-term investments including loans, requirements for maintenance, insecurity in regulatory frameworks (changed in feed-in tariffs) and vague yield expectations in the distant future amount to highly context specific barriers many of which are reinforced by a multidimensional vulnerability. The different dimensions will be discussed in the following sub-section.

3.3. Challenges of Empowerment in A Vulnerability Context

Consumer empowerment intends to enable consumers to exercise full consumer choice to live a life according to their own consumption preferences. According to this logic consumer choice is conceptualised as a form of freedom and may be equated with increased happiness. However, this rational neo-economic approach to individual freedom must be seen critically in that happiness may only be derived though consumption and various studies provide evidence that increases in material satisfaction are not automatically followed by subjective wellbeing [22-23]. Choice as freedom

however entails the need to consume because without consumption choice as a form of freedom remains irrelevant [22]. But freedom of choice and material wellbeing is achievable only for those who can participate in the market by gathering information, selling their labour, renting their capital, or otherwise drawing on economic, social and cultural capital [24]. While the fruits of empowerment as proclaimed by the EC [22] are already difficult to reach for the poor the unequal distribution of income and wealth (even in a social welfare state like Germany [25]) reinforces a general vulnerability context. The vulnerability context in turn has different dimensions some of which are of individual nature, others are the outcome of structural dynamics often of inequality. Table 1 provides a non-exhaustive overview of three different vulnerability dimensions. Each vulnerability dimension does not only exist on its own but intersects with the others producing multiple layers of deprivation [26]. The vulnerability context is thus a set of conditions or deprivations (e.g. low education restricting information access) pruning life and consumption choices. These conditions often lead to or recreate circumstances such as poverty or energy poverty [26].

Table 1. General Dimensions of Vulnerability.

i)	**Individual characteristics** (age, gender, income, health, ethnicity, religion, political orientation)
ii)	**Discriminating structures** among which housing markets (e.g. vulnerable households have access only to poorly insulated flats) and energy markets (e.g. lack of transparency and complexity of offers and opportunities)
iii)	**Policy making** (e.g. political underrepresentation of certain social groups, provision of information, compatibilities of different social policies, support programs to not cater for the needs of vulnerable households e.g. credit programs require a certain percentage of equity)

Source: Based on [27]

Understanding the vulnerability context thus entails an understanding of how it creates difficulties to participate and cope with the requirements of the modern society [28] or simply the conditions of a liberalised energy market. For example, individual physical and mental disabilities hinder decision making in that access to information (e.g. internet access, walking to a library, knowledge of ICT infrastructure, utilising a comparison site) is restrained; economic disabilities such as low income and poverty affect decision making in similar ways. Here it is in particular poverty that affects the perception of what is perceived relevant or simply of what is achievable [29]. Market vulnerabilities and discriminating systems are linked to the inability to process relevant information and to get access to certain options. Examples are opacity and inconsistency of information concerning different market offers as well as their high complexity [30].

Social policies often only regard one aspect of vulnerability applying their own form of rationality to solving a problem and sometimes stand in conflict with one another [6,8,27]. One of the most striking experiences from the SCORE project so far is in fact related to these in-compatibilities regarding social policies. On one hand policy makers intent to facilitate the participation of vulnerable consumers in RE projects (which is a form of investment and co-ownership). On the other hand, the requirements to receive social welfare payments (no assets, savings or financial participation in any project) restrain their participation in RE projects. While the (financial) participation in RE projects is beneficial and may even help to overcome structural dis-advantages (comp. previous section), these benefits (e.g. lower energy costs through dividends) only unfold over time. In contrast, the receiving of social welfare payments often conditions the immediate survival of the most vulnerable (paying for rent and food). Their refusal to become prosumer (as experienced in the SCORE project in Italy and Czech Republic) is therefore only logical. This points at a need for increased awareness and re-alignment of existing (social) policies.

The vulnerability context creates context specific challenges for consumer empowerment among which providing the "right" consumption/prosumption choice. In the energy context increased numbers of suppliers and supply tariff options to choose from enable the well-informed consumer to enhance individual utility and is thus a form of empowerment. When these options remain accessible

only to those who have the means to know about them (e.g. time and knowhow for market-research and to understand the complexity of market offers) or when other conditions such as a bank account, positive credit history, or the installation of smart meters determine their availability, consumer empowerment leaves out the most vulnerable [31–33]. The same applies to energy prosumption. Simply providing the legal possibility and information about energy prosumption empowers solely those already possessing the means for prosumption. Here the current EU strategy to consumer empowerment experiences its limits. Provision of information about consumption options should lead consumers to the conclusion that e.g. prosumption in the long term is the most cost attractive option and may in some cases mitigate energy poverty. In doing so the legislator follows the logic that consumers—as rational agents maximising their utility—choose the economically most attractive option of e.g. supplier switching or prosumption [7,8].

The challenge of this approach to consumer empowerment in a vulnerability context is however at least twofold. Firstly, human behaviour is not always following a "rational". Human behaviour including energy choices are not exclusively governed by rational thinking but rather by emotional, cognitive and socio-cultural considerations, biases and heuristics [32,34,35]. Decision making is often based on incorrect information and estimations about benefits and costs (biases) and influenced by external factors such as the way information is presented (framing), whereby information that stands out, is novel, or seems relevant is more likely to affect thinking and actions [36]. Secondly as mentioned above vulnerable consumers face particular barriers with respect to consumption choices. Understanding the situation of vulnerable consumers is therefore the first step towards understanding consumer behaviour and choice in a vulnerability context. This in turn informs successful policies for consumer empowerment.

Based on the general vulnerability dimensions described in Table 1 above we can thus summarise the following vulnerability dimensions in the energy prosumption context:

(i) **Individual characteristics:** Low savings/access to capital; lack of time, experience and knowledge about opportunities to engage in prosumption; limited access to supportive governmental schemes to participate in community energy projects.

(ii) **Discriminating structures:** Complexity of existing opportunities and opacity of the energy markets cause high costs for information gathering to engage in prosumption and often a need for (expensive) legal and economic advice [37]. In this way market inherent complexity discriminates against vulnerable consumers and exacerbates vulnerability.

(iii) **Policy making:** Where supportive policies and programs exist their design often does not consider the specific conditions of vulnerable households and hence remain inaccessible to them [26]. Other policies are mutually exclusive, especially where eligibility for means-tested transfers (e.g. energy or housing subsidies) would be impaired by asset formation effectively preventing participation in RE projects.

Another example for context related challenges is poverty and how it affects decision making unmasking the illusion of rationality [38,39] as the major driver of behaviour (for an overview of how the poverty context impacts energy choices see [6]) or simply the observation that vulnerable consumers in particular cannot make the choices—even if they want to—that would suit their needs best [40]. Even if a household knows that installing a PV installation would, in the long run, drive electricity prices down, without the necessary upfront capital this knowledge remains irrelevant. It is thus often not a question of willingness for example to become (co-)owner of a RE project (which provides tangible benefits such as lower energy costs) but of individual opportunities to receive a loan needed for this investment. The same applies to participation in community energy e.g. in RECs. As exemplified by the SCORE pilot projects vulnerability often translates into financial precarity effectively hindering the participation of vulnerable consumers even under an inclusive and low-thresholding financing approach where the contribution of participating households is small.

3.4. Individual vs. Collective Empowerment

From the discussion so far, it is apparent that empowerment in a vulnerability context must be more than the provision of consumer choices through access to information and consumption options. Understanding and providing access to the prerequisites needed to choose between consumption/prosumption options has to become part of empowerment. Irrespective of the specific context of e.g. promoting prosumption, consumer empowerment in a vulnerability context must be conceptualised as a long-term process [8]. It entails elements beyond consumption choices e.g. in form of self-help for social change [41] including elements such as political participation in form of deliberation [42], financial participation in the energy transition [43] and some form of relief. In addition, given that vulnerable groups often do not have direct control over the social conditions and institutional practices that shape their lives [44] empowerment needs to address the very social dynamics that reproduce social inequality by addressing entire social strata rather than individual consumers.

In general, the empowerment process happens at the interplay of the individual, interpersonal and collective. Unless individuals believe that they can produce desired effects and forestall undesired ones by their actions, they have little incentive to act in the first place [44]. Individuals lacking self-efficacy are convinced not to be in charge of their own destiny, have limited initiative and commitment and as a result tend to engage in passive, unproductive attitudes and behaviours [45]. Applied to the RE context the degree to which individuals engage in environment friendly consumption behaviour (e.g. turning the lights of or investing in RE) is a result of their environmental self-efficacy judgements [46]. For example, the experience of being powerless and at mercy of energy providers who threaten to shut down the power supply due to arrears contributes to a lacking self-efficacy as does the inability to provide desired energy consumption choices for one's children (e.g. leaving the lights on for studying) [47]. Self-efficacy increases when individuals gain a sense of control over their own life *inter alia* in form of increased choice and both material and cognitive means. In the energy context, enabling energy-poor households to become prosumers provides them with control over their own energy supply. Resulting improved EE [3] and reduced energy expenditure [6] allows them to experience a form of self-efficacy. Empowerment of the individual starts by providing education, access to information and processes facilitating the individual experience of self-efficacy [48]. These experiences in turn are not only shaped by the individual but by the respective social environment [44,49].

However, individuals in many cases and specifically in a vulnerability context do not have the control or power over the structural conditions that inhibit individual opportunities and choice [44]. They have thus always turned to others be it their family, neighbours or friends to form collectives to gather necessary competencies, resources and capital (economic, cultural and social [23]). In this way individuals benefit from the power of collective action to overcome individual obstacles [50]. These forms of organisation determine human survival since the beginning of time. Many of which were later enshrined in legal concepts such as the cooperative. The belief in collective agency—people's shared belief in their collective power, the interactive, coordinative, and synergistic dynamics of their transactions [44]—continues to determine empowerment until today. In line with these postulates the UN promotes the cooperative model and builds on individual and collective strengths [51,52] as a form of collective, interpersonal and thus individual empowerment in the global fight against poverty [53,54]. Therefore, we suggest collective empowerment instead of individual consumer empowerment since the need for individual empowerment (in the energy context) is caused by structural and societal dynamics creating systemic disadvantages rather than individual conditions.

3.5. Advantages of Collective Empowerment: The Example of Reactivating the Unemployed in Sociedades Laborales

A prime example in the vulnerability context demonstrating the advantages of collective empowerment is the reactivation of unemployed in the Spanish concept of Sociedades Laborales. A Sociedad Laboral (SL) is a qualified form of conventional corporation, majority-owned by its

permanent employees. Since 1985 in lieu of receiving monthly payments, job seekers can choose to capitalise their unemployment benefits into a lump sum in order to establish a new SL or to recapitalise an existing SL by becoming a member. In this way SLs offer unemployed individuals with the right to unemployment benefits to become entrepreneurs creating their own workplace and thus a way out of their precarious situation. What is more, SLs which may be set up by unemployed together with conventional entrepreneurs, or exclusively by either of the two groups appear on the market as regular corporations thus do not bear the stigma of being set up by or with the involvement of formerly unemployed [55]. It is estimated that about one-third of SLs utilise the capitalisation of unemployment benefits at the time of their founding. Between 2006 and 2013 on average 2,240 persons capitalized unemployment benefits to set up or join a micro-sized limited liability Sociedad Laboral (SLL) in Spain with an average annual total of around EUR 13,233 per person. It is important to stress that the capitalised unemployment benefit is not a state subsidy but stems from the social security contributions made earlier in times of employment. Similar mechanisms are also available in other members states: in France, unemployed persons can receive up to 50 per cent of their unemployment benefits under the "Aide à la reprise et à la creation d'entreprise" (ARCE) scheme. Portugal introduced the "Support Programme for Entrepreneurship and Self-Employment" or "Programa de Apoio ao Empreendedorismo e à Criação do Próprio Emprego/PAECPE" in 2009, which allows the conversion of unemployment benefits under certain conditions. For example, a full-time job for the unemployed person has to be created and the jobs created must be maintained for at least three years. Finally, in Bulgaria it is possible to receive one's unemployment benefits as a lump sum and to use them as a start-up grant.

This collective reactivation mechanism for unemployed in SLs was compared with individual start-up subsidies to reactivate jobseekers across the European Member States (previously assessed in the European Employment Policy Observatory (EEPO) review [56]) in a 2017 econometric study [55]. Following the EEPO criteria to evaluate the success of start-up subsidies that is, survival rate, access to capital and the capacity to create secondary employment the study on SLs [55] found that in comparison they were superior in all indicators under consideration:

- SLLs generally have higher survival rates than their conventional competitors, surviving long enough to amortise capitalised unemployment benefits: The average paid-out lump sum represents roughly the cost of 1.3 years-worth of unemployment benefits; on average, 88% of all SLs survive this long. Furthermore, in contrast to using up the unemployment benefits month to month both the (formerly unemployed) owner-worker and the SL make social security contributions leading to the accruing of a new expectancy for unemployment benefits from the first day of operation.
- SLLs are set up not only by unemployed persons but also by ordinary entrepreneurs and typically involve external investors which account for 27% of their partners. Unlike conventional start-up subsidies for jobseekers, SLs offer not only access to capital but practical assistance and entrepreneurial advice to an unemployed person joining or setting up an SL.
- With respect to secondary employment according to employment data for 2008–2013, 1.3 additional jobs were created in Spain per founding worker partner. In contrast, the EEPO review concludes that across several studies approximate only 0.2 additional jobs were generated in start-up firms set up under ALMP start-up subsidy programs [56].

These results are a clear indication that with regard to empowerment of formerly unemployed to return back to employment collective schemes like that of SLs are superior to individual schemes.

3.6. Participation in Renewable Energy Communities—Learning from the Sociedades Laborales

Applied to prosumption, access to credit is generally a challenge, but it is even more challenging for people with little business experience and no strong credit track record who bear the social stigma associated with unemployment or other vulnerability characteristics. Collective ventures such as SLs are a means to provide not only financial capital but also social capital and expertise, entrepreneurial experience, training and mentoring. What is more, SLs display the benefits of an efficient alignment

between different social policies, i.e., the possibility to capitalise unemployment benefits in form of a lump sum to facilitate entrepreneurship. Applied to energy vulnerability the capitalisation of energy subsidies would facilitate energy prosumption by enabling vulnerable consumers to buy into an existing REC or set up a new one. While energy costs will decrease for the new prosumer, profits from the sale of excess production can be paid out as dividends partly offsetting the energy subsidy no longer available for spending.

Although fully fledged prosumership—that is providing both the possibility to self-consume and sale to the grid or third parties—will be an incentive to become more energy efficient [3], a problem related to vulnerable consumers is underconsumption. Therefore, self-consumption might be larger than the respective share allocated to the individual proportional to his or her investment in the REC bringing energy use to normal levels. Similarly, in the first months of activity of a newly founded SL the new worker-owners may be inclined to pay themselves a lower wage than the market rate. For this reason, the Spanish government and in particular that of the Basque Country additionally subsidise the integration of unemployed persons as worker-owners with non-refundable subsidies paid directly to the SL [55]. This approach could also be applied to RECs which will be discussed in section 4.3.1. Therefore, when both individual energy-poor consumers and average energy consumers organise themselves in a REC to become prosumers they pull their competencies and resources together and benefit from the exchange with their co-investors. In this way they share their economic, cultural and social capital and increase collective agency as well as individual self-efficacy. Unlike in individual investments, in RECs business decisions need to be taken together, discussing, consulting and justifying them - this facilitates the exchange of experience, a learning process and in the best-case functions as an apprenticeship. Respectively participation in a REC as a form of asset formation becomes an instrument to increase the individual capacity to advance socio-economically beyond the satisfaction of consumption needs [57]. According to Sen (1999) individuals are only capable to shape their own destiny when they have adequate social and economic opportunities to unfold individual capacities [57]. Individual economic capacities in turn are increased through asset formation [57–59]. Participating in a REC not only changes the income side but has an effect on behaviour and attitudes as well [60] and addresses individual disadvantages. What is more, collaborating in a REC breaks up the segregation of disadvantaged communities [61] and affects individuals positively in that the diversity of one's primary group increases with demonstrably positive effects on health and education all the way to career choices re-framing individual self-efficacy beliefs [62]. Thus, the participation in a REC as a co-owner (which entails asset formation) enhances individual capabilities—the core of any empowerment approach.

4. Discussion: Putting Forward Collective Empowerment Strategies for RECs

Today, a wide range of RE projects and organisations already work towards the inclusion of vulnerable groups in the Energy Transition. Examples are Energent in Belgium (http://energent.be), Enercoop in France (http://enercoop.fr) and Energia Positivain in Italy (https://www.energia-positiva.it), as well as numerous projects working on the mitigation of energy poverty such as the EU project STEP (https://www.stepenergy.eu/results/) or the cost action Engager (http://www.engager-energy.net) as well as the Right-to-Energy coalition. The latter unites trade unions, anti-poverty organisations, social housing providers, environmental organisations, health organisations and energy cooperatives under the concrete objective of collaborating on the issue of energy poverty, including measures to alleviate it in the 2030 EU energy package (http://www.righttoenergy.org). However, these initiatives face structural difficulties and stress the importance of an *"enabling framework"* [63-65]. The European legislator acknowledges the potential of RECs to empower vulnerable consumers, introduces a definition for RECs and requires the European member states to ensure that RECs are *"accessible to all consumers, including those in low-income or vulnerable households"* (Art. 22 para. 4 (f)) and to *"assess the possibility to enable participation by households that might otherwise not be able to participate, including vulnerable consumers (...)"* [4] (Recital 67). Yet, while the potential capacity of RECs for the empowerment of vulnerable consumers and the need to include facilitating measures for the participation of vulnerable consumers in RECs in the "*enabling framework*" of RED

II are acknowledged a lack of political attention in policy-making for the inclusion of vulnerable consumers in RECs remains.

This is highlighted when looking at the current NECPs: In October 2019 RECs are explicitly mentioned in only 13 out of 28 draft NECPs. The inclusion of vulnerable groups and/or LIHs in RECs or measures to facilitate the participation of these groups was not mentioned in any draft NECP in October 2019. In the analysis of the draft NECPs the EC, therefore, calls on the MS to "*provide additional details and measures on the enabling frameworks for self-consumption and renewable energy communities in line with Articles 21 and 22 of Directive (EU) 2018/2001*" (the EC's recommendations are available at https://ec.europa.eu/energy/topics/energy-strategy/national-energy-climate-plans_en#the-process). However, although until 4th of March 2020 all ten of the final NECPs available in English translation mention RECs, the inclusion of vulnerable households and/or LIHs in RECs is only referred to vaguely in one NECP, namely that of Italy. The remaining nine translated final NECPs (AT, CY, DK, EE, EL, FI, HR, MT, SK) do not mention inclusion of vulnerable households or LIHs. The NECPs of Cyprus, Denmark and Greece mention the preparation of additional legislation as well as the provision of (financial) support schemes for vulnerable households to engage in self-consumption. Such the current shortcomings with respect to addressing the inclusion of vulnerable groups in RECs remain an indicator for a lack of political awareness. A similar knowledge gap with respect to empowerment and inclusion of vulnerable consumers as prosumers in REC appears to prevail in the respective literature until now.

With a focus on the second and third research question outlined in Section 2 we therefore highlight the local conditions for collective empowerment in RECs in sub-section 4.1. and the implications of behavioural economic for a better understanding of behaviour in the energy vulnerability context in sub-section 4.2. Sub-section 4.3 discusses access to finance and facilitative ownership and governance models as prerequisites for the successful participation of vulnerable consumer. Sub-section 4.4 discusses the need to understand and frame the relevance of participation for vulnerable consumers. Of course, this selection is not exhaustive and primarily motivated by the postulates of the *"enabling framework"* of Art. 22 para 4 RED II. While we do not provide a comprehensive literature review on all of these elements, we encourage both scholars in the respective fields and policy makers to consider them as a basis for the transposition of the RED II "*enabling framework*" and further research.

4.1. Local Conditions for Collective Empowerment in RECs

Community energy projects in their various forms have been on the research agenda for a while now [66], as has participation in the energy transition and in community energy projects [43]. In different lines of research citizen participation in energy community projects has been linked to aspects such as modes of governance [67], ownership and ownership structures [68], member responsibilities and competences [69], equal opportunities between communities [70], conflicts, trust, and social capital [71], deliberation [72] and power factors [73]. Radtke further mentions relationships and connections to policy makers and the public [74] and network structures linking local communities to energy initiatives [75] which have also been found to effect participation [76].

With respect to success factors of community energy the importance of local factors such factors related to community energy itself (e.g. human capital, skills, access to funds) and factors related to interaction with the local community (i.e. social capital, alignment with community values, attitudes towards RECs, local energy activism) are highlighted [77,78]. These are at least as important as factors related to local and national policies such as fiscal and financial support and planning policies [77,79–81]. Especially in the context of an *"enabling framework"* it must therefore be discussed how national frameworks can be designed to facilitate these local conditions on which RECs depend. Here it proves important to include differences between urban and rural settings and their implications for RECs and inclusive participation in future research.

For individual participation in community energy access to information and knowledge about existing participation opportunities are in turn major drivers of participation [82]. But also, additional prerequisites such as financial requirements (acquisition of shares) and the minimum duration of

participation determine participation (sometimes indirectly) [82]. While all these factors play a role motives to join energy communities remain diverse [77]. In Germany for instance motives to join an energy community are in tendency less revenue driven and tend to be more ideational (e.g. contributing to the energy transition) for low-income groups and academics than compared to high income groups [82]. With respect to equality of chances, and equity Park (2012) acknowledges differences between communities and their capacity to get involved in renewable energies [70]. Here the importance of practical capacities such as expert knowledge and time (human resources) for administrative, financial and other procedural activities to set up a community, to gain access to grants is highlighted.

However, while it is mentioned that inequity is a consequence of structural and economic factors [83] and therefor results in a "deeply seated problem of involving the most marginalised and deprived (...) communities" [70] the impact of these factors on the individual in a given community remains undiscussed. Although the distribution of prerequisites for individual participation (as mentioned earlier in the text) are equally affected by these inequities. For instance, social capital as the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual [84] has been linked to aspects such as information gathering [85,86] as a basis for participation [87]. Its role for the participation of underrepresented groups in community energy projects is therefore a promising starting point for further research.

While different authors in community energy research investigate different sets of motives in different settings [68,77,88–91] the discussion of motives for participation of underrepresented social groups such as LIHs remains superficial. Currently the potential motives of those social groups that do not participate in community energy remain unknown. The situation is similar for the respective incentives that could possibly motivate them and the structural conditions that might facilitate their participation. On the other hand, in the energy poverty discourse although different facets of energy vulnerability are already being explored and propositions for both policy making and further research made [92] prosumption is left aside. In a next step, these two strands of investigation—so far unrelated—should be combined and extended to prosumption and the participation in RECs under the lens of energy poverty mitigation.

As is the case for individuals there is a need to better understand the capacities and resources needed for existing RECs to facilitate inclusion. In this line, there has been much interest in capacity-building [73,93,94] and social capital [95–97] as special functioning of communities which facilitates community-based approaches. Existing capacity building approaches for communities to get involved in the production of renewable energy should include the aspect of inclusion. Here, community development literature points at the role of cooperation (e.g. with NGOs working with vulnerable consumers) to share skills, resources and experience to address and include vulnerable individuals pro-actively [83,98]. Following the model of aids for SLs in Spain [55] governments could support capacity building to stimulate the RECs development as required by Article 22 para. 4 (f) and (h) RED II with technical assistance (feasibility studies, auditing, and consulting services) for the RECs and coaching and training (including, e.g., energy efficiency seminars) for individuals.

4.2. Implications of Behavioural Economics

When further assessing the current EU consumer empowerment strategy and its applicability in a vulnerability context, behavioural economics provide valuable insights with respect to the limitations of 'rational consumer behaviour'. Referring to Pollitt and Shaorshadze [99] we distinguish three different areas:

1) Individuals assess cost and opportunities differently over time [100–102]. Time-varying discount rates not only affect the average consumer by changing consumer preferences depending on the time frame in which financial benefits are received but affect vulnerable consumers in a financial precarious condition in particular [103]. Vulnerable consumers for example perceive financial benefits of prosumption which typically materialise over a timespan of several years as irrelevant

if confronted with the immediate need to pay overdue electricity bills to avoid electricity cuts. Here the vulnerability context reinforces this heuristic.

2) According to the prospect theory consumers tend to make decisions by assessing the extent to which a choice differs from a specific reference point such as the status quo [104]. Rather than assessing costs and benefits of a choice against each other consumers tend to accept more risks to prevent potential losses rather than realise potential gains (status quo bias). As discussed, vulnerable consumers often rely on some form of social transfer payments and are unlikely to engage in any decision that jeopardises their claim for support, e.g., by acquiring assets in a RE project [6]. Empirical evidence confirming this barrier has been gathered in the course of interviews in the SCORE project in the Czech Republic as well as in Germany. Therefore, it is important to understand the prevailing reference point and preferences of different vulnerable households.

3) The cognitive capacity to process information as a basis for decision-making is limited, a phenomenon that can also be placed under the theory of bounded rationality [40]. Cognitive capacity (sometimes referred to as bandwidth) is utilised by internal processes to derive insights and decisions [105]. Especially under time constraints or in situations where multiple decisions under consideration of their consequences (trade-offs) need to be taken bandwidth is depleted and thus less cognitive capacity remains for other tasks [29]. Moreover, under time pressure rather than engaging in a rational cost-benefit-calculation (utilising and assessing all available information) consumers tend to engage in intuitive judgements and simplified choice strategies [106]. In addition to behavioural economics, an extensive string of social and cognitive psychology investigates the impact vulnerability and here in particular different forms of scarcity (e.g. time, nutrition or financial scarcity) have on the availability and utility of bandwidth. Scarcity as a condition captures one's mind, alters the content of cognition and the perception of options [105]. It adds difficult trade-offs to everyday experiences [107], shifts attention and selects information according to its internal logic to overcome scarcity [105]. As a result, simple activities such as grocery shopping translate to constant and effortful overcoming of buying temptations requiring massive bandwidth [103]. Each of these bandwidth-consuming dynamics alone do not create a burden; cumulative, however, they start to deplete bandwidth restraining its availability for more profound cognitive processes such as those required for efficient economic decision-making.

Consequently, the vulnerability context limits the consideration of alternative options, overshadows possible long-term benefits, depletes willpower necessary to adhere to a long-term objective and makes it more difficult to choose between options or to calculate trade-offs. Understanding the underlying heuristics and biases is the basis of an effective design for a choice architecture that facilitates the empowerment of vulnerable consumers. One of many difficulties here lies in the vast diversity of vulnerability contexts which is likely to render one-size-fits-all approaches ineffective. It is therefore crucial to understand the local context and the reference points and preferences of local vulnerable households. To compensate for these limitations vulnerable consumers need buffers and reserves to be able to consider prosumption and its benefits in the first place [108] and to mitigate the detrimental effects of the vulnerability context: When a single mother spent her monthly salary a week before she receives the next pay-check financial reserves like savings on her bank account can be crucial. Providing financial relief, time for information gathering, trainings and a simple program design may thus facilitate the participation of the most vulnerable [109].

4.3. Providing the Prerequisites for Empowerment of Vulnerable Consumers in RECs

4.3.1. Access to Finance

Traditionally cooperatives and in the past decade RE cooperatives play a prominent role with respect to community approaches and the provision of alternative governance and ownership models

in particular compared to national and international commercial RE ventures [110]. However, the inclusion of all consumer groups in cooperatives—although in theory an objective based on the principle of open participation [6]—has so far been difficult to achieve. In Germany, for example, more than 70 percent of RE cooperative members belong to the group of male, high education and high income. Other groups and especially those with low-income are underrepresented [14]. This is first and foremost a question of access to finance: RE projects, especially at the beginning face difficulties to raise sufficient equity; while access to credit is limited due to size, lack of collateral and risk-assessment they often depend on their members to provide required equity [6]. With respect to RECs, a recent study investigating 198 energy communities in nine MS shows that a majority depends on their members equity contribution [37]. Therefore, potential members usually need to buy shares. In Germany the average individual contribution in RE cooperatives amounts to EUR 3,899 with an average required minimum contribution of EUR 511 [111]. Such high contributions are a barrier for the participation of vulnerable consumers with limited financial means. This is especially the case since the participation typically does not immediately translate into financial benefits, but they only unfold over time (see also time-discounting).

The first obstacle is therefore primarily a financial one: Vulnerable groups as a rule do not have access to finance. This raises a second question: Should vulnerable groups be supported in gaining access to required financing or should RECs receive additional financial means to facilitate the inclusion of vulnerable groups. Ideally the *"enabling framework"* encompasses both dimensions to enable the participation of all consumers *"including those in low-income or vulnerable households"* as postulated by Article 22 para. 4 (f) RED II.

In Germany for instance, cooperative banks could play a major role in facilitating inclusive access to finance as they already have a local network of stakeholders [112] and most RE initiatives are organised as cooperatives [14]. The *"enabling framework"* could facilitate these local networks and provide a structure and incentives for inclusive and green investments in RE as outlined in the European Green Deal [1] and the Sustainable Europe Investment Plan [113]. When transposing the RED II an approach could privilege direct impact investments in those RECs that facilitate the inclusion of vulnerable consumers. Irrespective of direct investments from third parties, the provision of low-interest loans to vulnerable consumers to finance their participation in community energy projects as pioneered, i.a., by the Ærø Windpark on the Danish island of Ærø [114] appears to be a promising starting point. Here a local bank loan system was set up to facilitate access to finance for all residents of the island as a basis for participation in the project. To date such inclusive financing schemes remain local solutions without broader application or support from national policies in RE. In this regard the SCORE project is in contact with institutions like GLS Bank in Germany (https://www.gls.de/) and South Pole in the Netherlands (https://www.southpole.com) to discuss the design of similar financing mechanisms.

As part of the "*enabling framework*" RE projects that fulfil the RED II requirements of RECs in terms of governance and ownership structure should have access to preferential financial support, e.g., in form of zero or low interest rate credit programs and possibly direct subsidies as in the case of SLs specifically to include vulnerable consumers. Additionally, tax exemptions could be granted for those RECs that reach a certain diversity threshold—e.g., 10 percent of members are affected by vulnerability. Similarly, diversity could be linked to access to preferential treatment in administrative procedures. Articles 15 para. 1 (d) and 16 para. 6 RED II stress the simplification of administrative procedures to facilitate consumer prosumption [4]. In order to further support the development of inclusive RECs establishing an administrative fast track would lead to an additional incentive for RECs to include vulnerable groups.

With respect to measures aiming at the direct empowerment of vulnerable groups, we advocate for a "renewables asset formation agenda for vulnerable consumers" [6] which does not replace social insurance or safety net programs, nor would it contribute to the financialisaton of social policies (e.g. the shift from "defined benefit" to "defined contribution" in social security [115]). Rather it would offer both, financial support and assistance to low-income families, providing a lever for building up their asset base in a sound economic way by becoming (co-)owners in RECs [117]. Similarly, a

proposition recently carried forward by the German Green Party envisages citizen funds as a means for old-age provision: Given that for many people shares and real estate are either too expensive or too insecure as a retirement provision, the state should invest for its citizens [118]. Since the financial benefits of RE (co-)ownership materialise in the mid- to long-term, this implies a broadening of the welfare state perspective.

We thus recommend linking existing measures such as energy subsidy schemes with direct empowerment drawing on the above presented best-practice example of SLs in Spain. A similar mechanism could be introduced to energy-vulnerable households. These households usually receive some form of social transfer payment e.g. in form of energy subsidies to pay their energy bills (the Energy Poverty Observatory lists policy measures to mitigate energy poverty here https://www.energypoverty.eu/policies-measures). Providing the possibility to receive a part of their annual social transfers in a lump sum under the condition to invest that money in a local REC would be a cost-effective extension of existing subsidies. One of the major obstacles for the participation of vulnerable consumers namely a lack of access to finance would be overcome while the total of required subsidies would decline over time as more and more households in need would—through their enabled participation in RECs—no longer require public support. In consequence local authorities could use the released budget for the offering of additional (educational) services. However, in doing so the propensity for underconsumption of LIHs described above in section 3.6 has to be taken into account. Therefore, additional to the capitalisation mechanism governments when transposing the RED II could make available one-time subsidies directly to the REC for each vulnerable consumer becoming a member or shareholder which would be earmarked to compensate for underconsumption. Currently only a few MS provide financial assistance to vulnerable groups to enable them to become prosumers: Cyprus supports vulnerable households to produce RE for self-consumption through net-metering and financial aid to install a PV system, Greece introduced a law on energy communities that promotes energy communities and solidarity in the energy sector, including energy poverty measures. Additional best practise examples remain unknown. Given that this form of empowerment (vulnerable households with no financial assets benefit from a liberalised market through participating in RECs) is a new endeavour for both scholars in the field of participation in the energy transition and policy makers alike, its potential and conditions for implementation as a part of a just energy transition should be further investigated.

4.3.2. Appropriate Ownership and Governance Models

Any type of RE venture is confronted with the assessment of the best-suited ownership and thus governance model—so are RECs. In order to be considered a REC RED II does not proscribe any specific governance model but defines RECs as any *"legal entity (a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities"* [4] (Article 2, para. 16). As the choice for the best suited ownership and governance model must confer with the above definition [119] individual ownership and private law partnerships are not eligible; the other of the most common ownership and governance models in RE as listed in Table 2 can be employed. The right choice with regard to the inclusion of vulnerable consumers depends on factors such as the type and scale of investment (smaller PV installations or offshore wind parks) demanding different investment levels and financing mixes, but also required expertise and risk. Limited liability companies and limited partnerships are often used for medium-sized and above all large projects, particularly in the field of wind energy [90]. Cooperatives and trusteed schemes are usually employed for medium-sized and large projects, mainly in the field of photovoltaics and local heating networks.

Table 2. Comparison of different ownership and governance models in RE.

	Individual Ownership	**Private Law Partnership**	**Limited Partnership**	**Cooperative**	**Trusteed Scheme e.g., CSOP**
Type of investment	PV	PV	Wind	PV and local heating network	PV and local heating network
Size of investment	Small	Medium	Large	Medium–Large	Medium–Large
Financing Mix	High equity ratio	High equity ratio	Low equity ratio	High equity ratio	Low equity ratio
Influence on decision-making	Owner in full control, with oversight from local councils and other such stakeholder groups	Consumer-partners in full control: Voting rights according to contributions/ full information rights	Right to demand information; control and veto rights for consumer-shareholders only under exceptional circumstances	Direct: "one member one vote"; general assembly concentrates decision-making power	Indirect: Trustee exercises rights for consumer-shareholders, e.g. participation in management meetings or the right to demand information
Liability	Unlimited personal liability	Unlimited personal liability jointly with partners	No personal liability; liability instead limited to value of share	No personal liability; liability instead limited to value of share	No personal liability; liability instead limited to value of share
Transfer of shares	Not required, unless because of inheritance between individuals	Consent of all consumer-partners needed	Managerial consent needed; entry into the commercial register	Transferable albeit with restrictions; entry into the commercial register	Freely transferable; low transaction cost; only trusteeship agreement is altered
Costs	Low initial setup costs	Low initial setup costs	Higher initial costs to enter commercial register; higher administrative expenses	Higher initial costs to enter commercial register; higher administrative expenses	Expenses of incorporating trusteeship (and holding Ltd. If required due to absence of trust legislation); administrative expenses

Source: Authors' own elaboration based on [19]

For RECs with the objective to facilitate the participation of vulnerable consumers the choice and application of the respective ownership and governance model must take into consideration the characteristics of the vulnerability context discussed in Section 2. Table 3 compares three common models with respect to their ability to cater for the vulnerability context in particular with respect to the requirements of equity contributions being one of the major obstacles for the participation of vulnerable consumers. Even if—as described in the previous section—the provision of access to finance is incorporated in the respective national enabling framework for RECs and the participation of vulnerable consumers therein, ownership and governance models that require low equity contributions still have a central benefit in that both organisation and individual members do not have to spend much time on accessing said financing schemes.

Once more drawing on Germany as an example studies show that irrespective of their heterogeneity RE cooperatives tend to have high equity ratios in contrast to limited partnerships [91]. Here it is especially the prevailing incentive of its members that determines the financing mix: Often yield expectations remain below those of profit-oriented investors [120] and private members of RE cooperatives focus on environmental and social aspects which determine their participation. RECs alike are hybrid organisations in that they entail characteristics of not-for-profit organisations (e.g.

governance model) in which however members even if below market levels have a basic yield expectation [90]. Given this lack of a clear focus on profitability and low loan collateral to raise outside capital is difficult [121]. These factors contribute to the mentioned high equity ratio which in turn establishes a barrier for participation of vulnerable consumers.

Table 3. Prerequisites for the inclusion of LIHs in RE projects under different business models.

	Limited Partnership	**Co-operative**	**Trusteed scheme like CSOPs**
Equity contribution	Moderate; access to credit only against collateral or with guarantor	Moderate; membership shares have to be bought requiring liquidity	Low; future earnings are used to repay acquisition loan
Basic knowledge	Medium; managing partners external management possible	High; setup and management by members; no external management	Low; setup and supervision by trustee; external management possible
Time commitment	Low; involvement limited to control rights	Medium; members expected to be involved in all aspects	Low; involvement limited to crucial decisions; apprenticeship over time
Risk	Low; liability limited to value of share	Low; liability limited to value of share	Low; liability limited to value of share

Source: Modified after [6]

In addition to pure financial considerations, the degree of involvement necessary to participate in any of the three models consisting of basic knowledge in RE, the (local) opportunity of participation and time commitment determines participation equally. As has been discussed, the vulnerability context puts additional burdens on individuals in form of time and cognitive constraints which should be investigated further. As a hypothesis we assume that the lower the threshold in terms of required knowledge and commitment the more likely participation. This is not to say that vulnerable consumers lack the cognitive capacity to participate but rather that they need to deal with more pressing every-day challenges and need to decide where to spend their resources. The question remains which governance and ownership model facilitates participation and inclusion best. We propose that modernised versions of the traditional cooperative model such as consumer stock ownership plans (CSOPs) enable the participation of vulnerable consumers in that they do not have to pay for their membership up front but repay the acquisition loan of their share from the future earnings of the investment [6].

4.3. Providing Incentives for Vulnerable Consumers to Participate in RECs

4.3.1. Incentives for Participation

As a starting point we suggest the provision of direct benefits for participating in RECs to offset required initial time and monetary investments by vulnerable consumers (necessary to enable their participation in the first place). Under a "renewables asset formation agenda for vulnerable consumers" the decision to participate in a REC should yield immediate benefits [6]. As mentioned above, direct subsidies for vulnerable energy consumer could be tied to membership in RECs immediately increasing household income while providing a strong incentive to participate. And most importantly, investments in RECs should be exempt from necessity to liquidate one's assets when applying for social transfers. Currently, social policies supporting asset formation at the individual and household level mainly focus on mid to high-income households and appear less inclusive than income-based policies [122]. At the same time, means-tested transfers are a strong disincentive for LIHs to form assets since they typically require liquidation of all assets to become eligible for social transfer payments [60]. Consequently, asset-owning households are supported in further increasing their wealth while poor households are forced to spend down all of their assets, if

any, to receive support. This mechanism effectively discourages LIHs from building up assets as every effort to do so directly reduces their eligibility for social transfer payments. This paradox has also been dubbed "dual asset policy" [60]: The same social policy that supports mid and high-income households to form assets and hence increase private wealth disincentivise LIHs to even attempt to increase wealth beyond subsistence. A similar phenomenon is observed with regard to the needs-tested minimum income which takes into account any income received, debiting it from the transfer; any job paying less than the minimum income threshold is thus disincentivised, with the recipient being caught in the "poverty trap". While the latter has been discussed in the literature, we highlight the need to acknowledge welfare-system-inherent conflicts and arising disincentives in the context of energy prosumption and participation in RECs.

On a side note, encouraging vulnerable households to save money to finance their participation in RECs is—at least at the moment—no solution: Putting aside money at this point in time with the European Central Bank continuing its negative interest rate policy [123] is a loss. As a result, the already low saving amounts of LIHs are further reduced. The time it would take a LIH to form sufficient savings to engage in asset formation, e.g., through becoming co-owner in a RE project is too long and not economical. Nudging LIHs to engage in saving behaviour is thus somewhat cynical as it would keep LIHs in the poverty trap. Therefore, providing LIHs with a possibility to form assets that yield a financial return, e.g., participation in a REC, must be detached from accumulating savings in the bank. In addition, although measures like guaranteed feed-in tariffs have in the past successfully enabled private consumers to invest in RE installations [124], LIHs were not addressed as the benefit of feed-in tariffs is linked to the disposability of investment capital. Even though in same cases the legislators introduced low interest rate credit programs for private RE installations, access to these loans is usually still linked to a basic amount of equity capital. For a discussion of feed-in tariffs in the US and the exclusion of LIH see [125]. For Germany see [13].

Finally, what applies to vulnerable consumers must also be considered for RECs. Although many existing RECs want to be inclusive their situation does not always allow for the inclusion of vulnerable consumers (comp. access to financing). We therefore propose to further investigate incentives and conditions that facilitate RECs in their efforts to enable inclusion.

4.3.2. Framing the Participation in RECs

The way how information is presented affects its perception [126]. In consequence, an effective information approach needs to extend beyond consumer choice and include the local community and its decision-making process by framing it around what is perceived relevant and of interest [127,128]. This entails the framing of those incentives discussed as well as of those yet to be identified including aspects such as pro-social and pro-environmental behaviour.

While some approaches address economic decision makers (of a household) others demand for the identification of potential advocates for change at a community and family level. Promoting pro-environmental habits at school through teaching basic sustainable behaviour to school children affects not only the family but the entire community [129]. Once children learn basic energy saving behaviour, they pass this knowledge on to their parents and grandparents. Educating children about the benefits of participation in a local REC is therefore likely to educate their parents as well. Therefore, we suggest that presenting the participation in a REC not only as a consumption or investment choice but as benefitting the future of the family, particularly one's children, the motivation to participate increases. Assuming that, nudged by their child, parents change their behaviour, the child in turn benefits from self-efficacy, an important driver for individual development [48]. The nudging of parents through their children changes the choice architecture in that it alters their behaviour in a predictable—in this case pro-environmental way—without forbidding any options or significantly changing their economic incentives [130]. Nudging has increasingly become an instrument in social policy making especially in the environmental policy domain [131,132]. We, therefore, encourage future research to include this perspective to evaluate the potential and conditions of such framing approaches.

While empowerment in form of more choice can be liberating choice is also disciplining and potentially paralysing [22]. The more choice available the greater the need to gather relevant information increasing the complexity of decision making and the potential for error resulting in a state referred to as "choice paralysis" [133]. When the cost of processing all necessary information to perform the best choice outweighs the benefits of choosing consumers chose to not chose. With regard to framing and communication strategies in general less choice and less complexity helps to engage in particular those already overburdened by the difficult life choices they have to make.

In sum, the way how different choice options are presented by highlighting particular aspects educes information and associations linked to these aspects affecting the perception of a given choice situation [132]. Promoting the participation in RECs among vulnerable consumers calls for fewer but simple choices leading to participation and informing about these choices should be done in a simple and consistent manner. Future research should include these aspects and investigate the potential and limits of such framing approaches in practise.

5. Conclusions

The participation of vulnerable consumers in RECs can make a significant contribution to mitigating energy poverty thus shaping a social and just energy transition. Provided with an "*enabling framework"* (including elements such as tax and levy exemptions) RECs could offer lower energy prices and an extra income from dividends to their vulnerable members (see Figure 1). Prosumption is further linked to EE decreasing individual energy consumption [3]. In this way two major causes of energy poverty can be addressed that is high energy costs and low income. What is more, participation expends the individual social circle and thus helps to overcome social isolation from which many energy poor households reportedly suffer [134].

Moreover, the participation of vulnerable consumers is of particular importance for the overall success of the energy transition as especially this group has so far been underrepresented in RE projects if not entirely excluded. As a form of collective empowerment formerly vulnerable consumers not only become active participants in the energy market—as postulated by the EC as a basis for the most efficient market results—but they are empowered to become self-determining contributing members of society.

Consequently, in the RED II the European legislator obliges the MS to put forward a legally binding "*enabling framework*" for RECs to support and entice their setting up. A connected postulate is to facilitate the participation of vulnerable consumers in RECs. However, if this "*enabling framework*" when transposed into national law is not sufficiently tailored to vulnerable energy consumers' different life situation and behavioural characteristics, the objective of inclusion is unlikely to be achieved. What is more if inclusive RE projects as RECs do not benefit from a robust "*enabling framework*" that encompasses all strata of society, they are likely not to be able to assume their function to increase acceptance of RE since the success of the energy transition depends on the participation of all societal groups.

Therefore, a truly inclusive "*enabling framework*" enables RECs to provide competitive energy prices to their members by removing existing obstacles such as high tax and levy burdens or administrative and regulatory complexities. Simultaneously more knowledge about vulnerable energy consumers and the respective vulnerability context and how it impacts participation in RECs is needed. This serves as a basis for both RECs and policy makers to understand prerequisites, motives and incentives for participation in order to provide those elements and eventually the opportunity to participate.

While research investigating community energy and collective prosumption across Europe exists, research on inclusion and participation of vulnerable consumers in community energy, notably in RECs is scarce. Future research should thus investigate these elements notably the vulnerability context and how it affects participation. This must include the investigation of the role of vulnerable consumers as active consumers in community energy and reasons for why they remain underrepresented. In addition, the participation in RECs could be investigated from the perspective of social innovation and how new transactional modes can be a sustainable alternative to ensure the

inclusion of vulnerable households. At the same time, the NECPs which constitute a major step towards the future design of the European Energy Union currently lack the aspect of inclusion and many existing RECs focus on staying operational rather than extending their activities towards inclusion. Policy makers must therefore be informed and made aware of the potential inclusion of (energy) vulnerable households in RECs entails.

In practice projects such as SCORE report barriers with respect to inclusion and energy poverty mitigation that are linked to access to finance and to local eligibility rules for means tested social transfers for vulnerable households which prevent their participation in RE projects as co-owners. Incentives both financial but also ideational linked to pro-environmental behaviour must further be investigated and provided. A first step we propose a "renewables asset formation agenda for LIHs" to enable and support the participation of low-income households in RECs [6]. It is worthwhile to recall the main principles of this agenda and to extend them with particular emphasis on the empowerment of vulnerable consumers while drawing on best practice from Spanish Sociedades Laborales [55] and local banking schemes such as on the Island of Ærø [114]:

(i) Direct energy subsidies for vulnerable consumers could be tied to membership in a REC; these subsidies then could be capitalised and paid out as a lump sum to join an existing or set up a new REC. Once the REC is operative over time this would increase disposable household income while providing a strong incentive to participate actively in the energy transition. Furthermore, with regard to the acquisition of (co-)ownership in RE to promote prosumership vulnerable consumers receiving subsidies for energy expenditures could be automatically enrolled as (co-)owners in newly founded RECs.

(ii) Investments in RECs should be exempt from necessity to liquidate one's assets when applying for means-tested social transfers; this exemption could have a cap of at least EUR 1,000 per person per year which should increase for investments designed to benefit child education and the like.

(iii) An "*enabling framework*" should support capacity building of local municipalities which in turn can then offer coaching and training programs to facilitate the apprenticeship of vulnerable consumers when joining RECs. Of course, they could also provide financial assistance when doing so; this should include easier access to credit, low or no interest loans, credit guarantees and the like. Capacity building would include - building on best practice - the setting up of networks between local banks, impact investors and RECs to provide low interest rate loans to vulnerable households.

Such RECs not only drive forward a truly sustainable energy transition but have the potential to facilitate the inclusion of marginalised and vulnerable households as consumer co-owners providing them with the opportunity to improve their economic situation. Therefore, these issues need to be part of the national *"enabling frameworks"* in the EU Members States and should be accompanied by future research.

Author Contributions: For research articles with several authors, a short paragraph specifying their individual contributions must be provided. "conceptualization, Florian Hanke and Jens Lowitzsch; methodology, Florian Hanke and Jens Lowitzsch; investigation, Florian Hanke; writing—original draft preparation, Florian Hanke and Jens Lowitzsch; writing—review and editing, Florian Hanke and Jens Lowitzsch.

Funding: The SCORE project that this research is based on has received funding for a coordination and support action from the European Union's Horizon 2020 research and innovation programme under grant agreement No 784960.

Conflicts of Interest: The authors declare no conflict of interest.

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