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Does Access to Regulative Exemption Reduce Barriers for Energy Communities? A Dutch Case Study

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Abstract: European policymakers are encouraging national lawmakers to grant citizens a larger role in the process of energy transition. One way to achieve this is to promote the set-up of local energy communities. This article describes the impact of a particular policy approach, the Dutch regulative exemption, on an energy community. A comparison is made with the traditional barriers that energy communities encounter. The results indicate that, overall, the Dutch regulative exemption is a beneficial policy tool that can support the creation of local energy communities. The exemption enables the community to explore governance and finance models that will allow it to stack revenue streams, while keeping the initial investment costs to a minimum. However, the improved conditions do not allow for a significant improvement in the financial business case. In particular, costs of organising an energy community and the uncertainty of long-term organisational stability remain prohibitive barriers to the roll-out of scaled communities. The study provides a starting point for policymakers investigating how regulative freedom could be of help for local energy communities. The lessons learnt can be applied by policymakers across Europe to support citizen-led energy initiatives.

Keywords: energy communities; regulative exemption; local energy market; Dutch energy policy

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1. Introduction

The energy infrastructure of Europe has been on the verge of transformation since the EU authorised itself, in the Treaty of Lisbon (2007), to establish harmonised measures relating to Member States' energy policy (TFEU Art. 194(1)). European policy aims to transform the energy markets to more consumer-centric and decentralised models (EC, 2018). One way of achieving decentralisation is to promote the set-up of local energy communities. Towards this goal, in 2019, the European Parliament adopted two directives (Renewable Energy Directive (RED II) and Internal Electricity Market Directive (EMD)) that for the first time recognise "certain categories of community energy initiative as ¨energy communities¨" [1]. Furthermore, collective energy initiatives have been in practice in Europe for several decades [2]. Therefore, several different terms and interpretations are used to describe the term "energy communities" [3]. A broader definition of energy communities is derived from their democratic and local governance model as organisational structures around collective local energy actions that provide value for their participants or the local community [1].

In addition to changes in policy direction, a paradigm shift is also occurring at a social level. Compared with the year 2000, the willingness of citizens in 2020 to contribute to sustainability initiatives seems to have increased [4]. Until 2020, the prevailing community models had been similar to those of the 1980s, when local energy communities acquired common ownership of a few large generation assets [5]. The new wave of sustainable local energy initiatives is capable of involving "organisational forms, technology uses, skills, infrastructures, markets, and other institutional requirements maladapted and challenging to conventional regimes" [6]. Community initiators now find that cheaper and more efficient technology combinations are available but, due to regulative constraints and industry push back, not applied. In this context, it is important to understand what changes would occur if/when regulative constraints are minimised. Would additional regulative freedom allow community initiators to exploit the opportunities available in the 2020s?

The initiation and management of an energy community in the age of digitalisation is a complex process. When establishing energy communities, local authorities and community initiators encounter various economic, technical and institutional barriers [2]. This may in the long run result in systems of low public value [7]. Studies of energy communities confirm that they will be unstable if "heavily burdened by inefficient governance, complex legal requirements and high transaction costs" [8]. In the policy realm, sustainable innovation is desirable but it often faces the reigning structural power, especially in the field of niche development [6]. The academic literature further confirms that institutions favouring centralised energy systems constitute the largest barrier to local energy initiatives [9,10].

Even as EU Member States are introducing the energy communities concepts from RED II and EMD into their national legislation, some countries in Europe are already providing the possibility to test a potential new system set-up. For example, in 2015, the Dutch government published an administrative "sandbox" decree that exempts certain innovative local energy projects from the Dutch Electricity Law [11]. This exemption allows the local community to take control of its energy system management while pursuing goals to increase renewable generation and energy savings, while reducing CO_2 emissions [11]. Under the regulative exemption, projects can combine energy production, supply and network operations within one organisation and provide energy to members without supplier licence requirement [12]. One such exemption has been granted to an energy cooperative within the municipality of Eemnes.

This article describes how the Dutch regulative exemption has impacted the process of setting up a new type of local energy community market in Eemnes and compares this experience with the common barriers that other energy communities face. Numerous articles have explored the general barriers that energy communities face and analysed the opportunities that communities could exploit. However, no paper has attempted to combine these two branches of research and analyse a real-life case that uses state-of-the-art technologies and operates in a relaxed, regulative space. This study is the first to examine how additional regulative space could support the set-up and running of an innovative, citizen-led, local energy community, in particular, investigating whether the common barriers that energy communities encounter can be overcome with the help of the regulative freedom offered by the Dutch government. The lessons learnt can serve as an important example for European policymakers in understanding better the impact of the new policies on citizen-led energy initiatives.

The paper is organised as follows: Section 2 presents an overview of the Dutch policy context. Section 3 describes the case study and explains the methodology employed in this paper. Section 4 comprises the main part of the study. It presents the results of the meta-analysis and then contrasts these results with the results of the case study. Section 5 presents the conclusions and policy implications of the research.

2. Policy Background: Dutch Energy Policy Related to Local Energy Initatives

2.1. Policy Context

The overarching aim of the Dutch energy policy is to contribute to the European ambition for a sustainable, reliable and affordable energy supply [13]. From 2008 to 2020, to support local sustainable energy production, three new policies were adopted: the net metering scheme (*saldering*), the collective form of net metering (*postcoderoseregeing*) and regulative exemption (*ontheffing Besluit Experimenten decentrale duurzame elektriciteitsopwekking*) [11]. Compared with the energy communities established in the 1980s, the new energy communities have been encouraged to engage in broader activities at a local level, such as the resale of local renewable energy or providing advice on energy savings [2]. The new branding of the sale of local green energy and new services offered has increased consumer interest while allowing the cooperative to earn extra profit [2]. In conjunction with falling PV panel prices, this has fomented a surge of energy cooperatives. In 2018, approximately 500 energy communities were active in the Netherlands [3]. However, while the Dutch government has enacted policies to support local initiatives, some authors have argued that national policies are still primarily concentrating on supporting partnerships in traditional energy sectors and are paying little attention to citizen-led projects [2,12].

2.2. Legal Framework

The Netherlands Enterprise Agency (*Rijksdients voor Ondernemende Nederland* (RVO)), operating under the Ministry of Economic Affairs and Climate Policy, defines energy communities as legal voluntary entities with open participation whose primary purpose is to provide local environmental, economic and social benefits while promising not to make a profit [14,15]. (Communities are expected to provide diverse energy-related services to their members [14]. The applicable legislation for energy communities in the Netherlands is the Electricity Act 1998. In Article 1ar, the law defines provisions for different forms of energy self-consumption [16]. Furthermore, since 2014, the law has permitted a regulatory exemption space for experiments that contribute to developments in the production, transport and delivery of locally generated sustainable electricity or electricity generated in a cogeneration installation [16]. The regulative exemption clause was further defined in the Dutch Experimentation Decree of 2015 [11]. This administrative decree (*Besluit experimenten decentrale duurzame elektriciteitsopwekking*) exempts cooperatives from complying with certain provisions of the Dutch Electricity Act for a period of 10 years [1].

2.3. The Dutch Regulative Exemption

The experimentation decree for renewable energy projects allows project-based exemptions to energy cooperatives wanting to take over the majority of tasks undertaken by the grid operator and electricity supplier that are otherwise forbidden [17].

The exemption holder can become the producer, supplier and manager of the community electricity grid, eliminating the current strict division in the rest of the energy market [12]. Another requirement is that 80% of the end users must be consumers. In principle, the grid will be transferred back to the grid operator after the end of the exemption [11]. All these provisions enable an energy community to test a new technical system that could lower electricity bills for end users while incentivising renewable energy take-up.

The exemption holder must decide which roles they will take over and which will be performed by partner organisations and communicate these decisions beforehand to RVO [18]. In addition, the cooperative must have an internal governance structure in place, along with complaint management procedures. Finally, the exemption holders must prove to RVO that they have announced in writing the rates and delivery conditions to the customers in the network and obtained approval from the Authority Consumer Market (ACM) (the Dutch business regulation agency responsible for competition oversight, sector specific regulation, and consumer protection) for the methods employed to calculate the tariffs and tax rates [18]. Note that an exemption does not change the energy tax to be paid but allows the cooperative to discuss the matter with the ACM and possibly agree on a new rate [19].

The experimentation rules also set a maximum generation capacity for the community, which is equal to the maximum electricity consumption of the consumers participating in the experiment (+/−5%) [20]. Several other conditions and limitations apply, including the limitation of geographic scope, remaining approval of installation of generation capacity with the DSO, and bankruptcy provisions.

2.4. Policy Incentives

2.4.1. Net Metering

Since 2004, the Dutch government has established a net metering scheme (*saldering*) that has made solar panels a popular investment among homeowners. The net metering scheme allows private prosumers to feed locally produced energy back to the grid. In exchange, the utility subtracts the energy that was fed back from the total electricity bill without adding tax [21]. The scheme incentivises self-consumption, as the netted amount is capped by the maximum consumption of the individual prosumer [22]. From 1 January 2023, the netting scheme will be gradually phased out [23]. By 2031, the prosumers will only receive a net feed-in price from the energy company for the returned solar power [23]. This will increase the payback time for homeowners investing in solar power by approximately 5 years [22].

2.4.2. Zip Code Regulation

In 2014, the zip code regulation came into force (*postcoderoosregeling*), allowing community energy initiatives to share the ownership of electricity generation assets in a geographically delimited area. The policy was designed for citizens without access to their own installation site, such as a roof, but who wanted to participate in local renewable energy projects. The scheme incentivises citizens in an energy community to collectively set up a PV park or a windmill in the same postcode area [24]. Zip code regulation is a form of distant net metering or collective net metering [25] and even has a similar limitation: the collective project generation capacity must not exceed the maximum of 10.000 kWh/year, or the equivalent of members' yearly collective electricity consumption [26]. The policy mechanism was upgraded from collective self-consumption to a direct subsidy scheme in April 2021.

3. Method

3.1. The Case Study

This study analysis the set-up and operation of an innovative energy community project in the municipality of Eemnes. With 3600 households, Eemnes is located in the centre of the Netherlands, roughly 35 km from Amsterdam. The municipality has set a goal of meeting its energy demand entirely through renewables by 2030 [27,28]. Therefore, the municipality is supporting local citizen efforts to install more renewable energy assets in Eemnes [29]. In 2018, the municipality helped the Eemnes Energy Cooperative (EEC) apply for a Dutch regulative exemption experiment on decentralised sustainable electricity generation, which the EEC received in 2018 [17]. Furthermore, the project concept received support from the European Commission's H2020 programme as part of the project RENAISSANCE [30].

The Eemnes experiment aims to establish, based on flexible pricing, a consumer-centric centrally handled electricity market [30], i.e., a peer-to-pool community market where an ICT-based community manager enables local trading [4,30].The market is today only for electricity, thus other energy vectors are not part of the experiment. The physical community consists of homeowners with or without their own renewable generation assets. EEC conducts consumer onboarding, billing and site management. The community will also trade energy with the wholesale energy market [30]. The experiment begins with 10 homeowners; the ambition is to scale this up over a period of 10 years to approximately 1500 households. During the project set-up phase, the name of the pilot was changed from Micro Energy Trading Eemnes to LEF in Eemnes. The experiment of LEF in Eemnes is not the only activity the EEC is promoting among its members. The EEC is promoting a national green energy provider contract and providing advice on energy savings and joint investment options in renewables that takes advantage of the zip code regulation.

3.2. The Use of Barriers as an Analytical Tool

This paper employed barrier analysis as an analytical assessment tool [31] to compare an energy community set-up in Eemnes under regulative freedoms and an energy community set-up under traditional energy market rules. The academic literature details a number of barriers local energy initiatives face under the present energy market rules, identified in a meta-analysis of the literature. First, several overall key barriers were identified. To narrow the scope of the barrier analysis, the SCOPUS database was used to search for articles. The most widely cited articles focusing on energy community barriers between 2014 and 2020 were taken into consideration, given that it was during that time that the most recent and significant policy schemes were adopted. A literature search was thus performed for the period between January 2014 and December 2020 using only the keywords “energy community”, “energy communities” and “community energy”. The results were organised in descending order, from the most cited to the least cited works. Two main criteria were used for choosing articles from the search results. First, the articles had to include a section where barriers were analysed; secondly, the articles had to analyse more than one community in order to cover a variety of issues. The key articles contributing to the analysis were those by Brummer [10], who compared and analysed the barriers for 62 energy communities; Koirala [9], who conducted a literature analysis of 1285 articles mentioning terms relating to community energy systems; and Caramizaru and Uihlein [1], who reviewed 24 energy community case studies in Europe. The literature provides a long list of individual barriers that can fit under several theoretical categories of barrier [31]. However, for the purpose of this paper, the barriers are categorised into three broad groups: institutional barriers, technology related barriers and socio-economic barriers [9,32]. Regarding institutional barriers, this paper analyses the obstacles that derive directly from policies or regulation [33]. Technology-related barriers pertain to the selection, use and accessibility of technology. Socio-economic barriers are broadly related to the monetary issues that surround energy communities [9].

3.3. Empirical Data Collection

For the empirical research element, qualitative methods were employed to compare state-of-the-art literature on the common barriers energy communities face, with a real-life case study. The RENAISSANCE project deliverables and minutes of the meetings describe the process and results of the pilot set-up and operations. The barriers were contrasted with the evidence from these documents. The study has one limitation, namely the energy community is using a novel energy market model. The innovative nature of the project may have added new barriers and difficulties that were not present before.

4. Analytical Findings

In this section, traditional barriers for energy communities are compared with the exempted case study results. Three broad types of barriers identified in the literature are compared with the empirical evidence from LEF in Eemnes. The key barriers that energy communities encounter are broadly related to institutions, technology and socio-economics [9,32]. Although divided in this paper to enhance readability, the three categories are empirically intertwined [31]. For example, the institutional context defines the legal form that an energy community may take [9], which determines the business models that can be used in the community. The business model impacts the economic return that a community can generate. Similarly, technology barriers influence the ability to design different energy sharing models, impacting the business model. Following this logical pathway, this section first analyses the institutional barriers, then discusses technology and finally examines the socio-economics.

4.1. Institutional Barriers

The growth of local energy initiatives in Europe derives, to a large extent, from the fact that many citizens are not satisfied with the progress in greening our energy systems

[2,9]. Since the 1970s, different forms of energy initiatives have emerged in Europe as alternatives to the incumbent energy companies [5]. Nonetheless, sudden surges in the number of consumer-centric grassroot initiatives have emerged following legislative or policy changes [1,2]. For example, in Germany, the re-municipalisation of the grid has accelerated the growth of energy communities [5]. Similarly, in the Netherlands, following the liberalisation of the energy market, the number of energy cooperatives increased over a 6-year period, from approximately 40 initiatives to over 360 initiatives [2,34].

4.1.1. Frequently Changing Policies

Unclear, complex and frequently changing policies make it difficult for energy communities to grow [5,10]. Quickly changing policies do not allow communities to plan their activities securely [10]. The inability to construct clear plans limits the growth of the community because energy communities depend on the interpersonal trust between community members and initiators [9].

In the case of LEF in Eemnes, the exemption has been granted for a period of 10 years [17]. The exemption period starts from the moment the implementation commences, and thus the years spent preparing the experiment are not counted. In the case of the EEC, the exemption was granted to the cooperative at the beginning of 2018 and the implementation was anticipated to start in mid-2021. This allowed the EEC to take the time needed to prepare the experiment for implementation and build trust within the community [35]. The clear 10-year implementation period and flexible starting date have allowed community initiators to build internal trust and establish a clear timeline for future developments.

4.1.2. Organisational Form

Institutions determine the legal form that an energy community can take. In some cases, the models permitted can pose a barrier to community growth. For example, a not-for-profit nature may limit the long-term financial stability of the organisation, rendering the community dependent on voluntary work [10].

The 2015 regulative exemption was granted only to cooperatives and associations of owners [11]. On the one hand, this means that the EEC is an energy cooperative and thus its primary goal is not profit generation. On the other hand, the exemption affords the EEC the right to manage its own grid, making it possible for the cooperative to test new energy market models, such as peer to pool, as well as experiment with different business models [20]. Thus, the barrier related to limitations in the organisational model has not been resolved; but the possibilities under the same organizational model to stack up more revenue streams (Section 4.1.3) has increased. Thus, some of the pains from the barrier have been relieved. The community has more opportunities to breakeven in terms of cost and reduces the dependency on voluntary work in the long run.

4.1.3. Roles in the Energy Market

The regulator defines the roles an energy community is allowed to take in the energy market [5,9]. The energy market regulations limit the options for community energy trading models or access to the grid [4]. With limited possibilities to access certain energy markets, such as wholesale or ancillary services, the community has limited ability to stack up revenue streams [5,10]. Moreover, for any kind of energy sharing within the energy community, the law requires the organisation to have a supply licence, acquiring which is complex and costly procedure [20]. Similarly, rules regarding balancing responsibility activities and connecting new assets to the energy communities can "present a challenge for small energy communities" [5].

In terms of administrative barriers, the greatest benefit of the exemption is the ability to be freed from the supply licence, which helps to avoid various administrative procedures [17,20]. However, to fulfil the balancing responsibility requirement and have access to wholesale energy markets, the cooperative had to purchase these services from a white label energy supplier. This procedure has been used before by Dutch local energy cooperatives because it helps to reduce their administrative burdens [2]. Thus, although the EEC has the ability to take on the balancing responsibility role, the process is still too complicated for local initiators to manage on their own. However, due to the exemption, the community is able to offer new services to its members, with hope of lowering their electricity bills.

4.1.4. Additional Observations on Institutional Aspects

In the context of wider policy, RVO does not provide structured support for activating the exemption and helping communities to better understand all the administrative and legal provisions that need to be fulfilled before local trading can start. Furthermore, there seems to be a mismatch between the policy support that the Dutch government is offering and recognition of the Eemnes experiment as an innovation project by other governmental organisations. The experimentation proposal was submitted to both European and Dutch innovation subsidy programmes, and though two European grant requests were approved, the Dutch innovation subsidy granting agency did not provide a positive evaluation.

4.2. Technology-Related Barriers

Technological innovation has the potential to reduce the initial set-up costs of energy communities, but only if deployed wisely. The energy grid involves generation, distribution, storage and control technologies, which have become cheaper and increasingly sophisticated over the last decade, making real-time grid management technically and financially possible for local citizens [36]. New technologies can increase system reliability and transparency while paving the way for new services that can increase revenue streams within the community [4]. An increased number of flexible assets at the household level, such as heat pumps and smart appliances, provide an opportunity to exploit local flexibility, which can be traded within the community and with the national grid with the assistance of innovative technology platforms [9]. This provides an opportunity for energy communities to offer their members services such as energy efficiency, energy savings, energy storage, management of local distribution networks, aggregation and flexibility management [5]. All these opportunities have only become available in the last decade, meaning that in most small-scale initiatives, these opportunities have not yet materialised. Therefore, lack of support regarding technical skills and a limited access or ability to use technologies hinder the take-up of energy communities [2].

4.2.1. Lack of Expertise

Community "initiatives are often started by non-experts" [10], so there could be a lack of technical understanding within the community [9,10]. This could result in choosing hardware or software options that are not optimal for the community, resulting in a technology lock-in or situations where technologies with low payback are chosen.

RVO, before granting the exemption to a cooperative, requires the community to describe in its application which technologies and business models will be employed in the project. Therefore, the EEC has to demonstrate to RVO the innovative aspects and technical soundness of the community approach before being granted the exemption right [37]. Furthermore, already in the exemption application, RVO requires the cooperative to demonstrate that a number of experts will be supporting the project [37]. This reduces the chances that the community will be unsuccessful because of a lack of expertise. Overall, these mandatory provisions and a certain degree of flexibility make energy community projects less prone to the risk of failure than initiatives without exemption.

4.2.2. Barriers to Combining New Technologies

Although hardware and software prices are reducing, the small size of the communities and the lack of initial financing mean there is limited access to these technologies (e.g., community batteries or neighbours' PV panels). Furthermore, energy communities experience difficulties in accessing different ancillary service markets, not only because of institutional constraints, but also because of their limited size.

In the case of Eemnes, the regulative exemption enables the Eemnes community to manage its own grid [17], allowing the EEC to take better advantage of the assets that its community members already own (rooftop PV, heat pumps), lowering the initial investment costs and potentially improving the business case [38]. On the other hand, managing a grid requires smart software, adding to operational costs of running the community. In Eemnes, energy is traded between citizens with their own PV and community members without generation assets. In a later stage, flexible energy assets could be added [38], providing additional benefits. The exemption is, therefore, alleviating this barrier.

4.3. Socio-Economic Barriers

One way of reducing socio-economic issues is to establish the energy community by using new innovative electricity market models. The new prosumer models where citizens can trade energy among themselves, such as peer-to-peer or peer-to-pool models, are expected to generate profits [4]. Innovative business models, in conjunction with new ICT, are more likely to find ways to optimise old assets and reduce the up-front costs, as discussed in Section 4.2. In addition, energy communities should be able to generate income near the energy generation site, which will confer local economic benefits by creating local jobs (maintenance, management, etc.), keeping the generated value local [10,39].

4.3.1. Initial Set-Up Costs

One huge obstacle local energy communities face is the lack of initial financing and funding options when setting up [5,9,10]. Energy communities are unable to guarantee revenue streams, and their non-profit nature does not allow them to build up reserves [10], making the up-front expenditure of an energy community higher for local citizens and community members, compared with existing national grid alternatives. This impacts the long-term stability of the organisation [1].

The potential to create an energy community using innovative market models and technologies made the Eemnes project a more appealing candidate for consortiums seeking state-of-the-art pilot projects, such as RENAISSANCE. The ambition and the ready-to-go concept helped Eemnes receive two European funding opportunities, showcasing its European-level innovation [30,40,41]. Furthermore, the exemption reduced the initial set-up costs from a technology perspective, as discussed in Section 4.2.2.

However, the exemption does not provide better financing terms. Nonetheless, Eemnes has been in discussion with battery providers willing to provide support in the form of technical expertise and the organisation of a community-financed battery, partly due to the innovative nature of the project [42]. Therefore, this one-off exemption has helped the EEC obtain access to initial funds and financing, although the financial cost and uncertainty of organising these may outweigh the benefits and may not be replicable.

4.3.2. Uncertainty with Respect to Financial Success

It is difficult for municipalities and citizens to lead initiatives that promise green local energy but at a much higher cost. Financial benefits, such as shares or cheaper electricity prices, are among the most important factors motivating citizens to join energy communities [1]. Nonetheless, small community projects are considered “high risk projects with uncertain probability of success” [10]. Beyond having difficulties attracting new members, this uncertainty further lessens the probability of a community receiving initial financing and building up reserves.

More important than the initial set-up costs has been the impact of the regulative exemption on the potential for increasing the revenue streams of the community using an innovative peer-to-pool energy trading model. The LEF in Eemnes business model is built around two core energy transactions. Firstly, energy will be traded on the internal peer-to-pool community market, where prosumers and consumers are engaged in a mutual exchange of energy [30]. Secondly, the community will also be trading energy with the wholesale energy market. Before the project began, a simulation of this business case was created based on the PV and consumption data were collected from 50 households. Initial estimates indicate that the costs of consumed electricity in the electricity bill account for only 18% of the entire utility costs [42]. Estimates suggest that households in the community without PV installation would on average receive a lower electricity bill each year if they participate in the peer-to-pool model as they can take advantage of lower local energy prices [42]. At the same time, households with PV would have slightly higher electricity bills than usual as long as the current net metering rule remain in place, given that these offer higher compensation for surplus energy than the local pool market. Once the net metering starts to reduce (as of 2023), the prosumers of the community will also receive gradually lower electricity bills compared with the current bills when acting in the community, with maximum savings expected in 2031 (LEF in Eemnes minutes 2021). The project has also attracted the interest of the local Distribution System Operator (DSO), which announced that it would grant financial incentives to a community member if the community exercises local balancing and acts on the energy market as one connection point [43]. The community is projected to be able to offer lower electricity bills to its members as of 2023, while covering the gap prior to 2023 with the incentives from the local DSO [43]. Without the exemption, this type of local energy trading business model would not be possible.

4.3.3. Split Incentive

Split incentive barrier can appear in an energy community when costs and benefits are allocated unfairly between members. This issue can arise when the social housing sector is involved or if rental properties are part of the community. In such cases, landlords would need to make the initial investments in PV but the tenant would reap all the benefits [9]. Similarly, split incentive problem is present when designing the local electricity market price for a community that composes of individual prosumers and consumers, the latter having not contributed with capital investments into the communally used energy generation assets.

The split incentive barrier in Eemnes from the housing provider perspective was raised as the housing provider is not an active participant in the community and no tenant has raised the question. The problem might arise later, when Eemnes wishes to exploit economies of scale and reach a higher number of participants, given that there are various social housing properties in the municipality [28]. The second, split incentive issues have come out from the simulations of the yearly electricity bills, where the consumer had with peer-to-peer model a higher savings compared to the prosumer (Section 4.3.2). This issue has been solved by a final balanced electricity bill calculation at the end of the year on community level to have more equal compensation.

4.3.4. Economies of Scale

The reduced bankability of assets decreases the size of the community, preventing economies of scale. The local transactions that keep revenue local could also encourage “reinvestments in additional renewable generation” [39], increasing the size of the energy community, which increases the benefits accrued from economies of scale.

Economies of scale are not overcome in Eemnes. After 9 months of being operational the community has 10 active members who are billed through EEC and 135 households who share their energy consumption data with the project. Nonetheless, the regulative exemption is not a barrier here as with the provision EEC could expand up to 10,000 connections, which in the case of Eemnes would cover all the 3600 households registered in the municipality.

4.3.5. Other Observations

Given the goal set by Eemnes to reach 1000+ connections [30], community managers will need to hire professional day-to-day managers for the local grid in the long run or outsource this activity to a commercial party. In the project preparation phase, the cooperative members have been working on a voluntary basis to design the local market set-up with support from external experts [30]. At an early stage, instead of an external installation company, cooperative members who were installing the gateways for the community took up some of the engineer-related monetary jobs [30].

5. Conclusions and Policy Implications

This paper has analysed the extent to which common barriers energy communities face could be removed through the provisions set in a specific policy support tool such as the Dutch regulative exemption. The lessons learned in this paper be transferred to most European member states as the energy regulations across Europe follow similar principles due to the common market.

Regarding, socio-economic barriers, the removal of regulative barriers in Eemnes made it possible to stack more revenue streams and lowered initial set-up costs, this was not enough to confidently defend this as being a more competitive business case compared to traditional utilities. The margins of producing centralised energy versus decentrally produced and managed energy are not yet big enough to sustain the costs of running a community. Thus, testing new models and providing support for early initiatives are key to later replication of the community models elsewhere. Policymakers should consider providing financial support to community initiatives, whether in the form of tax incentives or direct financial support.

In addition, market access rules and grid usage rules could be made more transparent and beneficial for energy communities. In Eemnes, the DSO grid is used for local trading and additional revenue streams could be secured through participation at the DSO balancing market. This has increased the willingness of citizens to join the community and act as a grid balancing node for the remaining grid. Thus, regulators should think of ways in which regional grid operators could remunerate energy communities if the latter offer flexibility services to the grid. This approach would allow citizens to invest in renewable energy production locally while lowering the grid investments for the grid operator and the society as a whole.

Though the exemption opened the possibility for the energy cooperative to act as a utility, taking up DSO and BRP roles, it was not used in practice. The case study confirms that if regulators eliminate some of the institutional barriers, such as access to the grid or exemption from a supply licence, the community can solve technological and socio-economic barriers only if the necessary technical expertise is available. Therefore, national policymakers need to ensure that local energy innovation is combined with technical knowledge support, either in the form of financial aid or by providing expertise. The lack of such an option can negatively impact the business case, and the regulative changes set out in the two directives will have a limited impact in practice.

In the case of Eemnes, the regulatory exemptions were not combined with financial support for innovation. This meant that nationally recognised innovative local experiments had to be self-funded or make a significant effort to obtain grants. A lack of initial financing is an issue, as those taking initiatives lack the capability to access technical experts and new technology platforms. This further weakens the business case for the community and creates distrust and frustration among the community initiators. All in all, this could lead to a contrary impact on national energy markets, to the policymakers' initial ambition of boosting the energy communities' growth in Europe.

The Clean Energy Package directives [44] force Member States to provide energy communities in Europe more enabling conditions similar to the Dutch regulative exemption. It is in this framework that the Eemnes case study highlights the barriers that remain in place even if regulative constraints are removed. The Eemnes case study demonstrates that additional regulative freedoms can help the community set-up but, on their own, are not sufficient to address the key barriers the removal of which would allow energy communities to blossom. This demonstrates that providing only additional degrees of freedom to energy community initiators is not enough and that policymakers must also put in place an additional supporting framework of policies to support the growth of local energy communities.

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