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Auctions and renewable energy communities

Measures to support RES communities in auctions – Country experiences and lessons learnt

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1 Introduction

The Guidelines on State aid for environmental protection and energy for 2014 to 2020 require Member States to set up competitive bidding processes (also called auctions) from 2017 onwards, to grant support to all new renewable energy (RE) installations, with only a very few exceptions[1] (European Commission, 2014). Given the central sole auctions are set to play in support schemes, RE market actors face the question of how to secure support by either successfully participating in an auction or qualifying for an exemption. At the same time, the recast of the Renewable Energy Directive (RED II) acknowledges the importance of renewable energy communities (RECs) and requires Member States to consider the specificities of these market actors when designing support schemes. Considering these developments, this report assesses the impact of auctions on RECs and measures to support these market actors in/despite auctions.

RECs vary considerably across countries: The form that a REC initiative takes is generally determined by local needs, the actor landscape in the RE industry, and the policy and regulatory environment (Lucas, Leidreiter, & Muñoz Cabré, 2017). The first part of this paper describes the challenge of finding a definition for RECs[2], discusses the risks faced by RECs in renewable energy auctions, and explores measures to promote RECs. The assessment of the risks and of measures to address these risks focusses on RECs that are energy community developers with no project portfolio ("single-project RECs") and, to a lesser extent, on RECs that are based on local co-ownership of projects that have been developed by professional project developers. In addition, measures inside and outside the auction that promote RECs and local acceptance more broadly are also assessed, including exemptions from the auction.

The second part of this report discusses experiences from three countries that have either implemented measures to support RECs and/or more broadly promote local acceptance within the auction (Germany and France) or supporting measures outside the auction (Denmark).

The remainder of the report is structured as follows:

Section 2 discusses the relevance of RECs and the challenge of finding a unique definition

Section 3 investigates the risks faced by energy community project developers in RE auctions

Section 4 examines measures to address the risks faced by energy community project developers in RE auctions

Section 5 analyses experiences with measures implemented in Germany, France, and Denmark to support RECs and/or more broadly promote local acceptance

Section 6 outlines lesson learnt.

[1] Support may be granted without a competitive bidding process to installations with an installed capacity of less than 1 MW, demonstration projects, of wind projects with an installed electricity capacity of up to 6 MW or 6 generation units. Exemptions are also possible if Member States demonstrate: that only one or a very limited number of projects or sites could be eligible; or that a competitive bidding process would lead to higher support levels or low project realisation rates (European Commission, 2014).

[2] A detailed description of REC archetypes can be found in the 2019 Asset report „Energy communities in the European Union" (De Vos, Kielichowska, Abada, & Klessmann, 2019).

2 Relevance and definition of energy communities

Policymakers pay special attention to energy communities to foster the acceptance and ownership of RE development. Communities may reject RE projects if they are deemed to have costs for the community (e.g. nuisance during installation, concerns related to environmental issues, landscape or noise pollution), but the benefits accrue outside of the community (Interreg Europe, 2018). Opposition to RE projects may also stem from subjective factors such as local idiosyncrasies that stand in opposition to, e.g. industrial structures such as wind turbines (Zerrahn, 2017). Local participation in planning and decision-making processes, as well as local benefits through project ownership, direct community compensation or local job creation along the supply chain, can promote the acceptance of RE development.

RECs can also support the functioning of auctions. Assuming RECs need to participate in auctions because, e.g. no alternative support is available, having REC projects in auctions can lead to a more diverse actor landscape, which potentially increases the intensity of competition in the auction (Tiedemann, et al., 2015). Furthermore, local engagement can ease the project development process by avoiding or lessening delays due to unresolved community concerns or even lawsuits (Power Africa, 2018), and facilitating the land acquisition process, particularly for new wind projects in areas with highly fragmented ownership (Hauser, et al., 2015). Indeed, the non-agreement of one landowner to rent or sell an area may compromise the viability of a project. Site availability enables competition and facilitates reaching the auction scheme target, thus contributing to the effectiveness of auctions.

Article 22 of RED-II recognises RECs as relevant market actors and calls Member States to avoid discrimination and remove barriers to their development, create an enabling framework for their promotion, and report on the progress of these measures. Moreover, Member States shall consider the specificities of RECs when designing support schemes, including auctions, to allow them to compete for support on an equal footing with other market participants.

Definition of energy communities

While there is no widely accepted definition of "energy community", core elements behind this concept include local proximity, local participation, type of participation in RE development, and a focus on community co-benefits. *Local proximity* refers to the limitation of participating actors or beneficiaries of projects to a geographic community.

Another element of RECs refers to *local participation* by members or shareholders, such as natural persons, legal persons or local authorities (including municipalities). Members or shareholders of the energy community control it and/or reap its environmental, economic or social *community co-benefits*. (Non-for-) profit requirements for RECs may or may not be prescribed.

Types of participation in RE development include the ownership and/or involvement in project development. Actors such as local citizens can participate in the co-ownership or financing of RE projects by providing equity or debt. Participation can also include the development and sometimes operation of a RE project.

The definition in Article 2 (16) of the RED-II (European Union, 2018) focuses on local ownership and corporate governance. *RED-II defines a renewable energy community* as a legal entity;

- which, according to applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members located in the proximity of RE projects owned and developed by that legal entity;
- whose shareholders or members are natural persons, local authorities, including municipalities, or SMEs;
- whose primary purpose is to provide environmental, economic or social community benefits for its members or the local areas where it operates rather than financial profits.

In addition, a definition for *citizen energy community* is included in the Directive on common rules for the internal market for electricity ((EU) 2019/944). Article 2 defines a *citizen energy community* as a legal entity which:

- is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises;
- has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; and
- may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders.

The definitions in the electricity market Directive and RED-II, however, do not reflect the diverse landscape of community actors across Member States. The concept of "energy communities" denotes an ideal picture that is difficult to capture and concretize, which makes the development of a precise legal definition a challenge. RECs can take many forms and strive for different objectives, including social acceptance, local ownership, and actor diversity to avoid market concentration. RECs can also have different roles along the value chain, i.e. being involved either in the development or operation of RE projects. Moreover, the form that a RECs initiative takes is generally determined by local needs, the actor landscape in the RE industry, and the policy and regulatory environment. Depending on these, RECs can take different legal forms and organisational structures (Lucas, Leidreiter, & Muñoz Cabré, 2017).

Because there are several aspirations attributed to REC projects, legal definitions that try to capture community energy run the risk of either being too narrow, and thereby excluding certain forms of community energy or certain actors, or too wide/not "waterproof" enough, and thereby risking that projects and actors fall under this category that were not intended. Finding a legally robust, politically sound definition is therefore challenging.

This report analyses energy communities where there is local participation in the ownership/financing or development/operation of a RE project. Where relevant, the paper distinguishes on the a) expertise of the REC (i.e. new to the market/one-time actor) vs. experienced actor, b) activity of REC in project lifecycle (development, operation, ownership), and c) level of cooperation with professional project developers and/or professional capital providers. Measures inside and outside of the auction aim to reduce market barriers and consider RECs in support schemes, but may also more broadly target local acceptance without having a specific type of actor in sight (e.g. bonus in France, "option-to-purchase" and "value loss" schemes in Denmark[3]). Measures inside the auction were introduced in Germany and France through preferential rules, while supportive measures outside the auction were introduced in Denmark.

[3] Denmark's "option-to-purchase" scheme obliges wind energy project developers to offer a share of at least 20% of total investments in new wind energy projects to local citizens at cost price for both onshore and nearshore wind projects. The "value-loss" scheme obliges RE project developers/owners to compensate local citizens for any lost property value linked to the realization of the project. These measures are further discussed in section 5.3.

3 Risks faced by energy community project developers in RE auctions

Participating and winning in an auction requires significant expertise and access to capital, which smaller actors do not have to the same degree as large, experienced RE developers. Section 3 presents and discusses the risks auctions imply for small, often single-project (i.e. no project portfolio) RECs developing their own projects, which include financial risk, allocation risk, price risk, new-bidder risk, non-compliance risk, and non-realization risk. This section also describes how RECs with local co-ownership but professional project development are less affected by these risks (where relevant, risks that still apply to this type of REC are highlighted). Figure 1 presents the risks faced by RECs along the project development process before and after an auction, and also draws from previous AURES work on actor diversity (Wigand & Tiedemann, 2016) and the effect of auctions on financing conditions (Dukan, et al., 2019).

Though these risks are, in principle, faced by all bidders, they pose a stronger challenge to energy community project developers because of, among others, the challenge to spread these risks over a portfolio of projects and secure financing before winning an auction. The degree to which RECs are confronted with these risks depends on the type of RECs: a) expertise of the REC (i.e. new to the market/one-time actor) vs. experienced actor, b) activity of REC in project lifecycle (development, operation, ownership), and c) level of cooperation with professional project developers and/or financiers.

Figure 1 - Simplified representation of the risks faced by energy communities in RE auctions

Before the auction		After the auction
Pre-development stage	Auction date	Construction
Financial risk: challenge to directly fund or acquire financing for planning and permitting activities.	Allocation risk: challenge to spread impact of sunk costs if not successful (pre-development costs x probability of bid not awarded) New-bidder risk: challenge in dealing with formal mistakes for one-project bidders	Non-compliance risk: challenge to spread impact of financial penalty in case of construction delay or project failure
Financial risk: challenge to directly pay or acquire financing for bid bond	Price risk: challenge to calculate bid level	Non-realization risk: challenge in preventing delays that may lead to cancellation of the award

3.1 Pre-development stage

While the scope of the project pre-development stage varies across countries, and a distinction between a pre-development and a development stage is not uncommon[4], in this report it refers to planning and permitting activities implemented before the auction date. Financial risk refers both to the challenge faced by RECs to acquire capital (particularly equity) to fund the project pre-development stage, and to directly pay or acquire financing for the bid bond. Most of the project pre-development is financed from the project company's own resources. The availability of stable, well-working administratively-set FIT/FIP, which is not the case across all European countries, can enable RECs to acquire enough equity to finance the costs of the pre-development stage before construction starts. Because securing support under an auction scheme is less certain

[4] The pre-development stage may refer to the development of a project concept, the site identification, and feasibility study, while the development stage takes the project from the feasibility stage to financial close, including the securing a site and permitting (IFC, 2012).

compared to a scheme based on administratively-set FIT/FIP, and the support is a key source of project revenue required to pay back debt and dividends, RECs developing a project such as cooperatives, may have difficulties acquiring this capital.

Also, in many cases RECs have no or a shorter track record in project development and a lower credit rating, compared to more experienced developers and thus cannot, or only under less favourable conditions, receive bank guarantees for bid bonds (Klessmann, et al., 2015). Whether and under what conditions a guarantee would be given depends on how established the relationship between the bank and the project company is.

Experienced project developers with local co-ownership/financing do not face these types of financial risks to the same extent. Still, complying with the "local ownership/finance" attribute poses an additional burden on these bidders to either source this type of financing themselves or entrust this to a third party (e.g. civic crowdfunding platforms used in France). The risk is mitigated if there is enough supply of third-party entities performing these services and barriers to access them are manageable.

3.2 Auction date

Auction participants, by definition, bear the allocation risk despite the costs incurred in the development of their project. This risk can be assessed by a function of pre-development cost (for planning and permitting activities occurring before the auction) multiplied by the expected probability of the bid not being awarded. This risk is accentuated for one-project bidders who cannot spread the risk across a portfolio of projects. Though the level of pre-development required to participate in the auction varies between countries, the pre-development of sites (acquiring land leases, permits, etc.) entail cost (sunk cost) that will not be recuperated in case the bid is not awarded. RECs may have little or no chance of spreading risks over several projects due to their smaller portfolios, which may deter them from participating in the auction scheme (Tiedemann, et al., 2015). Single-project bidders, that is those with no project portfolio, also face a higher risk of making formal mistakes in their bids (i.e. new-bidder risk), which can make the bid invalid.

Experienced project developers with local co-ownership/financing also face the allocation risk but have a project portfolio to mitigate the impact of one non-awarded project.

Similarly, auction participants need information on the overall market development to determine the competitiveness of their project, that is to choose the right margin for their bid (i.e. price risk). If actors cannot, or only to a limited extent, assess the position of their project in the market, they may be deterred from placing a bid. In the case of onshore wind in Germany, bidders need to anticipate the designation of areas for wind farms in all federal states, and assess the bidding strategy of larger actors. This information, however, is less available to RECs with few projects or only in lower quality, compared to more experienced project developers (Grashof, Kochems, & Klann, 2015).

In early auctions, that is auctions that take place at an early stage of the project development process, RECs have less information on their own project costs and need to make assumptions on materials and financing. For example, more experienced project developers can leverage this information from ongoing purchase contracts with suppliers, especially for solar where project-specific purchase contracts are less needed (wind supply contracts are more project-specific). As a result of uncertainty, RECs could withdraw from the development of projects, although they could in principle develop projects that would be competitive. Experienced project developers with local co-ownership/financing do not face price risk because they can leverage this information from their project portfolio, and so determine the competitiveness of their project.

3.3 Construction stages

Risks after the auction include non-compliance risk and non-realization risk in the construction stage due to delays. Main reasons for delays include difficulties in procuring all required permits on time, reaching financial close, and getting components delivered and constructed on time. Component supply contracts are negotiated on price and delivery date. Manufacturers are willing to reduce prices if developers are either flexible on the supply date or buy large quantities. RECs do not have negotiation power on quantity hence have to be

flexible on the supply date. This flexibility in the time of delivery exposes them to a potential commissioning delay. Also, single-project RECs might face difficulties procuring permits on time due to a lower ability to deal with "permit pitfalls", such as underestimating the time and costs of procuring a permit or learning late in the process about an additional required permit that slows down project commissioning.

For the capital-intensive construction stage, including the procurement of solar modules or wind turbines, the project company solicits additional external equity from investors, so-called sponsors, and debt from banks. Difficulties in reaching financial close would delay the initiation of project construction, although this depends on the local lending market and how familiar they are with energy community projects.

If there is a delay, small, single-project RECs do not have a portfolio to spread the impact of a financial penalty with other projects built on time (non-compliance risk). Also, these actors face challenges in preventing delays that may lead to cancellation of the award (non-realization risk). Experienced project developers with local co-ownership/financing are not exposed to this risk in the same degree because they can mitigate the impact of an executed financial guarantee with their portfolio, have better supply contract conditions, and have experience with past "permit pitfalls".

After not being successful in an auction round, and observing the level of competition, bidders need to decide whether to "maintain" their bid (or only slightly reduce it) over several rounds, and so continue to bear the bid risk, or lower their bids and increase the likelihood of winning a support contract (Haufe & Tiedemann, 2016). Small, single-project RECs developing or operating a project tend to have more difficulties "maintaining" their bids after several rounds of not being successful, because delays in winning have a larger impact on generation costs than for project developers that have a project portfolio. If a project is not awarded in a round, small, single-project RECs could not switch to other projects in their portfolio. Accruing interest and other capital costs would affect them more than larger players (Leipziger Institut für Energie, 2015) (Nestle, 2015). Their smaller portfolio or lack thereof makes them more vulnerable in the event of intensified competition. Should these project developers not obtain cost-covering bids, they could be the first to be pushed out of the market.

As first outlined in section 2, RECs can play an important role for the efficiency and effectiveness of auctions in the long run. Having REC projects in auctions can lead to a more diverse actor landscape, which potentially increases the intensity of competition and the efficiency[5] of the auction (Tiedemann, et al., 2015). In terms of the auction effectiveness, RECs can ease the project development process by avoiding or lessening delays due to unresolved community concerns or even lawsuits (Power Africa, 2018), and facilitating the land acquisition process, particularly for new wind projects in areas with highly fragmented ownership (Hauser, et al., 2015). The role of RECs in enabling the use of more project sites represents an opportunity, especially as suitable areas become scarcer[6].

Measures to address the challenges faced by energy community project developers are discussed in Section 4.

[5] On the other hand, the efficiency of the auction would be lower if costlier REC projects, in terms of higher generation costs, are awarded. One reason for the higher generation costs could be that RECs benefit less or not at all from economies of scale due to their smaller portfolios. Lower project planning costs through better local anchoring and lower return expectations during project development stage may compensate for this disadvantage (Grashof, Kochems, & Klann, 2015).

[6] The potential to enable more sites for the auction could also materialize if RECs team up with professional project developers: they would continue to play a role in increasing the acceptance of the project, but the professional project developer participates in the auction.

4 Measures to address the risks faced by energy community project developers in RE auctions

This section discusses measures to address the risks auctions imply for energy community project developers. Because most of the risks are faced by small, single-project (i.e. no project portfolio) RECs developing their own projects, this section focuses on this type of REC. Where relevant, reference is made on how the measures can support RECs with local co-ownership/financing but professional project development. Section 4.4 outlines potential effects the measures have on the auction.

Figure 2 presents an overview of measures, the risk they help address, and country examples where the measure has been implemented. It should be noted that a measure is not necessarily better than another one because it addresses more risks. The risks RECs are exposed to depend on the type of energy community. For example, small, single-project RECs developing and operating a RE project typically face all the risks presented in Figure 2. Although RECs with local co-ownership but professional project development are largely not affected by these risks, complying with the "local co-ownership/financing" attribute may increase the financial risk and the allocation risk in cases of higher transaction costs resulting from involving local actors (see section 3).

Supportive measures aim to increase the likelihood of auction participation and winning a support contract by RECs, and can be broadly divided by the level of intervention in the auction. Measures inside the auction refer to preferential rules available to RECs as part of the auction's design elements, and so directly influence the outcome of the auction. Measures outside the auction encompass, on the other hand, mechanisms other than auction design elements to support RECs.

Figure 2 - Overview of measures to address risks faced by energy communities in RE auctions

	Measures outside the auction			Measures inside the auction		
	Provide financing for project pre-development	Bid quality control and market building	Exemption from the auction	Other conditions for participation	Bonus or quota for RECs in the auction	Different pricing rule
	Guarantee Fund in Denmark	Several countries	For example de-minimis rules in France and Germany	Preferential auction rules in Germany	Citizen participation bonus in France	Uniform pricing rule in Germany
Risk						
Financial risk	✓					
Allocation risk	✓		✓	✓	✓	
Price risk			✓			✓
New-bidder risk		✓	✓			
Non-compliance risk			✓	✓		
Non-realization risk			✓			

4.1 Supporting measures outside the auction

Measures outside the auction include the provision of financing for project pre-development through public resources/funds, bid quality control and market building. This type of measure can be either exclusive to RECs, like in the case of a guarantee fund, or be open to all market actors, like in the case of bid quality control and market building measures.

Financing can be in the form of a guarantee fund, an investment grant, or partial compensation for project development costs if bids are not awarded. These three measures aim to support energy communities in the project pre-development phase, thus mitigating financial risk (challenge to directly fund or acquire financing)

and the allocation risk (pre-development costs x probability of bid not awarded).

A guarantee fund back-stops loans provided by commercial banks to finance a share of the project pre-development costs. The guarantee is paid by the fund to the bank if the project is not awarded in the auction and is not realized. In the case of Denmark's Guarantee Fund, the guarantee is executed if the project is not realized, regardless of whether the project participated in an auction or not. In markets in which commercial banks seldom offer loans for project pre-development, a guarantee fund can stimulate the market to offer such credit lines: RECs developing and operating a project have an incentive to make use of the guarantee volume and finance part of the pre-development costs through a loan. A guarantee fund would also partially offset the allocation risk faced by these actors, which seldom have a project portfolio. The risk-reducing effect of a guarantee fund and thus its effectiveness in unlocking loans provided by commercial banks also depends on the creditworthiness of the entity that manages the fund. The experience with a guarantee fund in Denmark is analysed in section 5.3.

Unlike a guarantee fund, financing provided in the form of investment grants would not have to be repaid even if projects are successful in the auctions. The investment grant therefore reduces the cost of project planning, which if priced in at the time of the bid, would increase the probability of being awarded. The effect on the bid, however, would be low since the cost of project planning and development represent a very modest share of total installation costs and the investment grant caps the share of costs funded.

With partial compensation of pre-development costs if bids are not awarded, RECs are given the opportunity to be reimbursed for part of the project costs after participating in several action rounds without placing a winning bid. This reduces the allocation risk and the deterrent effect of participating in an auction. However, there is a potential for misuse due to the counterproductive incentive this measure creates. An actor might make a business of buying "bad projects" (for example, building permits with severe operating restrictions) just to then participate in the auction to receive funding from the partial compensation measure (Tiedemann, et al., 2015).

Other measures outside the auction include bid quality control and 'market-building' measures to reduce 'new-bidder' risk and the transaction costs of participating in the auction. A bid quality control, which checks the bids for completeness, can be particularly relevant at the beginning of the implementation of auctions to facilitate learning and foster acceptance of the new scheme. 'Market-building' measures help bidders prepare for the auction, and often include a timetable with auction process activities and dates, an auction manual, offering training and auction simulations to bidders and financial institutions, and holding a pre-bidding conference. These measures can support RECs developing and operating a RE project in preventing formal mistakes from disqualifying their bids.

4.2 Exemption from the auction

RECs can be exempted from having to participate in auctions, for example by offering either an administratively set tariff/premium or by granting access to the auction outcome ("accession mechanism"). Such an exemption would remove the allocation risk and, by definition, the remaining risks associated to participating and winning an auction. To ensure the volume control within the auction, the volume remunerated with administrative support should be deducted from the auction volume. Spain's Draft Integrated National Energy and Climate Plan (INECP) mentions the option to introduce an "accession mechanism" whereby citizens' projects can receive a fixed tariff tied to the result of auctions. An annual quota will be set and allocated on a first-come, first-served basis (Government of Spain, 2019).

A challenge that remains under an administratively-set support for RECs is how to define eligible criteria for the quota set aside, and how to effectively limit the use of the measure to the intended target group of community energy actors. Finding an appropriate legal definition for RECs to qualify for the exemption from auctions has proven considerably challenging. A proxy definition are the de-minimis rules, yet these refer to project size, not broadly to RECs. The Guidelines on State aid for environmental protection and energy for 2014 to 2020, sets de-minimis thresholds for tendering processes at 1 MW (and 6 MW or 6 generation units for wind energy). Below these thresholds, exemptions from tendering procedures can be granted. Larger REC projects would not fall under this threshold. Moreover, de-minimis rules may provide an incentive, also to professional project developers, to develop small projects, instead of larger, more cost-effective projects.

Exemptions from the auction have been implemented, for example, through de-minimis rules in France and Germany, and the Community Energy Strategy in the UK.

4.3 Preferential treatment within the auction

Preferential treatment for RECs could be in the form of special conditions for participation in the auction available to them. Lower pre-qualification requirements, such as a waiver of the building permit at the time of the auction for onshore wind in Germany, could reduce the problems associated with the allocation risk, since RECs would no longer have to bear the pre-development costs of procuring this permit at the time of the auction (Tiedemann, et al., 2015). In that case project developers would, however, be required to obtain a building permit after the auction which increases the risk of non-realisation for this segment. Moreover, and if the building permit is not available, banks may not be willing to issue guarantees due to the higher risks in project planning. The experience with lower pre-qualification requirements in Germany has been problematic due the distortions created in the auction and the risk of low project realization. Preferential treatment for citizen energy wind projects was repealed after only three rounds. Section 5.1 analyses the reasons for the suspension of the preferential rules.

Another option to reduce the burden of participating in an auction is to waive or substantially reduce the financial pre-qualification required in terms of guarantees or a bid bond. This could increase participation in the auction by RECs, which in turn could increase the level of competition. However, in principle, reducing the financial pre-qualification reduces the likelihood of realisation in this segment, which can make the fulfilment of the auction target more difficult. For this reason, a reduction of financial guarantees and the penalties they back, if at all, should apply only to a segment of auction participants according to defined criteria. If lower penalties and a waiver of the building permit are applied for energy community projects, the risk of non-realisation would increase considerably for this segment.

Another form of preferential treatment within the auction is to define a minimum quota or bonus reserved for RECs, both of which have the objective of increasing the likelihood of a project of a certain type being awarded. A bonus implies an administrative interfering on the pricing in the auction, while volume control is determined by the market. A minimum quota, on the other hand, implies an administrative fixing of the minimum volume reserved for energy communities, while the bid price for this volume would be determined entirely by the auction. A minimum quota can, however, also result in a higher auction price for RECs. In France, a citizen participation bonus is added to the support paid to projects that achieve a certain threshold of local financial participation in the project. successful RECs meeting certain criteria. The extra support increases their revenue and allows reducing their bid price, i.e. handing in more competitive bids to the auction. Section 5.2 presents the eligibility criteria for the bonus in France.

The bonus and minimum quota have similar effects: both result in a higher likelihood that projects by RECs will be awarded. This in turn prevents these actors from being crowded out of the market after several rounds of unsuccessful bids. However, from the point of view of the individual actor, the allocation risk remains, even though it is mitigated. The remaining risk could still deter these actors from conducting the project pre-development work required for participating in the auction.

Lastly, a different pricing rule could be applied to RECs. For example, one could apply two different price rules to two types of actors: pay-as-bid as the default and uniform pricing for RECs, as in the case of Germany's onshore auctions. If the pay-as-bid price rule applies to all bidders, each bidder will calculate a mark-up on his production costs (bid shading) to realise a profit in the event of winning. The mark-up depends on the bidder's assessment of the competition and his risk appetite. It is assumed that small players are more risk-averse than large players and thus select lower-priced bids in a pay-as-bid auction (Tiedemann, et al., 2015). In addition, it is assumed that there is less market-relevant information available to smaller actors (see section 3), and that they have less information to estimate the level of competition. With the application of uniform pricing, where the support level is determined by the last awarded bid in the auction, these disadvantages are considered. Because in this case their bids would be hardly price-determining, energy communities have an incentive to offer their true cost. This way, the level of information about the market they possess, and their risk attitudes are no longer essential when determining their bids. However, the application of the uniform pricing rule also increases the risk that energy communities could bid too low.

Overall, preferential treatment measures can be effective in promoting the auction participation and success of energy community developers. However, there is a trade-off due to the incentive preferential treatment creates for all actors – also those not initially targeted – to benefit from the rules. Defining the eligibility criteria in a way that clearly distinguishes between RECs and other actors and that eliminates the potential for non-intended actors to benefit from the rules or to eliminate misuse is very challenging. The preferential treatment measures in the German auctions showcase this challenge as actors that were not initially targeted by the measure were able to make use of it due to an unclear definition.

4.4 Impact of the measures on the functioning of auctions

Measures to support RECs can interfere with the auction's efficiency and effectiveness. Section 4.4 outlines the potential impact measures inside and outside of the auction have on its functioning, measured in terms of project optimisation incentives, the auction price level, and project realization (see Figure 3), compared to a no-measure scenario. The analysis in this section provides a general indication on how the measure may impact the auction. The exact impact of a measure depends on its concrete design and the local framework conditions.

Project optimisation denotes the incentive by bidders to optimize project costs and required performance. The *auction price level* refers to the impact of the measure on the overall price level: a positive impact indicates prices may decrease, while a negative impact means prices may increase. *Project realization* refers to the impact on energy community project developers' incentive or ability to realize awarded projects. Criteria with "**+**" or "**–**" symbols indicate whether the measure has a positive or negative impact, while "**=**" indicates there is no relevant effect compared to a no-measure scenario.

Figure 3 - Overview of impacts of measures on the auction

	Measures outside the auction			Measures inside the auction			
Impact on the auction	Financing for project pre-development: guarantee fund	Bid quality control and market building	Exemption from the auction	Lower material PQs	Lower financial PQs	Bonus or quota	Different pricing rule
Project optimization	=	+	–	=	=	=	=
Auction price level	+	+	–	+	+	–	–
Project realization	=	=	+	–	–	=	=

A guarantee fund does not change the incentive for project optimisation because RECs need to pay back the loan if the project is successful in the auction or, like in Denmark, if the project is realised. By reducing the risk of banks, a guarantee fund facilitates access to financing and also improves financing conditions in the pre-development stage which lowers the overall weighted average cost of capital. Therefore, project pre-development by RECs gets cheaper, allowing RECs to place lower bids in the auction (also depending on their expectation of the general bid level in the auction), which may positively influence the overall auction price level. A guarantee fund has no direct impact on the project realization at the development- and construction phase, i.e. after the auction. However, developers may be incentivized to take more risk in project pre-development, which could lead to a higher rate of project cancellation at early stages of project pre-development.

Bid quality control and market building has a positive impact on bid optimization because the measure supports the preparation of "better" bids in terms of formal compliance and strategic consideration of the expected level of competition. The reduced likelihood that projects are excluded increases the level of competition and lowers the auction price level. The incentive for project realization does not change because the

measures only addresses the pre-auction state of the project.

An exemption from the auction for RECs, on the other hand, has a negative impact on project optimization because, by definition, projects do not face competitive pressure. Because of the fixed tariff/premium and no competitive pressure, higher prices are more likely. In addition, if the volume of the auction is not adjusted according to the "REC"-volume exempted, higher prices for other projects in the auction are also likely. The impact on project realization can be positive. Having certainty on the tariff or premium level a project will receive before the project is developed and constructed, improves revenue certainty and reduces the likelihood of project failure, therefore the impact of the exemption would be positive.

Lower pre-qualification requirements for RECs do not change their incentive for project optimisation. As the measure decreases sunk costs and thereby encourages RECs to participate, it increases competition which generally has a positive impact on the auction price level. However, this may introduce a distortion in the auction if projects in different development stages participate in the same auction. The impact on project realization is negative because of an increased risk of the winner's curse: project costs that only become known during advanced stages of project development are unknown at time of bidding. In addition, lower pre-qualification requirements that open the door for speculative bids and reduce sunk costs also negatively affect project realization.

Lower financial pre-qualification (e.g. financial guarantees or bid bonds) have no distinguishable effect on the incentive for project optimization. Lower financial guarantees encourage RECs to participate, which increases competition and lowers the auction price level. However, this measure has a negative impact on timely project realisation since the costs of late or non-compliance are reduced. Nonetheless, for RECs with no project portfolio it is still very important to avoid project failure or a delay in project realization which is either penalised through a gradual reduction of the support or a cancellation of the award.

A bonus or quota likely does not influence the incentive for project optimization since RECs still need to prepare competitive bids to win the award and make use of the bonus or quota. The auction price level is higher because of the administrative adjustment of the auction volume through a quota or price in bonus, compared to a no-measure scenario and the same level of competition. No effect on project realization is expected.

Lastly, a different pricing rule, i.e. granting RECs with the price level of the last awarded bid (uniform pricing) while all other auction winners receive the price they bid (pay-as-bid), does not influence project optimisation because RECs still need to win an award. The average auction price level compared to scenario with pay-as-bid for all actors, however, will be higher. No effect on project realization is expected.

5 Experiences in Germany, France, and Denmark

This section analyses the experience with three countries implementing measures to support RECs or local participation in renewable energy projects. Germany introduced preferential rules for citizen energy companies in the 2017 onshore wind auction rounds. France has introduced preferential rules in its RE auctions since 2016, in the form of a citizen participation bonus paid to successful bidders with a share of project ownership or financing from local citizens. In Denmark, energy communities are supported via a guarantee fund that reduces the financial risks of REC project financiers. Further mechanisms aim at increasing local ownership and acceptance of RE projects in Denmark. Each country case presents the objective and eligibility criteria, describes the measures implemented, and assesses the successes and challenges in implementation.

5.1 Germany's preferential rules in onshore wind auctions

5.1.1 Objective of the measure and eligibility criteria

The objective of Germany's preferential rules for the participation of community onshore wind energy projects in auctions is to maintain a high level of diversity among actors in the market and thus facilitate competition in the 2017 newly implemented auction scheme (Bundesministerium für Wirtschaft und Energie, 2019). In this context diversity among bidders was meant multifaceted, comprising project size, size and number of the bidders, partial local ownership structure, local planning responsibility, local added value as well as higher local acceptance (Bundesministerium für Wirtschaft und Energie, 2015).

To be considered as "community energy corporation" and thus benefit from preferential rules, three eligibility criteria were defined. First it must be a corporation of at least 10 private individuals, with most of the voting power being held by local individuals and no single individual owning more than 10% of the voting shares. Secondly, the project size was restricted to a maximum of six turbines with a total capacity of 18 MW. Thirdly, the local municipality must be offered a 10% buy-in (cf. §3 par. 15 EEG 2017).

5.1.2 Description of the measure

Under the *Erneuerbare Energien Gesetz 2017* (EEG 2017) support for non-community wind energy projects is auctioned through a pay-as-bid auction. Bidders are required to have a building permit (*Bundesimmissionsschutzrechtliche Genehmigung / BImSchG*) at the point of bid submission and have 30 months to realize their project after being awarded or the award will be lost. [7] Three main measures were introduced in the EEG 2017 to facilitate energy community projects. The three were:

- First lower prequalification requirements for community energy projects, compared to other projects, in form of them not needing the building permit (*BImSchG*) for their project at the time of bidding and a reduced bid bond of 15€/kW instead of 30€/kW.
- Secondly, community energy corporation projects were provided with 54 months to realize their project instead of the usual 30 months.
- Thirdly, in contrast to the general rule of pay-as-bid, community energy corporation projects were subject to a uniform pricing rule, thus receiving the price of the highest successful bid, independent for their own bid.

The preferential rules allowed for the participation of community energy corporation projects in the auction at a much earlier stage of project development, thus reducing their allocation risk. In addition, community

[7] For the first three auctions in 2019 the realization period for onshore wind projects was only 24 months instead of 30 months. More details are available at: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/Ausschreibungen/Wind_Onshore/Ausschreibungsverfahren/Ausschr_WindOnshore_node.html;jsessionid=120B113A8C9DCC99E9D3A4C6D783AEEA

energy corporations face a lower non-compliance risk and a lower price risk in the auction.

5.1.3 Experience with the measures and lessons learnt

The experience with the preferential rules has been rather negative, which led to the suspension of the lower prequalification requirements and the extended realization period in early 2018. This means that currently two distinct phases exist, phase 1 in which for three consecutive auction rounds in 2017 the full set of measures was active and phase 2 from 2018 onwards in which all projects required a building permit at the time of bidding.

The three rounds in 2017, which included preferential rules for community energy projects, were very competitive, with each round being oversubscribed by a factor between 2.5 – 2.9 (FA Wind, 2017). The lower prequalification requirements provided an essential advantage for community energy bids, which represented 93% of the successful bids in 2017. The suspension of the lower prequalification requirements showed an immediate effect on the competition in the auctions. Since mid-2018, every auction round has been undersubscribed (see Figure 4), which has several causes, among them the low number of projects with permits, difficulties in acquiring new sites, lawsuits against projects and too stringent rules on updating already permitted projects (FA Wind, 2019).[8]

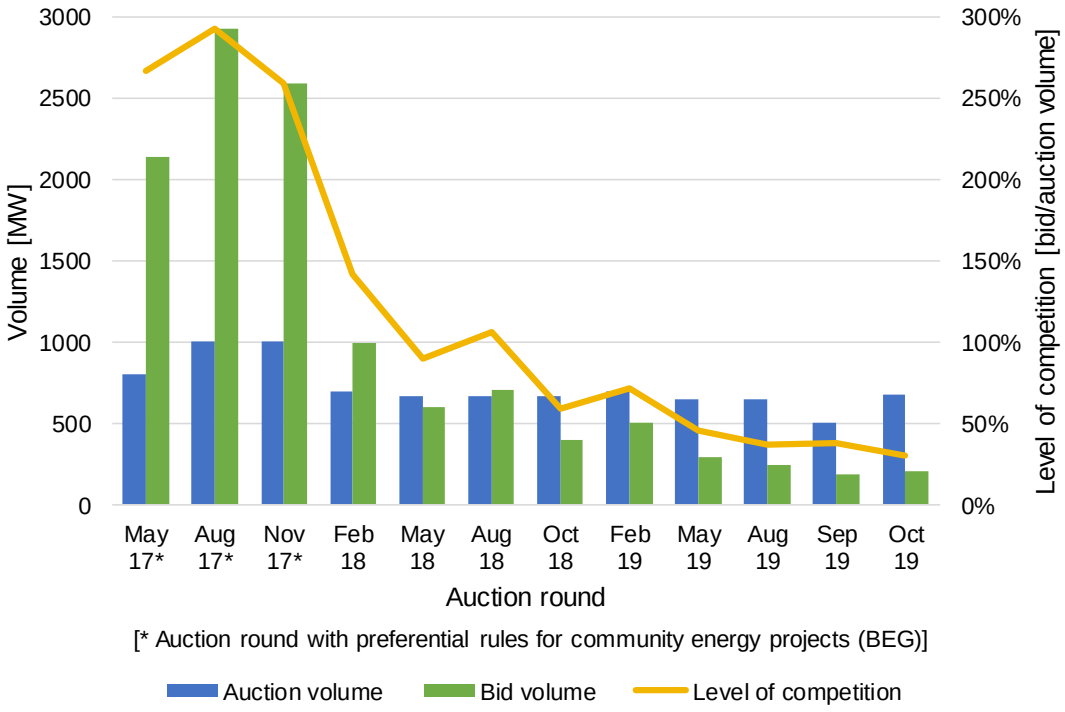

Figure 4: Wind onshore auctions - volumes and level of competition. Source: Navigant based on (BNetzA, 2019).

Figure 5 shows the shares of community energy projects in bid volumes and the awarded volumes of past auction rounds. 71 to 88 % of the bid volume in 2017 and 95 to 99 % of the awarded volume were attributed to projects fulfilling the eligibility criteria for community energy project. In the following years, after the suspension of the preferential treatment, the respective shares decreased to under 20 % (BNetzA, 2019).

[8] Upcoming auction dates and volumes for wind onshore had been published well in advance.

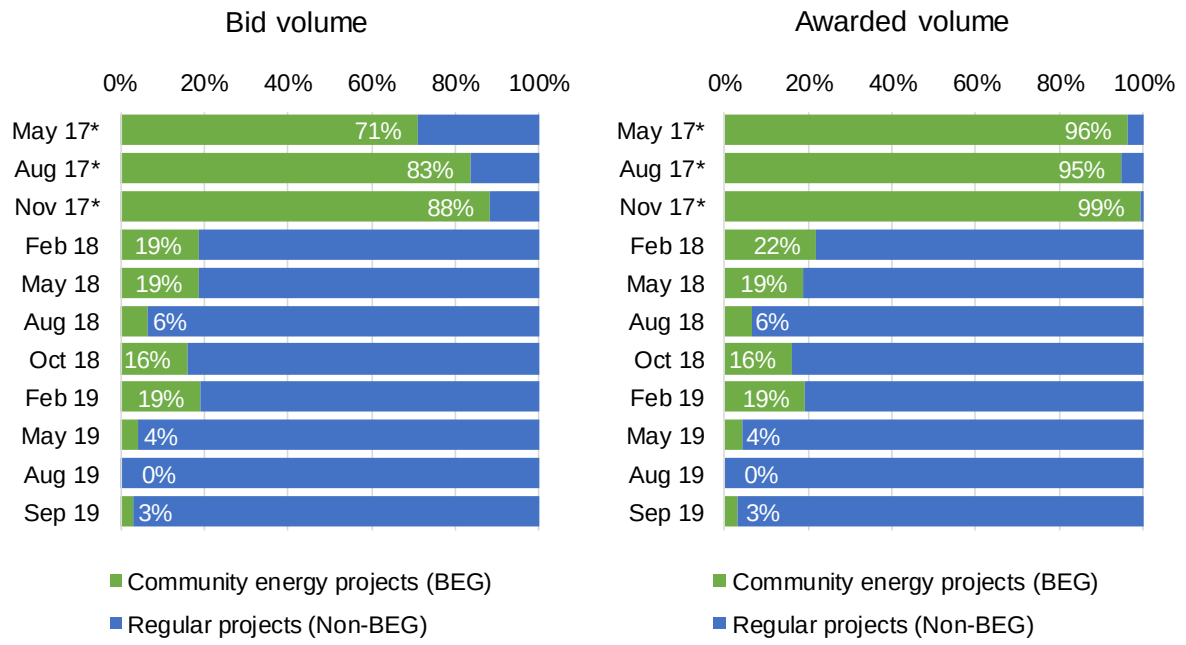

Figure 5: Share of community energy projects of the bid volume and awarded volume in the wind onshore auctions. Source: Navigant based on (Deutsche WindGuard; ZSW, 2019), (BNetzA, 2019).

Overall, it is questionable to what extent the shareholder constructions that participated and/or were awarded in the auction rounds in 2017 constitute community energy projects in the intended sense. Through special shareholder constructions, larger players which were not initially targeted by the measure were able to develop projects that fall under the EEG definition of community energy projects. Especially project developers that have already specialised in supporting or jointly developing projects with citizens made use of the unclear definition of community energy corporation (Grashof et al., 2019). An in-depth analysis of the auction round in May 2017 by Weiler et al. finds that 80 % of the capacity was awarded to professional multi-project developers that cooperated with natural persons in order to benefit from the preferential rules. However, despite these type of actors not being the intended target group of the preferential rules, their behaviour was not fraudulent, as they fulfilled all the legal requirements to be considered as community energy projects by the EEG 2017 (Weiler, Weber, & Holstenkamp, 2019).The effects of each preferential rule are discussed in detail in the following paragraphs.

Firstly, the possibility of **submitting a bid without a building permit** (BImSchG) was widely used by community energy projects. Table 1 provides an overview of all bids submitted in the three auction rounds in 2017. Between 60% and 80% of all bids were submitted by community energy projects without a permit. While only community energy projects could bid without a permit, they could also bid with a permit, which four successful bids did, compared to 195 successful bids without a permit[9].

From the German government's perspective, the effect of bidding without a permit increases the risk of non-realization in two ways. First, projects' risk of not being granted a permit at all and second the lower penalty reduces the sunk costs of non-realization for bidders. Furthermore, the market situation since mid-2018, i.e. the low level of competition resulting in higher level of awarded bids, creates an incentive to resubmit a higher bid for an already awarded project at a later auction and pay the penalty for not realizing the project at conditions of the first/initial award. This is possible, because projects without a permit cannot be uniquely identified. It is therefore possible for energy communities to not realize a project, pay the penalty and bid again,

[9] This can be calculated via the result reports of the German Federal Network Agency (BNetzA) available under: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/Ausschreibungen/Wind_Onshore/BeendeteAusschreibungen/BeendeteAusschreibungen_node.html.

either with the same or a similar project, in a later auction in the hopes to realize a higher bid price.

Resubmitting a bid can be a worthwhile strategy, since auction prices in 2018 and 2019 were around EUR 1 - 2 cents/kWh above results in 2017, and have been chronically undersubscribed, which basically guarantees a successful participation. However, so far only relatively few developers are thought to have pursued this strategy (Deutsche WindGuard; ZSW, 2019). The risk of delay seems to be prevalent. By late September 2019 only 37 bids that did not have a permit in 2017 were reported to have acquired a permit in the meantime (FA Wind, 2019), which could be an indication that many of those projects will not be realized at all within the 54 months realization period. In a worst-case scenario, this could lead to close to 2.7 GW of unrealized volume. In anticipation of these reasons and the fact that many professional multi-project developers that were not targeted by the measure took advantage of the preferential rules, community projects were required to submit a permit with their bid, from the first auction in 2018 onwards.

Table 1 - Bids for Onshore Wind Energy with and without permits (BImSchG) in 2017, Source: Navigant based on FA Wind, 2017

Date of the Auction	With permit		Without permit	
	Number of Bids	Volume [MW]	Number of Bids	Volume [MW]
1. May	96	681.3	160	2,136.7
1. August	77	547.9	204	2,926.8
1. November	45	337.9	165	2,590.9

Since a building permit is required, the share of awarded community energy projects dropped from its high of on average 93% in 2017 to around 15% in 2018 and finally to around 5% in 2019. However, this is most likely not due to the fact that acquiring a permit is too difficult for community energy projects, but rather that in an undersubscribed auction there is no need to bid as a community energy project as every project can bid the ceiling price and still get awarded, which in turn makes the uniform-pricing rule for community energy ineffective.

The **second measure** is that energy communities have a **54-month realization period** compared to the usual 30 or 24 months. This measure cannot be fully evaluated yet, because the realization period is still ongoing. However, it will most certainly lead to a significant gap in the deployment corridor which foresees a yearly capacity addition of 2.8 GW onshore wind in German onshore wind energy. This is due to the high number of community energy projects that were awarded in 2017. International experience suggests that most projects realize shortly before the end of their realization period (Bayer, Schäuble, & Ferrari, 2018). This would mean that most of the 2.7 GW of projects awarded in 2017 will only be realized in 2021 – 2022, while non-community energy projects would have needed to realize in 2019 - 2020.

The **third measure** is that energy communities were bidding under a **uniform-pricing rule** instead of a pay-as-bid format. In the first rounds, when the auction was still competitive, the uniform-pricing helped to reduce price risks for community energy projects, which tend to be smaller players, which have less knowledge and information about the market. Due to the high competition and oversubscription in 2017, average bid prices declined from EUR 5.71 cents/kWh in the first round, to EUR 4.28 cents/kWh in the second and EUR 3.82 cents/kWh in the third round (BNetzA, 2019). Since almost all projects were community energy projects, the uniform-pricing-rule had hardly any distinguishing effect and nearly all projects received the marginal price. In the current situation of undersubscription, the uniform-pricing rule does not provide any benefit either, as the undersubscription allows successful bids at the ceiling price.

Figure 6 shows the already realized volume from each auction round since 2017 which was held for onshore wind energy up until May 2019. It clearly shows only very little volume is already realized from the 2017 rounds, when a lot of community energy projects were awarded. It is to be assumed that most of the already realized projects are mainly the non-community energy projects, for which the realization period has ended

or is about to end. This means that most community energy projects have not been realized yet. Non-community energy projects from the first two rounds in 2018, after the preferential rules for the prequalification requirements were suspended and the realization period was set to 30 months for all participants, already feature much higher realization rates. Another potential side effect of the long realization rates is that projects are abandoned and resubmitted in a new auction to achieve a higher price. The full effect of the preferential rules on (non-)realization remains to be seen when projects hit the end of the prolonged realization period of 54 months.

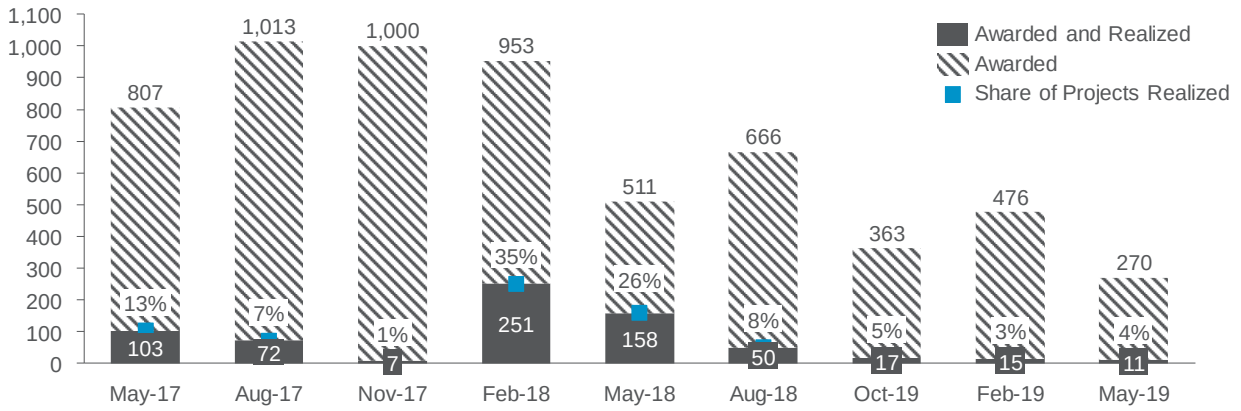

Figure 6 - Awarded and realized onshore wind volume [in MW]; Source: Navgiant based on FA Wind, 2019

Overall, this means that the German measures were on the one hand successful in incentivizing participation of community energy projects in the auctions but on the other hand they had unintended consequences. First it stands to debate if all actors were actual community energy actors in the intended sense, as a significant number of community energy bids were connected to multi-project developers (Weiler K. , Weber, Holstenkamp, & Ehrtmann, 2019). Secondly, the system of preferential rules crowded out other bidders, potentially even community energy projects that were initially targeted by the measures. Thirdly, and most importantly, the waiver of the building permits at the time of the auction as well as the longer realization periods increased uncertainty of realization. The lesson learnt here is, that defining RECs by prescribing a corporate governance model is difficult.

The combination of these adverse effects and the fact that originally the market share of community energy projects was estimated to be below 20% led to the revision of the measures and the alignment of the prequalification requirements after three rounds. One important lesson learnt from the preferential rules in Germany up to now is that low bid bonds in combination with not uniquely identifiable projects, i.e. a lack of building permits, can incentivize project developers to resubmit their bid at a later auction (at a higher price) and may lead to more speculative bids in general.

The example of preferential rules for community onshore wind projects in the German auctions shows that such measures within the auction have the potential to significantly impact and even distort the outcome of the auction. Preferential rules, such as lower prequalification criteria for some actors increase the permitting and non-realization risks. Longer realization periods for some actors lead to the auctioning of non-homogenous goods, as falling technology costs distinctly advantage actors with longer realization periods. These actors can take advantage of the technological progress and bet on falling costs for their technology.

5.2 France's citizen participation bonus in auctions

5.2.1 Objective of the measure and eligibility criteria

France introduced a citizen participation bonus in 2016 in line with Article 119 of the Energy Transition for Green Growth Act (LTECV) of 2015. By encouraging RE projects that participate in auctions to seek investments of community members (Rüdinger, 2019), the bonus aims to increase local acceptance and promote

local ownership (Ministère de la Transition Ecologique et Solidaire (MTES) , 2019). For project developers, the bonus is an incentive to involve community actors in the financing of RE projects, which compensates them for the additional costs incurred, for example, for community engagement measures or potentially higher financing costs (Interview with Andreas Rüdinger (IDDRI), 2019).

Eligibility criteria have been changed several times since the introduction of the bonus (Rüdinger, 2019). To be eligible for the bonus, bidders can ensure local participation through two different ownership models. Projects either demonstrate citizen participation through the capital held in the project company (*investissement participatif)* or in the overall financing of the project (*financement participatif)*. Moreover, eligible financial instruments for capital held in the project company have been restricted to ensure that capital shares held by local citizens or regional authorities indeed provide access to the governance of the projects through voting rights, e.g. by making convertible bonds ineligible financing options (Rüdinger, 2019).

For citizen participation through capital held in the project company (*investissement participatif)*, eligible bidders need to be either:

- regional authorities and municipalities, or
- stock companies or cooperatives with at least 40% of equity capital held by at least 20 natural persons separately or jointly or by at least one regional authority or municipality, or

For citizen participation in the financing of the project (*financement participatif)*, at least 10% of the overall project finance (i.e. equity, quasi-equity and loans) needs to be provided jointly or separately by at least 20 natural persons or by one or more regional authority or municipality.

Natural persons involved in projects on the basis of either of the models outlined above must have their principal residence in the *Département* of the project site, or a bordering *Département*. Particularly relevant for the *financement participatif,* additional natural persons beyond the minimum amount of 20 persons may invest in the project without complying with this regionality principle (Drogosch, 2018).

5.2.2 Description of the measure

If a bidder implements a project, in which citizens participate either through capital held in the project company (*investissement pariticipatif*) or through the overall financing of the project (*financement participatif*), a bonus of up to EUR 0.3 cents/kWh is paid on top of the FIP determined in the auction over the full contract period of 20 years.

For citizen participation through capital held in the project company (*investissement participatif)*, the bonus on top of the feed-in premium determined as part of the auction amounts to EUR 0.3 cents/kWh. For citizen participation in the financing of the project (*financement participatif)*, the bonus amounts to EUR 0.1 cents/kWh and reflects the lower degree of involvement in the governance of the project compared to that tied to capital shares in the project company (as in the *investissement participatif*) through, for example, dedicated voting rights.

For biomass installations, the bonus amounts to up to EUR 0.5 cents/kWh accounting for their higher capital costs. The bonus is only available to projects participating in the RE auctions. RE projects that fall below the de minimis clause (e.g. more than six installations or at least 3 MW of installed capacity for onshore wind and more than 100 kW of installed capacity for solar PV) and thus do not need to participate in auctions in order to secure support payments are not eligible for the bonus. For either form of participatory financing, the developer submits a declaration of commitment at the time of bidding with the selected form of citizen participation. The bonus is only paid if the project developer succeeds to attract sufficient local financial participation by the time of commissioning. The respective criteria must be fulfilled at least during the 3-year period following project commissioning. In case of non-compliance, penalties in the form of a reduction of payments from the reference tariff of EUR 0.3 cents/kWh over the whole contract period apply.

Figure 7 provides an illustrative overview of the participatory bonus in its two forms. Looking at the financing shares contributed by community actors, it shows the challenge of raising the required amounts is relatively similar between the two types (assuming a standard financing arrangement with a combination of 20% of equity and 80% debt) (Rüdinger, 2019). In this illustrative example, 40% of equity roughly equals 8% of overall financing and is thus relatively close to the 10% of participatory financing required under the *financement*

participatif. The main differences between the two types is thus the access to governance (higher in the case of *investissement participatif*) and the type of applicable financial instruments.

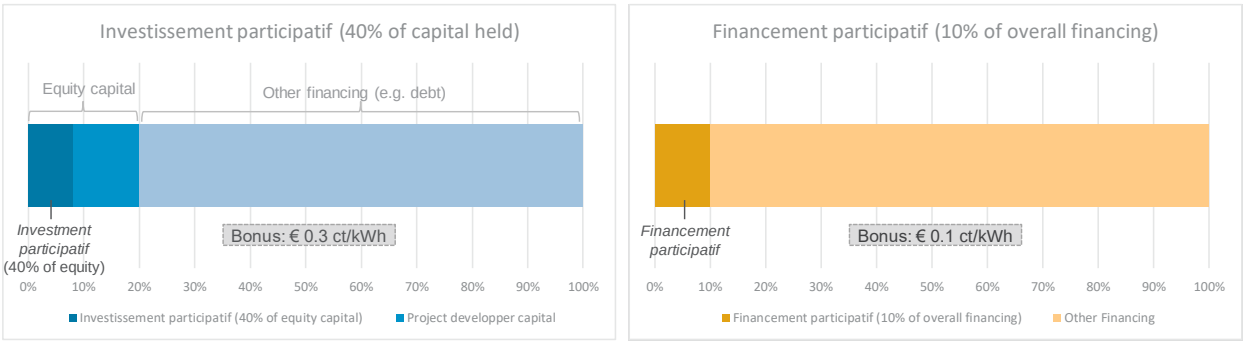

Figure 7 - Illustrative depiction of the participatory bonus for *investissement participatif* (left) and *financement participatif* (right), Source: Own illustration based on Rüdinger (2019).

5.2.3 Experience with the measure and lessons learnt

Participatory models of financing RE projects in France have steadily gained in importance in recent years.

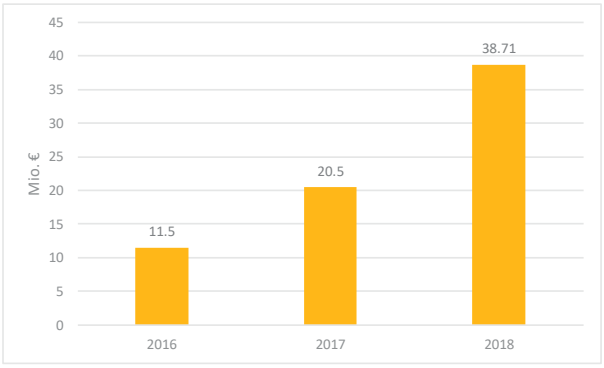

Figure 8 - Development of participatory financing through crowdfunding platforms since 2016. Source: Chicheportiche (2019)

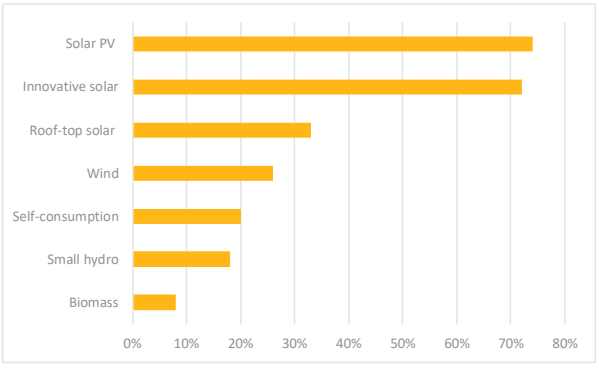

Figure 9 - Average shares of awarded projects making use of participatory bonus. Source: MTES (2019)

Incentivized by the participatory bonus, the involvement of natural persons in the financing of RE projects by (professional) project developers in France is increasingly done through dedicated **crowdfunding platforms** (Drogosch, 2018). Between 2014 and 2017, funds from citizens mobilized for RE projects via crowdfunding platforms grew from EUR 120,000 to EUR 20.5 million. In 2018, almost EUR 39 million of participatory financing through crowdfunding platforms had been collected for 1.1 GW of RE capacity, of which 64% of funds were raised for solar and 21% for wind installations (Chicheportiche, 2019). Figure 8 shows this development.

In terms of the overall attractiveness of the bonus for project developers (as of January 2019), an average of **36% of awarded projects have applied for the bonus** since 2016 across all auction rounds (Rüdinger, 2019). Figure 9 depicts the average shares of awarded projects per technology that have made use of the bonus. In particular, solar PV and innovative solar installations benefit from the bonus with application rates of over 70%, while participation rates for more capital-intensive technologies such as onshore wind and biomass remain well below this figure. Moreover, the uptake of the bonus for *financement participatif* has been significantly less pronounced than of the higher bonus for *investissement participatif* , which may be due to a less favourable cost-benefit ratio as perceived by project developers (Interview with Andreas Rüdinger (IDDRI), 2019).

A number of reasons may explain the **differences in the uptake of the bonus between technologies**. First, the comparatively higher level of competition as part of the French solar auctions may provide incentives for

bidders to make use of the bonus in order to increase the competitiveness of their bid vis-à-vis other participants.

Second, the financial attractiveness of the bonus is higher for technologies with lower average bid prices. For example, while a bonus of EUR 0.3 cents/kWh increases overall remuneration over the course of the project duration by a significant 5% (in reference to an average bid price of EUR 5.8 cents/kWh reached for solar PV in the fourth auction round), this financial incentive is much less important in case of technologies with higher average bid prices such as biomass (Rüdinger, 2019).

Third, particularly for technologies that already feature relatively high project development complexities and costs (e.g. permitting, social acceptability), the bonus as well as potential penalties in case of non-compliance may be perceived by project developers as an additional and avoidable risk factor, and this may be particularly relevant for wind projects.

Finally, the risk of failure in the procurement of capital may be perceived too high by project developers, in particular given that such risks increase with the absolute amount of participatory financing to be collected. This effect can vary between technologies since the same objective of a 40% equity share for participatory investment can imply substantial differences in terms of the absolute capital requirements, e.g. between an average wind project and a roof-top solar installation.

In general, while these experiences point to a certain success of the bonus in incentivizing project developers towards more participatory shareholder and financing models (at least for some technologies), a number of limitations merit further discussion.

First, given the short timeframe since the implementation of the bonus in its current form and thus most projects with citizen participation not having been commissioned yet, it remains to be seen to what extent projects that have made use of the bonus will be realized in the future.

Second, the bonus' eligibility criterion according to which citizens need to have their primary residence in the same or bordering *Département* of the project site creates challenges in certain rural regions with lower population densities and saving rates. In particular, limitations may arise for wind projects which are often located in rural areas but at same time have significant capital costs and thus funding needs. In these regions, the risk of falling short of the required community funds contributed by citizens in the fundraising process (e.g. via crowdfunding platforms) is significantly higher relative to those regions that include one or more major cities (Rüdinger, 2019).

Third, the incentivizing effect of the participatory bonus may call for citizen-provided funds in the range of EUR 50 and EUR 80 million per year in the period until 2020 and thus up to EUR 500 million in the next 5 years according to a recent study (Ponchel & Bordier, 2017). While the use of crowdfunding in the French renewables sector is already significant (see Figure 8), it remains to be seen whether the strong increases in available participatory funding through crowdfunding platforms in recent years can be sustained in order to support the volumes required by professional project developers to benefit from the participatory bonus.

Finally, the bonus' uptake is almost three times as high for solar installations compared to onshore wind, even though difficulties with local acceptability in France and elsewhere are generally much more pronounced for wind than for solar installations. This begs the question of whether the overall goal to increase local acceptability is accurately targeted by this instrument or whether the bonus is mainly used by project developers to increase the chances of winning in highly competitive auction rounds while the resolving of local acceptability issues is only attributed a secondary priority. Recent solar PV auction results support this argument, with the uptake of the bonus usually increasing in auction rounds with higher competition and decreasing with lower competition (Interview with Simon Bénard and Stéphanie Jallet (DFBEW), 2019).

Moreover, some uncertainties arise as to whether the participatory bonus in fact contributes significantly to its explicit goal of promoting local ownership of renewable energy projects. Even in the *investissement participatif* model, despite its requirement of voting rights being bound proportionally to invested capital shares and thus the existence of a formal stake of local actors in the governance of the project, local ownership may be rather limited. First, community actors are usually represented only indirectly in an aggregated form via the respective crowdfunding platforms in the governance of the project and thus have a rather limited individual influence. Second, given that project developers seek participatory financing at later planning stages (i.e. retroactively) at which most decisions (e.g. in terms of site, technologies etc.) have already been made,

a local investor's impact on important parts of the project's development process is usually relatively low. Third, project developers are only bound by the eligibility criteria to receive the citizen participation bonus for three years from the date of commissioning. In theory, local/citizen participation could therefore be removed from projects benefitting from the bonus after 4 to 5 years and replaced by less risky and/or restrictive forms of financing (Interview with Andreas Rüdinger (IDDRI), 2019).

Overall, a bonus as implemented in France allows for a rather shallow involvement of community actors by professional project developers and entails relatively broad eligibility criteria. This has led to its rather high average uptake despite the varying implications for different technologies and regions, as outlined above. On the other hand, the bonus does not entail a comprehensive local involvement in the project governance, particularly throughout the development and operation of RE projects. Nonetheless, the bonus' goal to increase local acceptance and ownership may still be served quite significantly, given the potential economic benefits for local communities that hold shares in RE projects receiving the citizen participation bonus.

5.3 Denmark's guarantee fund to support project development of local renewable energy projects

5.3.1 Objective of the measure and eligibility criteria

In 2008, Denmark introduced the Guarantee Fund was created in 2008 in line with Article 21 of the Danish Promotion of Renewable Energy Act (VE-Lov) against the background of an increasing trend towards RE projects being realized by professional project developers (Olsen, 2014). The underlying rationale for the Guarantee Fund is to facilitate the development of renewable installations that are pro-actively planned and realized by local citizens and thus have a higher local acceptance compared to projects without such involvement of citizens in the project development (Papke, 2018). Since 2008, the volume of the Guarantee Fund has remained unchanged and amounts to DKK 10 million (approx. EUR 1.3 million), which is financed by electricity consumers via the electricity tax (§ 8 par. 2 Electricity Supply Act).

The fund aims to reduce upfront costs in the early planning stages of local community-driven RE projects (Papke, 2018), at which financial risks are high. Guarantees provided by the fund aim to reduce financing costs in the context of raising capital for preliminary assessments. This is to increase the competitiveness of community energy projects vis-à-vis non-community actors in the RE sector and thus their participation and chances of being awarded in an auction (for installations subject to auctions).

Onshore wind installations larger than 25 kW and not used for self-consumption (§ 41 VE-Lov), solar PV plants as well as nearshore wind turbines are eligible. Offshore wind installations participating in tenders are not eligible to apply for guarantees from the fund. To be eligible for the fund, community energy actors must have at least 10 natural persons with co-decision rights as members. Moreover, the majority of the members shall be residents in the municipality of the site or live within 4.5 kilometres distance. For nearshore wind plants, the relevant municipality shall be the municipality that has a coastline, located within 16 km from the site (§ 21 par. 2 no. 1 and 2 VE-Lov).

5.3.2 Description of the measure

To support local community projects in the initial planning stages, the fund provides financial guarantees of up to DKK 500,000 (approx. EUR 67,000) per project in a 3-year period to financial institutions that lend money to local onshore and nearshore wind turbine owners' associations and other local initiative groups (§ 21 par. 5 VE-Lov) as well as solar PV cooperatives. [10] In case the project is not realized, the Guarantee Fund covers the loss. In the context of the Danish transition towards tender schemes for large-scale solar PV and onshore wind installations since 2018, guarantees allocated to community projects may induce lower-interest loans compared to a situation without such guarantees, as the risks for lending institutions are reduced, which may

[10] VE-Lov is the Danish Decree on the Promotion of Renewable Energy Act

impact positively on financing costs and bid prices.

The process under the Guarantee Fund is as follows: A local initiative planning a renewable energy project applies to the Danish Energy Agency (ENS) to receive a guarantee for a commercial loan to finance the pre-development stages (e.g. technical, environmental and economic feasibility studies or the permit application). On this basis, ENS decides on the granting of a guarantee (§ 21 par. 5 VE-Lov), which depends inter alia on whether the project conforms to the eligible target groups and that project realization is feasible (§ 21 par. 2 VE-Lov). In case of a positive decision, the local initiative takes out a commercial loan from a bank to finance the proposed planning steps (i.e. at commercial conditions but with a guarantee and thus potentially lower interest rates). ENS declares to provide a guarantee to the bank. The guarantee expires at the latest three months after the project's successful entry into operation. The guarantee can be withdrawn and must be repaid to ENS if a different project is planned instead of the original project or if the project is sold in whole or in part.

5.3.3 Experience with the measure and lessons learnt

A number of experiences point to a shortfall from the set targets. First, despite the fact that the fund's core aim is to increase the competitiveness of projects with local participation vis-à-vis larger actors, community energy projects have so far not been able to participate in past auction rounds (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). In this context, it should be noted, however, that a regular auction scheme for large-scale onshore wind and solar PV has only been introduced in 2018 and only two auction rounds have so far been organized as part of this scheme. Hence, overall experience is rather limited, and it remains yet to be seen whether more community projects will participate in future auction rounds.

Second, funds from the Guarantee Fund have remained rather underutilized more generally. According to the Danish Energy Agency (ENS), the currently available fund size amounts to circa DKK 6.5 million, with roughly DKK 3 million having been paid in guarantees, i.e. called upon due to non-completed projects, and DKK 0.5 million issued in guarantees (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). One of the reasons for the low uptake so far may be due the general increase in competitive pressures as a result of Denmark's transition to auction-based support schemes and thus higher participation barriers for smaller, community-driven projects (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). Moreover, the guarantee limit of DKK 500,000 is insufficient for larger community projects that require more financing and thus higher guarantees (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). The risk-reducing effect is likely to be negligible for larger projects.

Finally, other measures to promote community actors in Denmark such as the "option-to-purchase" scheme (see Box 1), which obliges wind energy project developers to offer a share of at least 20% of total investments in new wind energy projects to local citizens at cost price for both onshore and nearshore wind projects, or the "value-loss" scheme, which obliges RE project developers/owners to compensate local citizens for any lost property value linked to the realization of the project, have been more successful in targeting social acceptance.

Box 1 – Denmark's "Option-to-purchase" scheme (§§13-17 VE-Lov)

Under the *Køberetsordningen* ("Purchase right regulation" §§13-17 VE-Lov) wind energy project developers are obliged to offer ownership shares in new wind energy projects to local citizens, i.e. the project developer pre-develops the project to a certain degree (e.g. acquires the requried permits) and involves citizens retroactively. The regulation applies for both onshore wind installations above 25 m turbine height and nearshore wind projects as well as offshore projects not participating in auctions. Local citizens have the right to purchase shares corresponding to at least 20% of the project's value (cost price). The offer for sale of shares needs to be advertised in at least the local newspaper and needs to include the announcement of a public meeting to be held at least four weeks before the sales offer expires (Anker & Jørgensen, 2015). The Danish TSO Energinet.dk administers the scheme.

The right to buy is linked to the primary residence of citizens. For onshore wind projects, citizens over 18 year of age who live in a radius of up to 4.5 km from the project have a preferential right to buy up to 50 shares in a new project. The size of one share corresponds to the price of 1000 KWh which equals approximately EUR 400 to EUR 536 (Agora Energiewende & DTU Management Engineering, 2015). If any shares are left after applying this first priority rule, project developers have to offer shares to persons over 18 years with a permanent residence in the municipality where the project is established (second priority). If there are any remaining shares after the offer has been made to the local residents, the further allocation of shares can be done at the discretion of the project developer. In case of nearshore installations, this second priority right applies within a 16 km radius of the project location.

In case a project developer does not comply with the co-ownership regulation, this can result in the loss of feed-in remunerations (§ 54 para. 3 VE-Lov). In general, local co-investors share the same rights, obligations, risks and benefits as other investors.

Regarding the future of the Guarantee Fund, technologies eligible under the Guarantee Fund are envisaged to be extended to hydro and wave power installations (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). However, the fund's budget will not be increased beyond the total budget of 10 Million DKK according to representatives from ENS, and no additional fund is to be created in line with a political agreement from 2018 (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). By contrast, the focus will be a general review of the current measures to promote local citizen participation in RE projects and here mainly on the "value-loss" scheme and the "option-to-purchase" scheme rather than the Guarantee Fund (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019).. Moreover, the Danish Government is planning to bring forward instruments that target both the reduction in costs for project developers and ways to increase social acceptance (Interview with Emil Axelsen and Sobia Waheed (ENS), 2019). For this purpose, ENS has been analysing instruments to incentivize professional developers to engage with communities at an early planning stage (e.g. as part of research project "Wind 2050") (DTU, 2019).

In conclusion, measures outside the auction such as the guarantee fund introduced in Denmark can help mitigate financing risks of community energy projects by reducing upfront costs in the early planning stages. Experiences in Denmark demonstrate, however, that the instrument's success depends on its specific design (e.g. the appropriateness of guarantee volumes) as well as context-specific factors, including the measure's limitation in terms of reversing an overall trend towards actor consolidation and the simultaneous existence of similar measures promoting community energy actors.

6 Lessons learnt

Policymakers across Europe increasingly pay special attention to energy communities to foster the local acceptance and ownership of RE development. RECs can support RE development in various ways, for example by increasing local participation in planning and decision-making processes, as well as local benefits through project ownership. Furthermore, local engagement processes of RECs can facilitate the land acquisition process and thus ease the often-challenging pre-development of sites, particularly for new wind projects.

The implementation of auction-based support schemes, however, introduces new risks compared to fixed-price support schemes (such as predetermined feed-in tariffs/CfDs). These risks pose a strong challenge to energy community project developers, mostly due to their limited project portfolio and size. Participating and winning in an auction requires significant expertise and access to capital, which smaller actors do not have to the same degree as large, experienced RE developers. Against this background, different approaches to supporting RECs and reduce their risks in auctions are conceivable and have been implemented by EU Member States.

Our analysis of the impacts of auctions on RECs, the potential measures to support RECs inside and outside of auctions, as well as the experiences made with different measures in Germany, France and Denmark shows that there is no easy solution to promote RECs in the context of renewable support policies that place competition between all actors at the core. However, there are some lessons learnt that countries planning to support RECs should take into account.

- RECs can take many forms and strive for different objectives, including social acceptance, local ownership, and actor diversity to avoid market concentration. Auctions, as a competitive allocation mechanism for RE support, create a market for RE. Although auctions can yield an efficient allocation of support, their outcomes do not guarantee the achievement of societal co-benefits, which is often the focus of RECs. If there are no signals demanding REC projects, purely market-based support instruments (such as auctions) are unlikely to deliver projects with these attributes.

- Definitions are important in targeting the measures to RECs. Defining the eligibility criteria in a way that clearly distinguishes between RECs and other actors, and that eliminates the potential for non-intended actors to benefit from the rules or to eliminate misuse, is very challenging. Experience shows the stronger the preferential treatment, the higher the incentive for use by non-intended projects can be, as exemplified in Germany's corporate governance definition approach. Definitions for measures inside the auction might instead focus on the level of community involvement instead of prescribing specific business models. Approaches with a broader scope, available to bidders who meet certain co-benefit criteria (e.g. participatory funding in France) independent of their business model, represent an alternative. However, if measures targeting specific business models are the right fit for a country, they might be better served outside the auction because the compliance evaluation can prove too cumbersome as part of an auction qualification process.

- Measures to support RECs constitute "signals" inside or outside the auction to encourage RECs. Indeed, measures can mitigate the impacts of auctions on small, single-project energy community developers, including financial risk, the allocation risk, new bidder risk, price risk, non-compliance risk, and the risk of non-realization. Impact of the auction on RECs depends on a) the expertise of RECs (new to the market/one-time actor/limited market oversight due to size), b) the activity of RECs in project lifecycle (development, operation, ownership), and c) the level of cooperation with professional project developers and/or financiers.

- Measures within the auction come at the compromise of market distortion. Preferential rules making projects at different project development stages compete, should be avoided given the distortion they create in the auction. The implementation of lower pre-qualification requirements and longer realization deadlines in Germany's onshore wind auctions illustrate this:
    - Pre-qualifications aim to reflect important milestones in the project development process to

avoid permitting risk and non-realization; not to give an advantage a specific actor over another.
    - Similarly, longer realization deadlines lead to the problem of auctioning non-homogenous goods due to falling technology costs. Different realization periods have the effect that bidders with a preferential rule – i.e. more time for project realization – will face different uncertainties regarding future costs and invite for more speculative bids compared to bidders with shorter realization periods.

- Measures within the auction should minimize the distortion introduced in the auction, and not lead to unintended results if all bidders were to make use of them. A bonus is a measure inside the auction that increases the likelihood that projects with certain attributes are successful. Bonuses, unlike lower pre-qualification requirement, do not have a negative effect on project realisation.

- Supporting measures outside the auction, such as a guarantee fund, can help address financing risk and the allocation risk. These measures interfere considerably less with the auction compared to preferential treatment or the exemption from auctions. Denmark's experience shows the uptake of this measure depends on the sufficiency of the guarantee volume, and the limits of a measure's effectiveness in reversing a trend towards actor consolidation.

- Countries may consider exempting RECs from the auction. Certain types of RECs can be exempted from having to participate in auctions, for example by offering an administratively set tariff/premium. De-minimis rules, which define project size thresholds, have been used to define exemptions and create a less-risky environment for small projects. An alternative to administratively defining a tariff/premium is to grant RECs access to the auction outcome ("accession mechanism"), which means that eligible projects can receive a fixed tariff tied to the result of auctions. Such a measure should be combined with a fixed annual quota to control the volume of RES capacities being developed inside and outside of auctions and reduce distortive effects on the auctions.

References

Agora Energiewende & DTU Management Engineering. (2015). *A Snapshot of the Danish Energy Transition. Objectives, Markets, Grid, Support Schemes and Acceptance.*

Anker, H. T., & Jørgensen, M. L. (2015). *Mapping of the legal framework for siting of wind turbines - Denmark. Frederiksberg: Department of Food and Resource Economics, University of Copenhagen. IFRO Report, No. 239.*

Bayer, B., Schäuble, D., & Ferrari, M. (2018). International experiences with tender procedures for renewable energy – A comparison of current developments in Brazil, France, Italy and South Africa. *Renewable and Sustainable Energy Reviews, 95*, 305-327. doi:https://doi.org/10.1016/j.rser.2018.06.066

BNetzA. (2019). *Ausschreibungen für EE- und KWK-Anlagen*. Retrieved from https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/Ausschreibungen/Ausschreibungen_node.html

BNetzA. (2019, 10 17). *Beendete Ausschreibungen*. Retrieved from bundesnetzagentur.de: https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/Ausschreibungen/Wind_Onshore/BeendeteAusschreibungen/BeendeteAusschreibungen_node.html

Bundesministerium für Wirtschaft und Energie. (2015, 03 16). Unterarbeitsgruppe Akteursvielfalt / Bürgerenergie. Berlin: BMWi. Retrieved from https://www.erneuerbare-energien.de/EE/Redaktion/DE/Downloads/marktanalysen-praesentation-ag-buergerenergie.pdf?__blob=publicationFile&v=6

Bundesministerium für Wirtschaft und Energie. (2019, 10 14). *Akteursvielfalt / Bürgerenergie*. Retrieved from www.erneuerbare-energien.de: https://www.erneuerbare-energien.de/EE/Navigation/DE/Recht-Politik/EEG-Ausschreibungen/Akteursvielfalt-Buergerenergie/akteursvielfalt-buergerenergie.html

Chicheportiche, R. (2019). *Baromètre 2018 du crowdfunding EnR : un record de 38 M€ collectés*. Retrieved from https://www.greenunivers.com/2019/04/exclusif-barometre-2018-du-crowdfunding-enr-un-record-de-38-me-collectes-201557/

Cowtan, G. (2017). *Community Energy: A guide to community-based renewable energy projects.* UIT Cambridge Limited.

De Vos, L., Kielichowska, I., Abada, I., & Klessmann, C. (2019). *Energy Communities in the European Union - Revised Final Report. The ASSET project is funded by the European Union.* Retrieved from https://asset-ec.eu/wp-content/uploads/2019/07/ASSET-Energy-Comminities-Revised-final-report.pdf

Deutsche Windguard. (2015). *Akteursstrukturen von Windenergieprojekten in Deutschland.* Retrieved from Bundesverband WindEnergie e.V. (BWE): https://www.wind-

energie.de/sites/default/files/download/publication/akteursstrukturen-von-windenergieprojekten-deutschland/20150218_studie_akteursvielfalt_final.pdf

Deutsche WindGuard; ZSW. (2019). *Anreize und rechtliche Spielräume zum Verzicht auf die Nutzung erteilter Zuschläge.* Varel: Deutsche WindGuard GmbH.

Deutsche WindGuard; ZSW. (2019). *Vorbereitung und Begleitung bei der Erstellung eines Erfahrungsberichts gemäß § 97 Erneuerbare-Energien-Gesetz Wind an Land.* Varel: Deutsche WindGuard GmbH.

Drogosch, B. (2018). *Bürgerschaftliche Beteiligung an Erneuerbare-Energien-Projekten in Frankreich. Memo. Deutsch-Französisches Büro für die Energiewende (DFBEW). .*

DTU. (2019). *Projet Homepage Wind 2050*. Retrieved from http://www.wind2050.dk/

Dukan, M., Kitzing, L., Brückham, R., Jimeno, M., Wigand, F., Kielichowska, I., . . . Breitschopf, B. (2019). *Effect of auctions on financing conditions for renewable energy. A mapping of auction designs and their effects on financing.* Retrieved from http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D5_1_final.pdf

European Commission. (2014). *Communication from the Commission — Guidelines on State aid for environmental protection and energy 2014-2020. OJ C 200, p. 1-55.* Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN

European Union. (2018). *Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources. Official Journal 328. PP 82-209.* Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0082.01.ENG&toc=OJ:L:2018:328:TOC

FA Wind. (2017). *Analyse der 3. Ausschreibung für Windenergieanlagen an Land.* Berlin: Fachagentur Windenergie an Land.

FA Wind. (2019). *11. Ausschreibung für Windenergieanlagen an Land.* Berlin: Fachagentur für Windenergie an Land.

FA Wind. (2019). *Hemmnisse beim Ausbau der Windenergie in Deutschland.* Berlin: Fachagentur Windenergie an Land.

Government of Spain. (2019). *Draft of the Integrated National Energy and Climate Plan 2021-2030.* Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/ec_courtesy_translation_es_necp.pdf

Grashof, K., & al., e. (2019). *Detailauswertung der ersten Ausschreibungsrunde für Windenergie an Land – Implikationen für die Entwicklung des Monitorings von Akteursvielfalt.* Berlin: UBA. Retrieved from https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2019-08-30_climate-change_32-2019_akteursvielfalt-photovoltaic-windenergie__0.pdf

Grashof, K., Kochems, J., & Klann, U. (2015). *Charakterisierung und Chancen kleiner Akteure bei der Ausschreibung für Windenergie an Land .* Retrieved from Fachagentur Windenergie an Land: http://www.fachagentur-windenergie.de/fileadmin/files/Veroeffentlichungen/FA-Wind_Studie_kleine_Akteure_in_Ausschreibungen_IZES_07-2015.pdf

Haufe, M.-C., & Tiedemann, S. (2016). *How to participate in an auction for RES support? Webinar #5 - AURES Auction Academy.* Retrieved from http://auresproject.eu/events/aures-auction-academy-5

Hauser, E., Hildebrand, J., Dröschel, B., Klann, U., Heib, S., & Grashof, K. (2015). *Nutzeneffekte von Bürgerenergie. Eine wissenschaftliche Qualifizierung und Quantifizierung der Nutzeneffekte der Bürgerenergie und ihrer Bedeutung für die Energiewende.* Retrieved from IZES - Institut für Zukunftsenergiesysteme: https://www.buendnis-buergerenergie.de/fileadmin/user_upload/Studie_Nutzeffekte_von_Buergerenergie_17092015.pdf

IEA-RETD. (2016). *Cost and financing aspects of community renewable energy projects. Volume II: Danish Case Study.*

IFC. (2012). *Utility-scale solar power plants - A guide for developers and investors. International Finance Corporation (IFC).* Retrieved from https://www.ifc.org/wps/wcm/connect/fe79dd27-5c9d-4cb0-8dc0-00e54073aa87/SOLAR%2BGUIDE%2BBOOK.pdf?MOD=AJPERES&CVID=jrR7UB7

Interreg Europe. (2018). *Renewable energy communities. A policy brief from the Policy Learning Platform on Low-Carbon Economy.* Retrieved from https://www.interregeurope.eu/fileadmin/user_upload/plp_uploads/policy_briefs/2018-08-30_Policy_brief_Renewable_Energy_Communities_PB_TO4_final.pdf

(2019, October 21). Interview with Andreas Rüdinger (IDDRI).

(2019, October 8). Interview with Emil Axelsen and Sobia Waheed (ENS).

(2019, October 16). Interview with Simon Bénard and Stéphanie Jallet (DFBEW).

Klessmann, C., Wigand, F., Tiedemann, S., Gephart, M., Maurer, C., Tersteegen, B., . . . Nebel, J. (2015). *Ausschreibungen für erneuerbare Energien. Wissenschaftliche Empfehlungen.* Retrieved from Ecofys, Consentec, Fraunhofer ISI, ZSW, Takon, BBG und Partner, GÖRG Partnerschaft von Rechtsanwälten mbB: https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/wissenschaftliche-empfehlungen-ausschreibungen-fuer-erneuerbare-energien.pdf;jsessionid=526E1E614EA698A0D39AF4441A080A1A?__blob=publicationFile&v=7

Leipziger Institut für Energie. (2015). *Marktanalyse - Windenergie an Land. Untersuchung im Rahmen des Vorhaben IIE zur Stromerzeugung aus Windenergie.*

Lucas, H., Leidreiter, A., & Muñoz Cabré, M. (2017). *Renewable Energy Tenders and Community (Em)power(ment): Latin America and the Caribbean. A report for REN21.* Retrieved from https://www.ren21.net/wp-content/uploads/2019/06/LAC-Report.pdf

Ministère de la Transition Ecologique et Solidaire (MTES) . (2019). *Programmation pluriannuelle de l'énergie 2019-2028. Projet pour consultation.*

Nestle, U. (2014). *Marktrealität von Bürgerenergie und mögliche Auswirkungen von regulatorischen Eingriffen.* Retrieved from BBEn - Bündnis Bürgerenergie e.V.: http://www.leuphana.de/fileadmin/user_upload/Forschungseinrichtungen/professuren/finanzierung-finanzwirtschaft/files/Studie_Marktrealitaet_von_Buergerenergie_Leuphana_FINAL_23042014.pdf

Nestle, U. (2015). *Ausscheibungen für Erneuerbare Energie. Überwindbare Hemmnisse für Bürgerenergie? Eine wissenschaftliche Expertise von EnKip (Energie- und Klimapolitik Beratung).*

Olsen, B. E. (2014). Regulatory financial obligations for promoting local acceptance of renewable energy projects. In M. Peeters, & T. Schomerus, *Renewable Energy Law in the EU. Legal Perspectives on Bottom-up Approaches.* Cheltenham: Edward Elgar.

Papke, A. (2018). *Die Regelungen zur Förderung der Akzeptanz von Windkraft in Dänemark. Hintegrundpapier. Würzburger Berichte zum Umweltenergierecht.*

Ponchel, T., & Bordier, C. (2017). *Orienter l'épargne des ménages vers le financement des énergies renouvelables : quelle contribution du bonus au financement participatif ? Point Climat No 48. I4CE.*

Power Africa. (2018). *Guide to Community Engagement for Power Projects in Kenya.* Retrieved from https://www.usaid.gov/sites/default/files/documents/1860/FINAL_Guide_to_Community_Engagement_-_Jan_17_2018_508-compressed.pdf

Rüdinger, A. (2019). *Les projets participatifs et citoyens d'énergies renouvelables en France: état des lieux et recommandations. Iddri, Étude N°03/19.*

Tiedemann, S., Wigand, F., Klessmann, C., Ragwitz, M., Maurer, C., Kohls, M., . . . Erhart, K.-M. (2015). *Akteursvielfalt Windenergie an Land. Herausforderungen, Akteursdefinition und mögliche Sonderregelungen.* Retrieved from Ecofys, Fraunhofer ISI, Consentec, BBG und Partner, Takon: https://www.erneuerbare-energien.de/EE/Redaktion/DE/Downloads/wissenschaftliches-papier-ecofys-akteuersvielfalt-windenergie-land.pdf?__blob=publicationFile&v=2

Weiler, K., Weber, A., & Holstenkamp, L. E. (2019). *Kurzbericht zur Akteursstruktur der Ausschreibung für Windenergie an Land vom Mai 2017 .* Retrieved from https://www.umweltbundesamt.de/sites/default/files/medien/372/dokumente/20190822_kurzbericht_ausschreibungsrunde_mai-2017.pdf

Weiler, K., Weber, A., Holstenkamp, L., & Ehrtmann, M. (2019). *Kurzbericht zur Akteursstruktur der Ausschreibung für Windenergie an Land vom Mai 2017.* Berlin: Umweltbundesamt. Retrieved from https://www.umweltbundesamt.de/sites/default/files/medien/372/dokumente/20190822_kurzbericht_ausschreibungsrunde_mai-2017.pdf

Wigand, F., & Tiedemann, S. (2016). *Specific design elements for RES auctions: actor diversity. Webinar #7 of the AURES Auction Academy.* Retrieved from http://auresproject.eu/files/media/documents/aures-auction-academy-7.pdf

Zerrahn, A. (2017). *Wind Power: Mitigated and Imposed External Costs and Other Indirect Economic Effects. DIW Roundup 111.* Retrieved from https://www.diw.de/de/diw_01.c.556900.de/publikationen/roundup/2017_0111/wind_power_mitigated_and_imposed_external_costs_and_other_indirect_economic_effects.html

ZSW, Bosch & Partner. (2019). *Vorbereitung und Begleitung bei der Erstellung eines Erfahrungsberichts gemäß § 97 Erneuerbare-Energien-Gesetz. Teilvorhaben II c: Solare Strahlungsenergie.* Retrieved from https://www.erneuerbare-energien.de/EE/Redaktion/DE/Downloads/bmwi_de/zsv-boschundpartner-vorbereitung-begleitung-eeg.html

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