Investing in a Renewable Future – Renewable Energy Communities, Consumer (Co-)Ownership and Energy Sharing in the Clean Energy Package

by Prof. Dr iur. Jens Lowitzsch*

I. Introduction: The Active Consumer as Prosumer and Co-Investor in the Energy Transition

Consumer (co-)ownership in renewable energy (RE) is one essential cornerstone to the overall success of Energy Transition. When consumers acquire ownership in RE they can become prosumers[1] generating a part of the energy they consume such reducing their overall expenditure for energy while at the same time having a second source of income from the sale of excess production. In June 2018, the European Union agreed on a corresponding legal framework as part of a recast of the Renewable Energy Directive[2] (RED II) which entered into force in December 2018:

- Consumers, as prosumers, will have the right to consume, store or sell RE generated on their premises, (i) individually, that is, households and non-energy small and medium sized enterprises (SMEs) and collectively, for example in tenant electricity projects (Art. 21 RED II), or (ii) as part of Renewable Energy Communities (RECs) organised as independent legal entities (Art. 22 RED II).

- Transposing the RED II into national Law until June 2021 Member States – amongst others – have to adopt an enabling framework for prosumership and in particular for RECs. Defining citizen's rights and duties the directive links prosumership to such different topics as fighting energy poverty, increasing acceptance, fostering local development and incentivising demand-flexibility.

The RED II is part of the Clean Energy Package of the European Union[3] and its rules are embedded in those of the 2019 Internal Electricity Market Directive (IEMD) and Regulation (IEMR).[4] The transposition of these comprehensive rules – in

* Jens Lowitzsch holds the Kelso Professorship of Comparative Law, East European Business Law and European Legal Policy at Europa-Universität Viadrina Frankfurt (Oder). He directs the HORIZON 2020 project "SCORE – **S**upporting **C**onsumer Co-**O**wnership in **R**enewable **E**nergies as coordinator (CSA 2018-2021, *see* https://www.score-h2020.eu/).

1 The artificial word probably first introduced by Alvin Toffler in his book *The Third Wave* (1980) stems from the Latin; as early as 1972 Marshall McLuhan and Barrington Nevitt suggested in their book *Take Today,* (p. 4) that technological progress would transform the consumer into a producer of electricity.

2 O.J. L 328/82 of 21 December 2018.

3 On 30 November 2016 the European Commission presented a package of measures to keep the EU competitive as the energy transition changes global energy markets with four main goals, *i.e.,* energy efficiency, global leadership in RE, a fair deal for consumers and a redesign of the internal electricity market.

4 On 18 December 2018 the proposals on both reached political agreement in the inter-institutional negotiations (so-called Trilogue) and were published on 14 June 2019 in the Official Journal with the IEMD (O.J. L 158/125) to be transposed into national Law until 31 December 2020 and the IEMR (O.J. L 158/54) to enter into force on 1 January 2020.

particular those on energy communities – requires developing, implementing and rolling out business models that broaden the capital participation of consumers in all 28 Member States. The challenge is to include municipalities and/or commercial investors like SMEs and advance to economies of scale while retaining the benefits of individual consumer participation.

This article gives an overview of the most important new rules on (Renewable) Energy Communities in the context of the RED II and the IEMD/R. Against the background of the relevance for financing RE prevalent business models for RE-investments across the EU are looked upon to analyse how they fit the new framework.[5] A specific focus lies on "energy/electricity sharing" within RECs and the underlying (digital) technologies. It also presents a financing concept for consumer (co-)ownership compatible with the requirements for (Renewable) Energy Communities, that is, the Consumer Stock Ownership Plan (CSOP).

1. The Clean Energy Package – Regulatory Overhaul of the Energy Union

In 2015 the European Commission issued two Communications: "Delivering a New Deal for Energy Consumers" and "On a New Energy Market Design".[6] Their message was that the three pillars of future consumer energy policy would be consumer empowerment, smart homes and networks, and data management and protection. From the outset on the Commission explicitly emphasised the role of *prosumers*[7] and thus advocated for both reducing energy costs through self-generation and consumption[8], and expanding the consumer's role through intermediation and collective participation schemes.[9] The European Economic and Social Committee (EESC) further issued two initiative opinions (TEN 578 and TEN 577) which strongly advocate the "prosumer approach". Consequently, when developing the new market design, the European Commission's identified priorities were (1) (variable) RES promotion and deployment, (2) market integration and (3) putting consumers "at the centre of the future energy system" which includes making them self-consumers and (co-)owners.[10]

Drawing back on the challenges of system integration, RE investments, the role of public institutions and public acceptance, it was clear and acknowledged by the EU that providing the right framework for consumers is crucial. Following the launch of the framework strategy in February 2015, the Commission published three preparatory documents and a public consultation in July, focusing on market design, especially market compatibility of RES and their support schemes on one hand and on the role of energy consumers as active market players on the other. To implement the approach described above, the European Commissioned published the Clean Energy Package for all Europeans[11] in November 2016. The Directive on Energy Performance on Buildings was adopted and published in the Official Journal already in May 2018. In summer 2018 the Energy Efficiency Directive,[12] the RED II and the Governance Regulation reached political agreement in the inter-institutional negotiations (so-called Trilogue)[13] followed by that on the IEMD/R in the end of that year; as of February 2019 the latter were not yet published in the Official Journal but the consolidated text of the agreement was already available.

The test with regard to consumer (co-)ownership models is whether or not the final result of the Clean Energy Package, in particular the recast of the RED and of the IEMD, will harness its potential

5 This analysis stems from the book Energy Transition Financing consumer (co-)ownership in renewables 18 country studies and a comparative analysis , J. Lowitzsch (ed.), Palgrave McMillan, 2019.

6 COM(2015) 339 final and COM(2015) 340 final both of 15 July 2015.

7 *See* in particular Best practices on Renewable Energy Self-consumption (SWD(2015) 141 final), accompanying document to the Commission Communication Delivering a New Deal for Energy Consumers (COM(2015) 339 final).

8 *See* COM(2015) 339 final p. 6, c) Reducing energy bills through self-generation and consumption: *"Decentralised renewable energy generation, whether used by consumers for their own use or supplied to the system, can usefully complement centralised generation sources. Where self-consumption exhibits a good match between production and load, it can help reducing grid losses and congestion, saving network costs in the long-term that would otherwise have to be paid by consumers."*

9 *See* COM(2015) 339 final p. 6, *d) Increasing consumer participation through intermediation and collective schemes: Collective schemes and community initiatives have been emerging with increasing frequency in a number of Member States. More and more consumers engage in collective self-generation and cooperative schemes to better manage their energy consumption. This innovation by consumers is also resulting in innovation for consumers and opens up new business models."*

10 European Commission *"A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy"*, Pub. L. No. COM2015/80/EC, COM2015/80/EC COM2015/80/EC 21, 2015.

11 Eight legislative proposals on over 1000 pages covering governance, RE, EE, energy performance of buildings, internal electricity market, cooperation of regulators, innovation, etc. For information on content and state of play: https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans.

12 O.J. L 328/210 of 11 December 2018, amending Directive 2012/27/EU on energy efficiency.

13 That is the negotiation between the two co-legislators (European Parliament and Council of the EU) moderated by the European Commission.

to facilitate prosumership both individually as "Renewable Self-consumers" and collectively as "Renewable Energy Communities".

2. Five Important Challenges remain

As public discourse transcends ideological grounds and centres on the question of how to most efficiently achieve the Energy Transition policy makers are more and more perceptive to arguments in favour of consumer ownership in RE. We observe a broad variety of policy initiatives resulting in legislative support for RE consumer (co-)ownership and prosumership. Examples for such legislative initiatives supporting both net metering and the recognition of collective or (co-) ownership schemes both across the EU and in non-EU countries[14] are Brasil, California, Canada, Chile, Denmark, India, Italy, the Netherlands, Pakistan, Spain or Greece. While each of these regulations remained piecemeal the new EU framework indicates the way to a coherent legal framework for consumer ownership in RE. However, although the Clean Energy Package for all Europeans paves the way to a EU wide legal framework it still needs to be transposed into national law and subsequently filled with implementing provisions. Taking into account the complexity of the issues involved consistent solutions are much needed, solutions that link the role of the prosumer with that of the other agents on tomorrow's energy markets. Here it should be borne in mind that the attractiveness of RES in general is assessed on the wholesale market, where they compete with other generation sources while the attractiveness of self-consumption depends on retail prices[15]; the challenge is how to frame a consistent policy to incorporate prosumers, be it individuals, municipalities or SMEs, as central actors linking the two.

The – sometimes conflicting – goals of this process require trade-offs and pose tasks in three areas, namely (i) policy efficiency and simplicity, (ii) predictability and flexibility, and (iii) the sharing of benefits and costs. To reduce transaction costs associated with integrating new, typically small or medium sized actors in a complex policy setting demands an efficient but simple framework. While support schemes should be predictable both for investors and public finances they need to adapt flexible to evolving market conditions. Exemptions from fees and levies for some consumers lead to higher end-prices for the remaining threatening their acceptance of RE. Thus, five important challenges remain:

I. Creating a coherent incentive system for RES and RE "prosumage"[16] based on market related price signals.

II. Designing a consistent structure of network charges permitting adaptation of network tariffs to changing conditions with a view to their influence on consumption behaviour.

III. Market integration of consumer (co-)owned RE projects while avoiding sub-scale investments, allowing pooling of local projects and partnerships with municipalities and strategic investors.

IV. Integrating self-consumption and net metering into a future decentralised electricity storage system including sector coupling and e-mobility.

V. Regulating aggregation and direct marketing including peer-to-peer as well as the challenges of digitalisation such as smart grids, micro grids and blockchain technology.

II. The Consumer at the Heart of the energy Markets – Slogan or Programme?

Consumer (co-)ownership received explicit recognition of its crucial role – in terms of fighting energy poverty, increasing acceptance, fostering local development, incentivising demand-flexibility, etc. – and of its rights and duties in the recitals 66 to 76 RED II.[17] But, more

14 For an overview *see* C. Gauthier and J. Lowitzsch, "Outlook: Energy Transition and Regulatory Framework 2.0: Insights from the European Union" (p. 749) and the concerning country reports in: J. Lowitzsch (ed.), Energy Transition 2019, *op. cit.*.

15 M. Welsch, S. Pye, D. Keles, A. Faure-Schuyer, A. Shivakumar, P. Deane, M. Howells, *"Europe's Energy Transition: Insights for Policy Making"*, Elsevier Academic Press. London; San Diego, CA; Cambridge, MA; Oxford, UK, 2017.

16 An extension of the concept of "prosumption" (production and consumption) to "prosumage" (production, consumption, and storage) involves decentral energy storage by batteries enabling to detach the moments of electricity generation and consumption. *See* W.-P. Schill *et al.*, Solar prosumage: pros, cons, and an illustration of system effects in: J. Lowitzsch (ed.), Energy Transition, 2019, *op. cit.*

17 Article 296 Treaty on the Functioning of the European Union (TFEU) requires that EU legal acts shall state the reasons on which they are based on; the recitals are referred to in this article to interpret and clarify ambiguities as is settled case law of the European Court of Justice; *see e.g.*, Cases 24/62 of 4 July 1963, *Federal Republic of Germany vs. Commission of the European Economic Community,* C-244/95 of 20 November 1997, P.

importantly, clear definitions in Art. 2 RED II and two dedicated articles 21 and 22 RED II foster consumer (co-)ownership in RE and prosumership. However, going back on what made the first RED a success, namely strong governance tools to ensure long-term signals and regulatory stability, the Clean Energy Package takes a step back: (i) Instead of national binding targets a binding EU-wide RES share target for 2030 is set to 32 per cent;[18] (ii) although the level of 32 per cent is an improvement from the 2014 European council decision of 27 per cent it is still coming short to reach the target of containing global warming to two degree centigrade.[19] On the other hand, the governance tools, *i.e.,* national action plans, reporting and monitoring, are set in the Governance Regulation[20] that extends the reporting requirement and also includes a corrective mechanism should Member States strategies diverge from the collective path.[21] Against this background it is worthwhile to recall the relevance of consumer ownership for the Energy Transition against the background of the prevalent business models to understand the setting of RECs in the Clean Energy Package.

1. Relevance: Closing the financing gap

In order to limit global warming to 2°C and avoid the worst effects of climate change, it is estimated that the world needs to invest an additional USD 1 trillion per year through 2050.[22] While the year 2015 saw global investment in the energy sector of approximately USD 1.8 trillion, a total of about USD 3.5 trillion would be required each year from 2016 through 2050.[23] All in all, the IRENA estimates that USD 25 trillion have to be invested in RES by 2050 to meet the latter requiring to triple the actual annual investment rate.[24] For the EU to meet a 34% RES share in final consumption by 2030, would necessitate USD 73 billion per year, that is, 0.3% of the current EU-28 GDP and an increase of around USD 20 billion per year compared to the 2016 investment level.[25] Local authorities in charge of energy efficiency (EE) and climate policy with limited budgets often lack means to initiate new and innovative projects. Closing the financing gap becomes even more important since investments in RE are an important driver of economic development and employment. A Commission study[26] finds that "new industries with a strong lead market potential have been created, which contribute a value added of about 94 billion EUR or about 0.7 per cent of the total GDP and an increase in total employment of about 2 million, that is, about 0.9 per cent of the total workforce in Europe in 2011". The Report of the European Commission Expert Group R&I policy framework for Green Growth & jobs confirmed that RES investments would positively impact job generation.[27] The EESC[28] concludes that the growth in renewables brings about new jobs along its value chain "with this job generation effect being particularly high in the sectors of EE (0.38 job-years/GWh), PV (0.87), biofuels (0.21) and wind (0.17) when compared to coal and gas (0.11)."

2. Status quo – conventional business models

Prevalent business models – Present business models which fund RE investments of private individuals fall into two categories:

(1) Genuine, more egalitarian ownership schemes, for example, energy cooperatives, that typically are small- or medium-sized projects confronting the problem of being "sub-scale" investments.[29]

Moskof AE v Ethnikos Organismos Kapnou.

18 Along with a reduction of 40 per cent of GHG and 32.5 per cent for energy efficiency savings.

19 This, however, could be corrected by using the planned upward review clause in 2023.

20 O.J. L 328/1, Regulation on the Governance of the Energy Union and Climate Action (EU) 2018/1999 of 11 December 2018.

21 European Commission, press releases: "Europe leads the global clean energy transition: Commission welcomes ambitious agreement on further renewable energy development in the EU" (14 June 2018) and "The Energy Union gets simplified, robust and transparent governance" (20 June 2018).

22 M. Fulton, R. Capalino, "Investing in the Clean Trillion: Closing The Clean energy Investment gap", CERES report 2014.

23 At the same time the decline in fossil fuel investment would be largely offset by a 150 per cent increase in RES investments between 2015 and 2050; IRENA estimates that total demand-side investments in low-carbon technologies would need to surge by a factor of ten over the same period (IRENA 2017).

24 International Renewable Energy Agency, *"Global Landscape of Renewable Energy Finance"*, 2018, retrieved from /publications/2018/Jan/Global-Landscape-of-Renewable-Energy-Finance.

25 In 2014, the European council agreed to a target of 27 per cent share of RES in energy consumption by 2030. However, the IRENA report *"Renewable energy prospects for the European Union"* ordered by the Commission estimates that a share of 34% could be attained with a saving potential compared to the reference scenario. Thus considering political (Paris Agreement) and technological developments (unexpectedly quick cost reductions), 27 per cent is considered a conservative and inadequate hypothesis.

26 *"Employment and growth effects of sustainable energies in the European Union"*, FINAL REPORT, Brussels, 2014; the gross value added of the RES sector may increase to about EUR 100 (120) billion and employment in the RES sector would amount 1.6 (2.1) million persons by 2030 if a target of 30 per cent (35 per cent) in terms of the gross final energy is implemented.

27 "Changing gear in R&I: Green growth for jobs and prosperity in the EU", Directorate-General for Research and Innovation, Brussels 2016.

28 "Changing the future of energy. Civil society as a main player in renewable energy generation", Final Report, Brussels, 2015.

29 *I.e.,* optimisation of the size of technical installation, *e.g.,* a 100 kW citizen wind turbine is not economically sound; scalable financing techniques on the other hand would help small investors pool their investment, boost it

(2) Profit-oriented, market-centred investment schemes such as closed-end funds that attract money for large-scale projects but do not permit investor participation in decision-making.

If RE projects are to be combined with active citizen participation, both financial and in decision-making, new models must be innovated. The question is how do we retain the benefits of individual consumer participation when advancing to economies of scale, while simultaneously including low-income households? Support for business models that facilitate consumer ownership in RES must first level the playing field. If investments in RE at the local/regional level are to succeed in an environment of regulatory conditions which favour large investments, that is, the worldwide trend toward direct marketing and auction models, consumer ownership models must be able to co-exist with their commercial competitors. This is ever more important in the light of the rent-seeking behaviour of large investors – often heavily invested in fossil fuels – aiming at securing advantages of their established market position and thus profits regardless of increasing cost efficiency.[30]

Stakeholder involvement and financial participation – Financial participation has a complex relationship with participation in decision-making and stakeholder involvement in general. In addition to helping to close the financing gap, the involvement of all stakeholders is now recognized as crucial to the success of policies responding to climate change, including the shift to green energy. Participation can take diverse forms and occur at different stages of project implementation: (i) information about the on-going development; (ii) participation in decision-making during the planning process; and (iii) financial participation in the project. While the first two forms of participation involve all stakeholders the last one is reserved to shareholders. In addition to the obvious benefits of engaging citizens in decision-making during the planning phase,[31] financial participation in the project itself has material benefits, namely, the right to share in the investment profits. With regard to participation in decision-making the involvement of citizens as consumers that become (co-)owners can take either of two forms: passive financial participation which involves no role in decision-making and where investment return is the principal objective (*e.g.*, bonds, loans, silent partnerships and limited partnerships); active financial participation, where citizens-owners also assume a role in the governance of the utility (*e.g.,* coops, limited liability companies and partnerships).

While financial participation in general may provide consumers with the incentive for maximum involvement, active participation through voting rights provides them with the power to exercise it. The literature defines these two types of financial participation as participation in a broader, i.e., passive sense and a narrower, i.e., active sense.[32]

3. Consumer (Co-)Ownership and Renewable Energy Communities – Defining the Setting

With regard to the future role of RECs on the European energy markets it is necessary to understand the institutional setting they are to operate in. In a more general sense they embrace participation schemes that *(i) confer ownership rights in RE projects to (ii) "active" consumers in (iii) a local or regional area*. The link with the concept of consumer (co-)ownership[33] implies financial participation combined with some degree of participation in decision-making in a legal entity located in a specific geographic area where the consumer lives. Furthermore, as a rule this will also involve (co-)ownership of municipalities as the pacemakers of the energy transition and commercial investors, both important in practice but often difficult to combine.

Referring to best practice experience[34] and in accord with the above criteria, a REC may embrace a variety of different local partners that until now

with leverage and build a more efficient standard industrial 3 MW wind turbine.

30 Cf. G. C. Unruh, "Escaping carbon lock-in", Energy Policy 30, 2002, 317-325, p. 321.

31 P. Devine Wright, *"Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy",* Wind energy 2015, 8(2), p. 125-139.

32 Cf. Ö. Yildiz, *"Financing renewable energy infrastructures via financial citizen participation – The case of Germany",* Renewable Energy 2014, pp. 68, 677-685.

33 A comprehensive definition of citizen financial participation in RE does not yet exist inasmuch as forms vary greatly from country to country. Definitions in the literature often refer to unique national concepts shaped by historical development and their corresponding business models (*see, e.g.,* G. Walker, N. Simcock, "Community Energy Systems. International Encyclopaedia of Housing and Home", 2012, pp. 194-198) or stem from technologic, economic and political characteristics.

34 For a systematic review of 18 countries *see* J. Lowitzsch (ed.), Energy Transition, 2019, *op. cit*.

were used to participate in separate and distinct investment models, depending on their specific characteristics: While collective investments of individual citizens/consumers as a rule would take the form of RE-cooperatives, municipalities would prefer public utility companies and SMEs or commercial partners special purpose vehicles. The challenge with regard to an ownership-oriented approach is to combine the participation models practised across the EU under the common roof of a REC. In this regard, three approaches are expected to be present in various combinations:

– Schemes summed up under *citizen energy,* also referred to as energy citizenship,[35] typically involving consumer ownership while not necessarily local / regional.

– *Community energy/community power* models representing locality and common interest of resident consumers,[36] although they may not always foresee ownership rights for individual citizens, in particular voting rights.

– *Prosumership,* that is, approaches where a consumer (co-)produces the goods or services he or she consumes involving both individuals and enterprises (micro or SMEs).

Under the roof of a Renewable Energy Community these approaches, of course, would have to comply with the core requirements of the definition in the RED II which are discussed in the following. Consumer (co-)ownership as a result of co-investments of different type of local actors thus intersects with "citizen energy", "prosumership" and "community energy" (*see* Figure 1) while the transposition of the concept into national law may reflect the above-mentioned key elements to a varying degree.

III. The Regulatory Framework for Energy Communities

The RED II sections on self-consumption and collective local organisation call on Member States to *"provide a more conducive investment environment for self-generation and self-consumption"* and *"to suppress administrative and market barriers to new self-generation capacity, to replace lengthy authorisation procedures with a simple notification requirement and to put in place efficient one-stop shops."* Recital (70) of RED II states:

„The participation of local citizens and local authorities in renewable energy projects through renewable energy communities has resulted in substantial added value in terms of local acceptance of renewable energy and access to additional private capital which results in local investment, more choice for consumers and greater participation by citizens in the energy transition. Such local involvement is all the more crucial in a context of increasing renewable energy capacity. Measures to allow renewable energy communities to compete on an equal footing with other producers also aim to increase local citizen participation in renewable energy projects and therefore increase acceptance of renewable energy."

As to political and communication barriers to consumer ownership, the political climate which previously hindered implementation of new business models, like the Consumer Stock Ownership Plan (CSOP; *see* below section VI.) has now improved because of the structural particulars of the RE market. Measures necessary for decentralising energy production, such as planning designation or grid extensions, are more likely to gain acceptance when participants from the society at large are involved. Not only have policy makers changed their attitude, but the renewables industry and even large energy suppliers are more receptive to consumer (co-)ownership, regarding it beneficial to the implementation of local supply concepts and smart grids.[37] Consumer owned projects do not compete with or replace other investors. Instead, consumer ownership expands the society's renewable capacity.

35 The term "citizen" in this context encompasses both natural persons individually and organised, *e.g.,* civil society groups, social entrepreneurs, schools, micro enterprises, faith groups.

36 Commonly used in Anglo-American countries and in particular in the UK, this term stresses the participation of local authorities, government departments and utility companies (*see* G. Walker, P. Devine-Wright, "Community renewable energy: What should it mean?", Energy policy 2008, 36(2), pp. 497-500).

37 In the UK, as part of DECC's Community Energy Strategy, published on the 27th January 2014, the renewables industry and the community energy sector committed to work together to facilitate a substantial increase in the shared ownership of new, commercial onshore renewables developments.

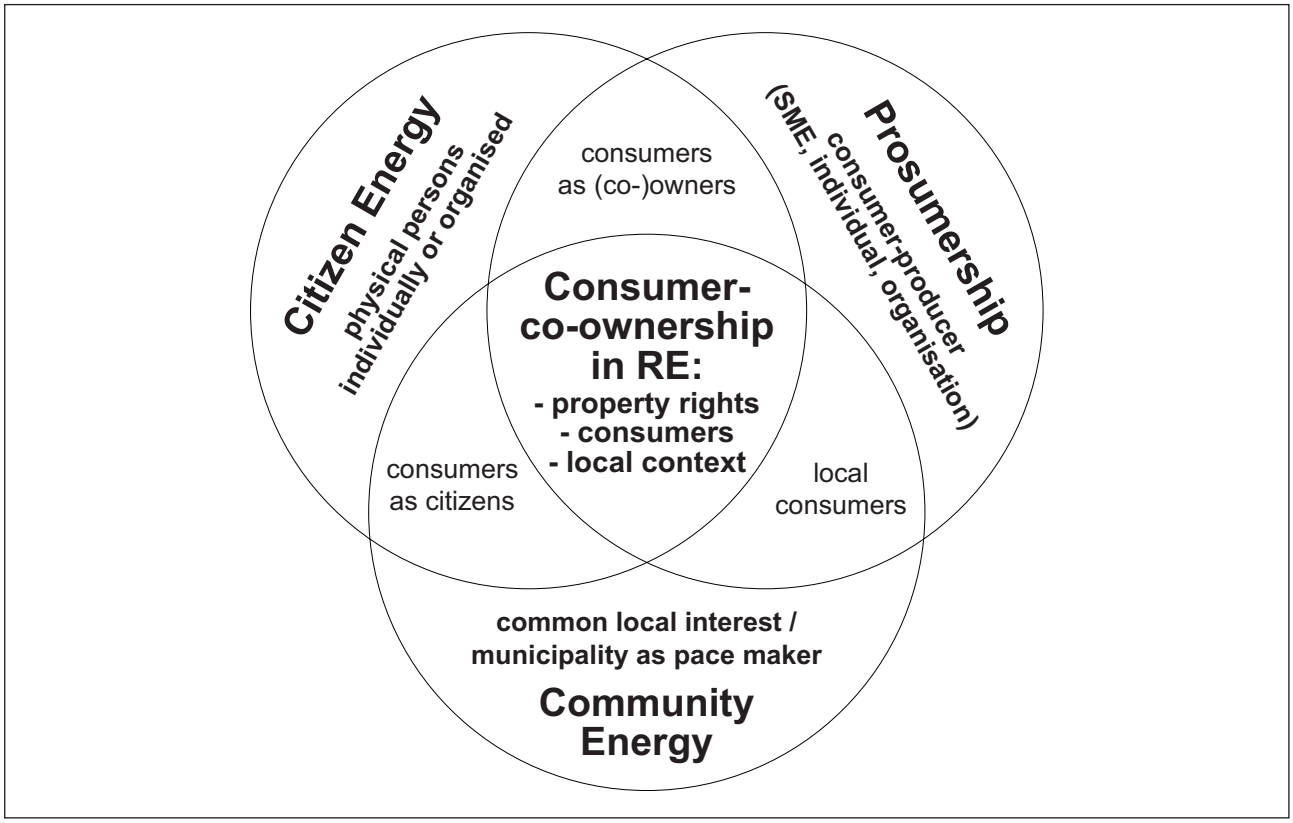

Figure 1. Renewable Energy Communities and their relationship to citizen energy, prosumership and community energy.

1. Market integration – The legislative challenge for RED II and IEMD

Market integration of RES aims at creating competitive energy markets with renewables generally subject to normal market rules. This entails the question of how to align subsidies with normal market rules and how to provide a level playing field for all market participants. Here the ownership structure of the RE sector is crucial. The optimal market design will avoid both concentrated ownership in the hands of a few – an oligopoly detrimental to competition – as well as a fragmented market with a plethora of small players driving up transaction costs and impeding governance. The 2018 negotiations between the European Commission, Parliament and Council concerning the Clean Energy Package is a good example of the policy challenges involved. While there seems to be consensus among policy makers to postulate a sufficiently large number of market participants to guarantee competition and prevent market domination by a few large players, there is disagreement about the degree of "actor diversity" necessary. At the root of this controversy lies the question of what constitutes a level playing field and particularly the question of whether or not small RE producers can coexist and compete with the large incumbent energy suppliers without regulatory support. This issue directly impacts the development prospects for (co-)owned consumer projects which are typically medium or small.

The Council of the EU, on the one hand, stressed liberalization of markets and was reluctant to grant any preferential conditions for small players as proposed above. The European Commission and in particular the European Parliament on the other hand, favoured modest preferential conditions for prosumers and local small producers in order to ensure a level playing field and "equal footing" when competing for RE support. Above all the question of a *"right to prosume"* and the right to market generated energy directly (stipulated in Art. 21 RED II) as well as the framework to facilitate Renewable Energy Communities (Art. 22 RED II) were controversial. On the one hand the involvement of consumers as (co-) owners is inclined to facilitate their new role as active consumers which is key amongst others for demand flexibility. On the other hand, a disperse ownership structure, acknowledging the numerous actors on the RE markets and particularly the phenomenon of "Citizen Energy",

raises the problem of market fragmentation. With an expanding number of small units owned by individuals, governance, control and predictability of the energy markets where balancing supply and demand and security of supply are crucial become increasingly complex and thus problematic.[38]

Against the background of the RED II compromise reached in June 2018 and that on IEMD/R of December 2018 confirming both fair conditions for self-consumption and collective local organisation thereof, one way out of this dilemma again is to innovate and deploy new organizational models for prosumership. Such contractual arrangements would allow pooling and scaling of RE investments (co-)owned by consumers while opening them up to various combinations of municipal or commercial investment, especially by SMEs. In particular as RECs as regulated in Art. 22 RED II require that local shareholders or members, *i.e.,* "natural persons, SMEs or local authorities, including municipalities" control them[39] as defined in Art. 2 of RED II necessitate a multi-purpose corporate vehicle allowing joint investments by the various agents mentioned.

2. Relation between Electricity Market Directive/Regulation and Renewable Energy Directive

Energy communities are mentioned and defined in both the RED II and the IEMD. While the recast of the renewables directive focuses on the promotion of RE and thus speaks of "Renewable Energy Communities" (RECs) the directive on the internal electricity market of the European Union as the more general legal act addresses "Citizen Energy Communities" (CECs). This raises the question of the relation between these two types of energy communities – and more generally between these two legal acts.

While the purpose of IEMD/R is the completion of the internal market in electricity that has progressively been implemented in since 1999 that of RED II on the other hand is to specifically support the deployment of RES for *energy production including electricity* and to foster acceptance for renewables among the Europeans.

Both directives expressly see the consumer "at the heart of the energy markets" defining him or her – individually or jointly – as "Active Consumer" (IEMD) respectively as "Renewable Self-consumer" (RED II). With regard to energy communities the IEMD mainly concerns the horizontal level, that is, their rights and obligations towards public authorities, other electricity enterprises and consumers. This design is also reflected in recital 2 IEMR on the aim of the internal market in electricity *"to deliver a real choice for all consumers in the Union, both citizens and businesses, new business opportunities and more cross-border trade, so as to achieve efficiency gains, competitive prices and higher standards of service, and to contribute to security of supply and sustainability."*

The Directive provides – amongst others – energy communities with a level playing field vis-a-vis other market participants (*see* Art. 65 IEMD). RED II on the other hand additionally has an important vertical element as it ensures for example that RECs can compete for support as Art. 22 para 7 puts it "on an equal footing with other market participants" and calls on the Member States to "take into account specificities of renewable energy communities when designing support schemes".

Such while the enabling framework under IEMD is primarily a "regulatory framework" (*see* Art. 16 para. 1, sentence 1) that of RED II has the explicit aim "to promote and facilitate the development of RECs" (*see* Art. 22 para. 4, sentence 1) including preferential conditions or incentives. However, above distinction is not always sharp since the IEMR/D also contain elements that support the deployment of RES.[40] Enshrined in Art. 12 the IEMR for example defines the principle of priority dispatch for RE plants with an installed electricity capacity of less than 400 kW[41] (and for RE plants commissioned after 1 January 2026 less than 200 kW) and for demonstration projects for innovative technologies.[42] Furthermore, with regard to RECs Art 8 para. 3 IEMR stipulates that

38 This problem is also reflected in the "energy trilemma" – a term coined by the World Energy Council – summing up the difficulty to find a balance between the three goals defining energy policy, *i.e.,* energy security, affordable/competitive energy prices, and sustainabil ity/decarbonisation.

39 The RED II proposal of the European Commission and the European Parliament s position were even stronger requiring a minimum of 51 per cent ownership stake and corresponding control rights of these groups.

40 *See* also recital 4 IEMR stipulating as an explicit aim *"to ensure the functioning of the internal market for electricity and includes requirements related to the development of renewable forms of energy and environmental policy, in particular specific rules for certain types of renewable power-generating facilities, concerning balancing responsibility, dispatch and redispatching as well as a threshold for CO_2 emissions of new generation capacity where such capacity is subject to temporary measures to ensure the necessary level of resource adequacy, namely, capacity mechanisms."*

41 RE-plants that concluded contracts before the entering into force of the IEMR continue to benefit from priority dispatch.

42 Pursuant to Art. 2 pt. (24) IEMR *"a project which demonstrates a technology as a first of its kind in the Union and represents a significant innovation that goes well beyond the state of the art."*

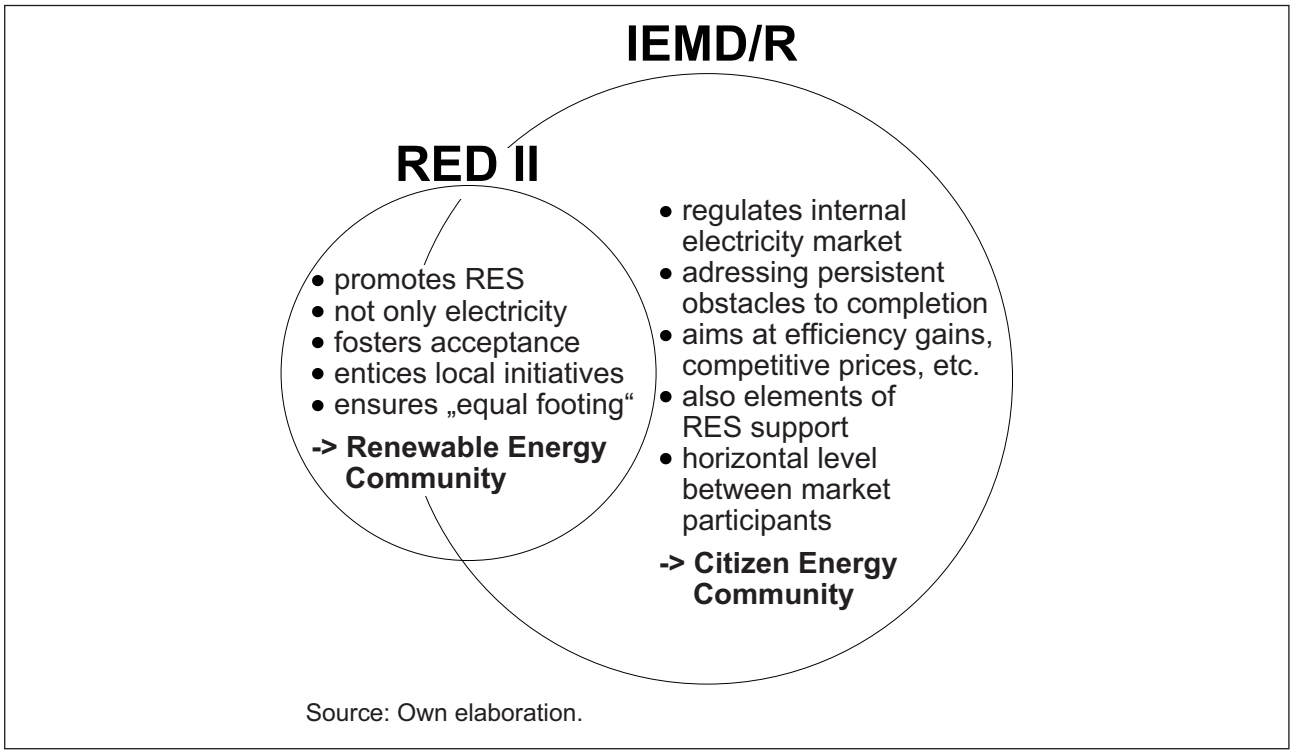

Figure 2. Relation of the RED II and the IEMD/R.

"Nominated electricity market operators shall provide products for trading in day-ahead and intraday markets which are sufficiently small in size, with minimum bid sizes of 500 Kilowatt or less, to allow for the effective participation of demand-side response, energy storage and small-scale renewables including directly by customers." Figure 2 illustrates the relation of the RED II and the IEMD/R.

In sum, generally speaking RECs are a specific form of CECs that are benefitting from an enabling framework promoting and facilitating their development. However, they have an own area of operation not falling under the IEMD/R as far as other types of energy, that is, not electricity, are concerned. In this regard the possibility to benefit from RECs small-scale back-up conventional generation is an important element for micro-grid solutions be it on or off-grid (more details in section V. below).

With regard to energy communities, of course, European energy law does not rule out other private law citizens' initiatives or consumer-oriented initiatives that are facilitated by and implemented with the participation of the public administration in the Member States;[43] however, such initiatives would not benefit from the specific enabling regulatory framework of IEMD and in particular from the preferential conditions or incentives foreseen in the enabling framework to promote and facilitate the development of RECs under RED II. This governance model can thus be described as an opt-in mechanism aiming to incentivise replication across the EU. A different question yet, however, left open by the European legislator, is how to deal with energy communities that disqualify as a REC either deliberately or because they involuntarily cannot keep up the RED II requirements.

3. Defining prosumership and consumer (co-)ownership in renewables

Art. 2 RED II defines three categories of actors that benefit from preferential conditions with regard to market access and authorisation procedures, namely, "Renewable Self-consumers" and "Jointly Acting Renewable Self-consumers" (both regulated in Art. 21 RED II) as well as "Renewable Energy Communities" (*see* Art. 22 RED II). The introduction of jointly acting prosumers is a major step ahead with regard to tenant energy projects that empower in particular low-income households

43 *See* M. Jasiak, "Energy Communities in the Clean Energy Package", European Energy Journal, Vol. 8, 2018, p. 30.

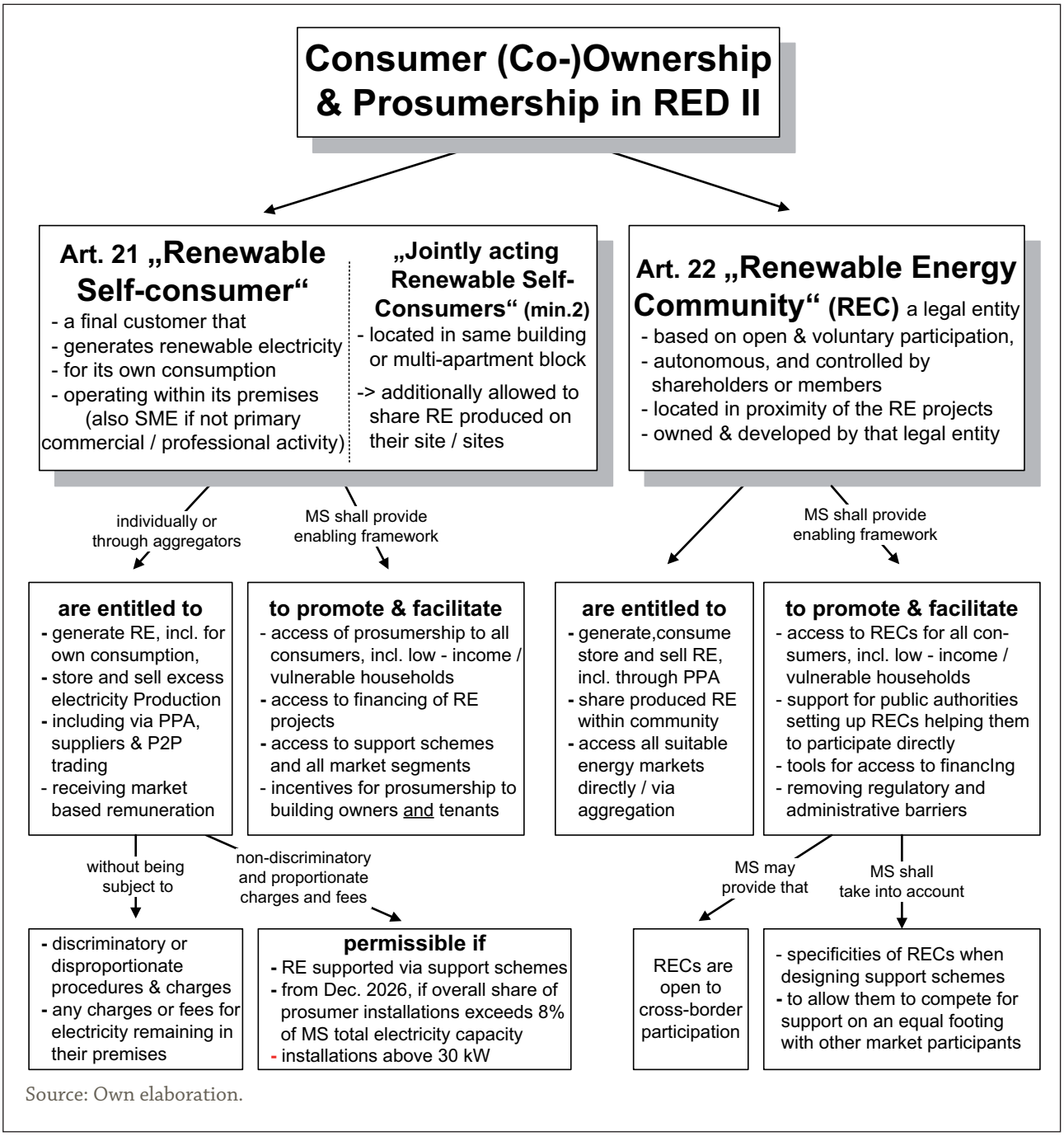

Figure 3. Overview – prosumership and consumer (co-)ownership in the RED II. Source: Own elaboration based on C. Gauthier and J. Lowitzsch, "Outlook: Energy Transition and Regulatory Framework 2.0: Insights from the European Union", in J. Lowitzsch (ed.), Energy Transition, 2019, op. cit.

typically renting their home and not owning real estate with the same "right to prosume". When transposing the RED II Member States shall thus ensure that prosumers individually or through aggregators, are entitled to generate and store RE as well as to sell excess production to the grid at a market-based fair remuneration without being subject to discriminatory charges and – with regard to electricity that remains in their premises – any charges or fees. Figure 3 summarizes the position of the three categories of actors against the pending transposition of RED II by the Members States of the European Union.

IV. Focus: Renewable Energy Communities

Under the new rules different types of (local) consumers organised in energy communities, have the right to consume, store or sell energy generated on their premises. As mentioned above the RED II also obliges the Member States to provide an enabling framework to promote and facilitate the development of RECs on the basis of an assessment of financing, administrative and regulatory barriers as well as discrimination in procedures or charges concerning support schemes, grid interaction and market rules. Pursuant to Art. 22 para 5 RED II this framework will be integrated into the updates of the Member States' integrated national energy and climate plans and progress reports mandated by the Governance Regulation. Finally, the RED II emphasises in recital 71 that *"(t)he specific characteristics of local renewable energy communities in terms of size, ownership structure and the number of projects can hamper their competition on equal footing with large-scale players, namely competitors with larger projects or portfolios" (emphasis by the author) and calls for measures to offset these disadvantages which "include enabling renewable energy communities to operate in the energy system and easing their market integration"*. Therefore, RED II recognises the possibility of introducing preferential rules and opens the field for possible (positive) discrimination since is follows from the general principle of equality in EU law[44] that while similar situations have to be treated equally dissimilar situations may be treated differently.[45] This also regards taxation where possible collisions with European competition law became a thorny issue in the light of the extension of the definition of State Aid in the sense of Art. 107 para. 1 TFEU.[46] Referring to preferential taxation for cooperatives in Italy the ruling of the European Court of Justice of 8 September 2011 defined more precisely the test criteria for State aid establishing that further to being cumulatively fulfilled motives and aims of the relevant measure need to be taken into account equally.[47] In analogy to the established principles for cooperatives[48] it seems appropriate to assume that preferential tax treatment for RECs will fall outside the scope of the State aid rules provided that with a focus on their (local) controlling shareholders or members: (a) the REC acts in their economic interest; (b) their relations are not purely commercial, but are linked to their local individual RE energy supply; (c) they are actively involved as prosumers in the local RE project; (d) they are entitled to equitable distribution of the results of economic performance.

Other than the proven benefits of RECs to closing the financing gap and increasing acceptance for RE projects mentioned above the justification to promote and facilitate the development of RECs is to be seen in the overall objective to integrate variable RES in the energy markets as given in the recitals of both RED II and IEMD. While, *e.g.*, recital 8 RED II states that *"(c)onsumers are essential to achieving the flexibility necessary to adapt the electricity system to variable and distributed renewable generation. ..."* recital 37 IEMD links this to behavioural changes necessary stressing that "... (t)he benefits of such active participation are likely to increase over time as the awareness of otherwise passive consumers is raised about their possibilities as active consumers and as the information on the possibilities of active participation becomes more accessible and better known." Moreover recital (43) IEMD declares "... *This Directive aims to recognise certain categories of citizen energy initiatives at the Union level as 'citizen energy communities', in order to provide them with an enabling framework, fair treatment, a level playing field and a well-defined catalogue of rights and obligations.*" It is thus conclusive that recital (76) RED II ascertains: *"The Energy Union strategy also recognised the role of the citizen in the energy transition, where citizens take ownership of the energy transition, benefit from new technologies to reduce their bills, and participate actively in the market."*

44 Settled case law of the European Court of Justice; *see, e.g.,* Case 8/82 of 23 Feb. 1983, KG Hans-Otto Wagner vs. BfIM, ECLI:EU:C:1983:41.

45 Cf. M. Jasiak, *loc. cit.* p.34; *see e.g.,* Cases C558/07 of 7 July 2009, *S.P.C.M. et al. vs. v Secretary of State for the Environment, Food and Rural Affairs,* EU:C:2009:430, para. 74, C579/13 of 4 June 2015 *P&S vs. Commissie Sociale Zekerheid Breda et al.,* EU:C 2015 369, para. 41 or C477/14 of 4 May 2016, *Pillbox38 Ltd vs. Secretary of State for Health,* ECLIU:C:2016:324.

46 This regards in particular the criterium of "selectivity"; *see* J. Blumenberg Aktuelle Entwicklungen des EU-Beihilferechts im Bereich der deutschen Unternehmensbesteuerung, pp. 19-27, p. 65; ifst-Schrift 516 (2017); for details *see* L. Neckenich, "Selektivität im Steuerrecht", HFSt 8 2018.

47 That is, that the measure (a) be financed by the State or through State resources, (b) be selective, (c) have a possible effect on trade between Member States, and (d) potentially distort competition on the Single Market in the Joined Cases C-78/08 to C-80/08 O.J. 2011, C 311/06 (Paint Graphos).

48 *See* Commission Notice on the notion of State aid as referred to in Article 107(1) TFEU (2016/C 262/01), section 5.4.1. *Cooperative societies* (nos 157-160).

1. Core elements of the Renewable Energy Communities under RED II and IEMD/R

The IEMD and the RED II have in common that an energy community is a legal person, able to act in its own name, to exercise rights and to be subject to obligations. Consequently, projects that are not incorporated and solely based on contractual arrangements between individuals or legal entities are not subject to this regulatory framework. Art. 2 para 16 RED II defines a REC as *"a legal entity (a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity; (b) the shareholders or members of which are natural persons, SMEs or local authorities, including municipalities"*. Tying the "effective control" – which should generally be understood as 51% of the shareholding but in cases of a disperse ownership structure might be a lower threshold[49] – to the local members of a REC is a structural feature in governance stemming from the 32% target of renewable's in the energy mix whose achievement depends to a large extend on the acceptance of RE projects by the local population.

While CECs in principle are open to all types of entities the definition in Art 2 pt. 11 IEMD is very similar with three differences, i.e., (i) the absence of the notion of geographic proximity,[50] (ii) the lack of the requirement to be autonomous[51] and (iii) a limitation for enterprises being included in the shareholders controlling the entity to those of small and micro size.[52] While the former two features are clearly rooted in the characteristics of REC's distributed RE generation the latter aims at establishing a level playing field on which citizen led initiatives can compete with the incumbent commercial actors.[53] Under a systematic and under a teleological point of view barring medium-sized enterprises from the group of shareholders controlling a CECs can be seen as the equivalent of the requirement for "local" control in RECs. Since RED II limits the control and autonomy of RECs to their local shareholders or members in practice it may be questionable whether a medium-sized enterprise would qualify as "local" if it had, *e.g.,* headquarters or subsidiaries not located in the proximity of the RE-project; for such enterprises participating in a REC thus would come at the price of not being among the shareholders controlling the project. At the same time if a medium-sized enterprise is a genuine local partner it opens up access to financing for RECs which – as a specific form of CECs – are benefitting from an enabling framework promoting and facilitate their development. Furthermore, as pointed out above, RECs have an own area of operation not falling under the IEMD/R as far as other types of energy, that is, not electricity, are concerned which may require a different size of professional partners.

With regard to the **purpose** of energy communities RED II and IEMD are equal. Art 2 para. 16 (c) RED II stipulates the primary purpose of a REC *"to provide environmental, economic or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits"* which is almost the identical wording of Art. 2 pt. 11 IEMD. The **scope of operation** of energy communities in general is defined in Art. 2 pt. 11 IEMD as follows A citizens energy community *"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;"*. However, as already stated RECs have an additional scope of operation where energy that is not electricity is concerned. Within this range energy communities are entitled to sell their production, including through power purchase agreements. Interestingly, Art. 21 para 5 RED II stipulates that *"(t)he renewables self-consumer's installation may be owned by a third party or managed by a third party for installation,*

49 Since the notion of "effective control" is neither defined in RED II nor in IEMD its interpretation when transposing the directives will depend on the principles of national company, tax or contract law or other rules determining when a shareholder or member of a legal person is ultimately responsible for their decisions; *see* also M. Jasiak, *loc. cit.* p.32.

50 Proximity will have to be further defined by the Member States when transposing RED II through land use, zoning or similar national legislation; *see* also M. Jasiak, *loc. cit.* p.32.

51 "Autonomy" in this context should be understood as a 33% ceiling for ownership stakes of individual shareholders or members; more generally, recital 71 RED II stipulates that *"REC should be capable of remaining autonomous from individual members and other traditional market actors that participate in the community as members or shareholders, or who cooperate through other means such as investment"*.

52 For the definitions *see* Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises, 2003/361/EC, OJ L 124.

53 This is confirmed by recital (44) IEMD stipulating that *"Membership of citizen energy communities should be open to all categories of entities. However, the decision-making powers within a citizen energy community should be limited to those members or shareholders that are not engaged in large scale commercial activity and for which the energy sector does not constitute a primary area of economic activity. Citizen energy communities are considered to be a category of cooperation of citizens or local actors that should be subject to recognition and protection under the Union law...."*

operation, including metering and maintenance, provided that the third party remains subject to the renewables self-consumer's instructions. The third party itself shall not be considered to be a renewables self-consumer." The equivalent in the IEMD with regard to the right to commissioning tasks is Art. 15 para 2 (d) entitling CECs *"to delegate to a third party the management of the installations required for their activities, including installation, operation, data handling and maintenance, without that third party being considered to be an active customer;"*. The issue of owning, establishing, purchasing or leasing distribution networks and to autonomously managing them is discussed below in section V in the context of a specific scope of energy communities' operations branded "energy/electricity sharing".

2. Rights, obligations and incentives

Recital (30b) IEMD stipulates that *"(t)he provisions of this Directive on citizens energy communities provide for rights and obligations, which are possible to deduce from other, existing rules, such as the freedom of contracting, the right to switch supplier, the responsibilities of the distribution system operator, the rules on network charges, and balancing obligations."* These rights (for the rights of RECs *see* also Figure 3 above) and obligations of energy communities are stipulated both horizontally and vertically in a general manner in Arts. 16 IEMD and 22 RED II and more specifically throughout both directives. This includes for example the repartition of network charges in a transparent, non-discriminatory and cost reflective way, however, ensuring that energy communities contribute in an adequate and balanced way to the overall cost sharing of the system. In this context it is important to stress that both IEMD and RED II ensure that energy community members maintain their rights and obligations as customers (*see* Art. 16 para. 3 (e) IEMD and Art. 22 para. 2 (b) RED II). The non-discriminatory regulatory framework should take into account the non-professional, consumer-oriented and innovative character of energy communities where possible, provided that this does not collide with overriding public interest. The degree of regulatory overview depends, of course, on the scope of activity of an energy community and, for example, is lower for commercial activities and higher for network operation. For the specific provisions on management of distribution networks *see* below section V. 2 d).

Apart from the general catalogues of rights and duties there are also rules with specifications and exemptions for energy communities. According to Art. 5 IEMR market participants have balance responsibility, i.e., they are responsible for any imbalances they cause in the electricity system and are either themselves *"balance responsible parties"* or may contractually delegate their responsibility. However, Members States may allow derogations for RE plants with an installed electricity capacity of less than 400 kW (and for RE plants commissioned after 1 January 2026 less than 200 kW) provided that financial responsibilities for imbalances are fulfilled by another party. Non-discriminatory access also for renewable electricity to balancing markets is guaranteed by Art. 6 IEMR including electricity generated from variable RES, demand response and energy storage, be it individual or through aggregation. Art. 8 IEMR stipulates that electricity market operators on day-ahead and intraday markets shall provide products for trading in these markets with minimum bid sizes of 500 Kilowatt or less sufficiently small to allow for demand-side response, energy storage and small-scale renewables also directly by prosumers. With regard to non-market-based redispatching[54] Art. 13 para 6 IEMR defines an exemption from downward redispatching and possible curtailment for self-generated renewable electricity which is not fed into the grid unless no other solution is available to resolve grid security issues.

With regard to incentives, RED II puts RECs in a better position towards public authorities and other electricity undertakings providing a catalogue of explicit rights granted specifically to them and defining the principles of non-discriminatory and proportionate treatment. This additional scope of RED II is of particular importance in Member States where RECs do not yet exist like for example in Eastern Europe. This obligation of Member States in Art. 22 RED II includes to ensure that *"unjustified regulatory and administrative barriers are removed"*, *"tools to facilitate access to finance and information are available"*, *"regulatory and capacity-building support is provided to public authorities in enabling and setting up RECs, and in helping authorities to participate directly"* and that they *"take into account specificities of renewable energy communities when*

54 Market-based redispatching with resources selected amongst generation, storage or demand facilities and being financially compensated is the rule while non-market-based redispatching is only a default solution.

designing support schemes in order to allow them to compete for support on an equal footing with other market participants." To avoid that utilities or financial investors set up RECs to benefit from this consumer-oriented enabling framework RED II limits corporate control to the above-mentioned qualified categories of entities and excludes undertakings whose participation in a REC constitutes their primary commercial or professional activity.

V. Electricity / energy sharing

Over more than two decades since the 1990s the increasing connectedness of digital processes via telephonic or fibre-optic or satellite transmission resulted in computers today being interlinked across local and global networks. The Internet starting out as a communication tool for military and research purposes and over time, morphed into a commercial entity with ever-faster emerging web services and shared computing resources provided via what is dubbed "the cloud". Interconnected machines and software did not only make it possible to execute physical actions digitally but dramatically reduced the dependence on geographical locality,[55] a key element for the development of decentralised RE production. This development also gave birth to smart grid technology, that is, smart meters and information and communication technologies (ICT) enabling the active interface between the supply and demand sides in energy value chains. The opportunity for electronic communication based on decentralised interaction no longer necessarily brokered by the incumbent energy companies and their intermediaries also brought along prospects for trade between small-scale energy producers. These new opportunities digitalisation brought along for the Energy Transition – as well as the accompanying challenges – are reflected in both RED II and IEMD/R. In the context of RECs this regards on the one hand (virtual) net-metering, energy/electricity sharing. The context and aims of the introduction of energy/electricity sharing are probably best reflected in recital 7 IEMR: *"In the past, electricity customers were purely passive, often buying electricity at regulated prices which had no direct relation to the market. In the future, customers need to be enabled to fully participate in the market on equal footing with other market participants and need to be empowered to manage their energy consumption. To integrate the growing share of renewable energy, the future electricity system should make use of all available sources of flexibility, particularly demand side solutions and energy storage, and should make use of digitalisation through the integration of innovative technologies with the electricity system. …"*

Consequently recital 71 RED II stipulates that "Renewable energy communities should be able to share between themselves energy that is produced by their community-owned installations."

1. Definition and scope

Art 21 para 4 RED II obliges Member States to ensure that renewables self-consumers located in the same building, including multi-apartment blocks, are entitled to engage jointly in prosumership and *"that they are permitted to arrange sharing of renewable energy that is produced on their site or sites between themselves, without prejudice to the network charges and other relevant charges, fees, levies and taxes applicable to each renewables self-consumer",* but the RED II falls short to provide a definition of energy sharing. The legislator has left this definition to IEMD in recital (46): *"Electricity sharing enables members or shareholders to be supplied with electricity from the generation installations within the community without being in direct physical proximity to the generating installation and without being behind a single metering point."* During the trilogue the council approach had still used the term *"virtual sharing"* which only in the final negotiation was substituted by *"electricity sharing"*. Against this background it seems justified to include the right to virtual net-metering within the community[56] as an element of *"electricity sharing"*. This is confirmed in an earlier passage of the same recital (46) IEMD describing the technical frame specifically linked to technologies and communication technologies (ICT): *"Citizens energy communities should not face regulatory restrictions when they apply existing or future ICT to share electricity produced using generation assets within the community among their members or shareholders based on market principles, for example by offsetting the energy component of members or shareholders using the generation*

55 W. B. Arthur, *"Where is technology taking the economy?"* Seattle: McKinsey Quarterly, 2017.

56 In this context virtual net metering should be understood as a tariff arrangement within an energy community that, *e.g.*, enables a multi-meter property owner to allocate the property's solar system's energy credits to tenants as (co-)owners of the installation.

available within the community, even over the public network, provided that both metering points belong to the community".[57]

Consequently, it is also the IEMD that in Art 16 para 3 obliges Member States to ensure that citizens energy communities: *"… (e) are entitled to arrange within the community sharing of electricity that is produced by the production units owned by the community subject to other requirements laid down in this article and subject to the community members retaining their rights and obligations as final customers."* With regard to point (e) it, however, stipulates that *"where electricity is shared, this shall be without prejudice to applicable network charges, tariffs and levies, in accordance with a transparent cost-benefit analysis of distributed energy resources developed by the competent national authority."* Taking into consideration the aim of RED II and IEMD/R to integrate RES into the energy markets and to avoid conflicting interpretations it can be assumed that above principles apply also to RECs in the area of operation not falling under the IEMD/R as far as other types of energy than electricity are concerned. This is particularly important with regard to the possibility to benefit from small-scale back-up conventional generation as an important element for micro-grid solutions.[58]

In this context pursuant to Art. 16 para 2 IEMD Member States may provide in the enabling regulatory framework that CECs *"… (b) are entitled to own, establish, purchase or lease distribution networks and to autonomously manage them subject to conditions"* set out in Article 16 para 4. Whereas the REC's equivalent rights in principle follow from their properties as a specific form of CEC it remains unclear whether – unlike for CECs – Members States are obliged to grant them these rights. The doubt stems from the fact that Art. 22 para 4 RED II stipulates that the enabling framework to promote and facilitate the development RECs *"shall ensure, inter alia, that: … (e) renewable energy communities are not subject to discriminatory treatment with regard* ***to their activities, rights and obligations as*** *final customers, producers, suppliers,* ***distribution system operators,*** *or as other market participants"* (emphasis by the author); their resulting right to operate distribution systems would imply that they are also entitled to own distribution systems which would, however, result in a conflicting interpretation with the mere possibility to grant this right to CECs in the IEMD. Moreover, the legislator should have been – again – more precise with regard to the question whether or not this equally applies to networks distributing other forms of energy than electricity.

2. The underlying smart grid technology

a) Smart meters, smart grids.

Today, with decentralised production schemes and local self-consumption technologically practicable and economically feasible consumer owners of RES in principle have the opportunity for a second source of income from capital ownership in RE. However, prerequisite for this economic incentive unleashing its potential to influence prosumers' consumption behaviour is the availability of choice between self-consumption and sale (for more details *see* Section III. 3. above). This type of trade can take place either in a closed circuit, that is, a micro grid (MG), or using the existing distribution networks, while in both cases, however, relying on smart grid technology.

In enabling peer-to-peer trading of self-produced energy, the digitalisation thus has the potential to solve a core problem of distributed generation and in particular prosumership, that is, how to trade the energy produced and on which market. In the fossil energy world this market has been characterised by pre-formulated bilateral agreements and a structural asymmetry between vast numbers of consumers on the one side and few retail energy suppliers on the other with the latter imposing the conditions of contract. Limiting the economic prospects of prosumership, this structural asymmetry impaired the large-scale deployment and diffusion of micro-generation.[59] With decentralised RE production, for the first time, access to energy markets that used to be the privileged playing field of incumbent energy suppliers seems to open up to the prosumer. Consequently Arts. 19 – 22 IEMD re-launch the

57 The EP had proposed Art. 16a IEMD expressly referring to virtual net metering and ICT as follows: including applying existing or future ICT technologies such as virtual net metering schemes and those based on distributed ledger technologies, as well as through power purchase agreements or peer-to-peer trade arrangements for example ; however Art. 16a was not included instead leaving the definitions to the mentioned recitals.

58 *See* also M. Jasiak, Energy Communities in the Clean Energy Package , *loc. cit.*, p. 36.

59 I. Kounelis, G. Steri, R. Giuliani, D. Geneiatakis, R. Neisse, I. Nai-Fovino, "Fostering consumers' energy market through smart contracts", *Energy and Sustainability in Small Developing Economies (ES2DE), 2017 International Conference*, pp. 1-6.

roll-out of smart metering[60] with the relevant provisions applying to future installations and to installations replacing older smart meters. Art. 19 para 2 IEMD stipulates that "Member States shall ensure the deployment in their territories of smart metering systems that assist the active participation of customers in the electricity market." However, this may be subject to a cost-benefit assessment according to the principles laid down in Annex III of the directive. Where smart metering is negatively assessed as a result of the mentioned cost-benefit assessment pursuant to Art. 21 IEMD consumers as final customers – while bearing associated costs – are entitled to have a smart meter installed or upgraded. The underlying rationale is to promote EE and empower final customers with the aim to optimise the use of electricity, *inter alia* by introducing interoperable smart metering systems in particular with consumer energy management systems and smart grids, providing energy management services and developing innovative pricing formulas (in particular with consumer energy management systems and smart grids (compare Art. 19 para 1 IEMD).[61]

While having the obvious advantage of interconnecting energy consumers with energy producers, smart grid technology can be key to enabling an improved balance of electricity supply and demand in decentralized grid control, but that requires substantial investments. Global smart grid investments in Western Europe alone are estimated to reach EUR 110 billion until 2027[62] as compared to EUR 3.15 billion in 2014 with the bulk of investments in smart grid projects stimulated by public funding.

b) (Virtual) net-metering

While net metering is beneficial to the prosumer it is problematic for the energy system as a whole, above all when large deployment levels are reached.[63] Price variation and grid constraints, that is, peaks or slumps are not taken into account and thus, as with FiTs, price signals and demand-flexibility are impaired. Therefore, a number of restrictions and adaptations have been implemented to make net metering "grid-friendlier" and more flexible. The EESC promotes the combination of FITs with net metering to provide small investors with guaranteed fixed prices while at the same time benefitting from grid flexibility measures.[64] In many countries, net metering is restricted in time (Denmark) or to small scale projects (Netherlands, Belgium) or by evaluating at wholesale price the electricity fed in, which is then paid or credited to the prosumer (Italy).[65] Finally, net metering usually requires that the owner of the RE system and the self-consumer are identical while it is not possible when the plant's owner is a third party. Exceptions are virtual net metering, the "postal code" approach in the Netherlands or the new German tenant electricity model.[66]

During the trilogue concerning the recast of the RED (February-June 2018), net metering and exemption from grid costs were one of the primary bones of contention. Nevertheless, the final RED II compromise stressed that prosumers are the link for reconnecting market integration and variable RES promotion, both as demand-flexible consumers and potential new investors.[67] Therefore, it is ever more important that the IEMD allows electricity sharing from the generation plants within the community without being in direct physical proximity or behind a single metering point (*see* above section 1 "definition and scope"); here, recital (46) IEMD clarifies that this concerns "generation available within the community, even over the public network, provided that both metering points belong to the community" (emphasis by the author).

60 Defined in Art. 2 pt. 23 IEMD as *"an electronic system that capable of measuring electricity fed into the grid or electricity consumed from the grid, providing more information than a conventional meter, and that is capable of transmitting and receiving data for information, monitoring and control purposes, using a form of electronic communication".*

61 This is particularly important in the light of Art. 11 IEMD stipulating an entitlement to dynamic electricity price contracts: *"Member States shall ensure that the national regulatory framework enables electricity suppliers to offer a dynamic electricity price contract. Member States shall ensure that final customers who have a smart meter installed can request to conclude a dynamic electricity price contract with at least one supplier and with every supplier that has more than 200,000 final customers."*

62 Northeast Group Western Europe Smart Grid: Market Forecast (2017-2027) , June 2017, available at www.northeast-group.com, accessed 27 April 2018.

63 European Commission, Staff Working Paper, "Best practices on Renewable Energy Self Consumption", SWD2015/141/EC.

64 "Changing the future of energy. Civil society as a main player in renewable energy generation", Final Report, Brussels, 2015.

65 European Commission, Staff Working Paper, "Best practices on Renewable Energy Self Consumption", SWD2015/141/EC, 2015.

66 *See* S. Akerboom, F. van Tulder (chapter 15) and Ö. Yildiz (chapter 13) in: J. Lowitzsch (ed.), Energy Transition, 2019, *op. cit.*

67 Their potential, however, can only be harnessed conditional on a market design offering a level-playing field and allowing for dynamic market-based price signals that have the potential to kick-start demand response and foster a stable but adaptable framework for long-term investments.

c) Distributed ledger technologies and peer-to-peer trading

Art. 2 (18) RED II defines 'peer-to-peer trading' as "the sale of renewable energy between market participants by means of a contract with pre-determined conditions governing the automated execution and settlement of the transaction, either directly between market participants or indirectly through a certified third-party market participant, such as an aggregator." The underlying blockchain technology relies on the concept of tracking single transactions simultaneously on a shared ledger that the parties to the transaction trust to be accurate and permanent.[68] The Internet, being inherently decentralised, is the natural information grid for blockchain technology.[69] The name blockchain stems from the way information is stored: Transactions are periodically bundled into blocks to create an immutable chain. Each time a new block is confirmed, it is synchronised between all nodes having to agree on the new block enabling immutability of all entries independent of a centralised clearing intermediary.

Applied to energy prosumage[70] blockchain technology creates a transparent, flexible and distributed consumer-owned platform which can register the information on energy prosumption collected from smart metering devices in a tamper proof manner.[71] When this electronic ledger is combined with self-enforcing "smart contracts", that is, a contract which is executed between the two parties when predefined parameters are fulfilled without any further physical action or expression of will, necessary standard transactions can be executed automatically within guaranteed intervals. This type of automated trading would allow to define expected energy flexibility at the level of each prosumer ex ante and to set rules for balancing energy demand with energy production at grid level including the associated rewards or penalties.[72]

As of 2019, both demand and small-scale energy production of prosumers are none-controllable parameters in the energy system. Under the current technology and policy framework, a decentralised grid system with an increasing share of RE is economically inefficient as it requires an extensive need for backup power plants resulting in vast redundancies on the supply side. Blockchain technology promises a first step towards a possible real-time consumer (co-)owned energy economy, as it would permit to allocate resources in real time through the price-driven infeed and exit of energy. For the trading of excess energy production prosumers would not rely any longer on an intermediary charging them transaction costs but instead have the economic incentive to act as local suppliers. At the same time a broader choice with regard to both energy supply and demand, entices to take a more active role which in turn will favour local RE production).[73] This would facilitate self-consumption as well as on- and off-grid sale: Peers are able to sell and buy energy directly from other peers in the same MG in line with their production and consumption behaviour or – depending on market prices – opt for feeding it into the public grid. For example, energy produced in a RE installation of one apartment building can be balanced between the different parties avoiding levies for the use of the public grid when prices are low as a result of excess supply or sold to other consumers in times of high demand when prices offset these levies.[74]

However, the potential to render numerous, small-sized energy transactions between two private parties cost-efficiently depends on the cost of the blockchain transactions itself. While economies of scale tend to favour larger transactions there are also bandwidth issues limiting individual blockchain protocols: A centralised system can immediately verify and record transactions. On a distributed ledger, transactions must be recorded, verified and accepted by a majority of participating nodes in very short intervals to

68 Cf. D. Siegel, *"Pull: the power of the semantic web to transform your businesss"*, Penguin, 2009.

69 The majority of research projects is centred on direct exchanges of energy between customers, that is, "peer-to-peer" marketing of energy and offering electricity based on crypto currencies. However, the fields of application include managing the trade of REC and the charging of electric vehicles or optimizing internal and business-to-business processes in large energy companies; *see* Emerton, "Emerton whitepaper – Blockchain in the energy sector", 2017, available at: http://www.emerton.co/blockchain-in-the-energy/ accessed 27 April 2018.

70 *See* W.-P. Schill *et al.*, "Solar prosumage: pros, cons, and an illustration of system effects" in: J. Lowitzsch (ed.), Energy Transition, 2019, *op. cit*.

71 *See* Grid+, Grid+ Whitepaper v2.0 - The Future of Energy , 2017, available at: https://gridplus.io/assets/Gridwhitepaper.pdf, accessed 27 April 2018.

72 C. Pop, T. Cioara, M. Antal, I. Anghel, I. Salomie, M. Bertoncini, Blockchain Based Decentralized Management of Demand Response Programs in Smart Energy Grids , Sensors (Basel), 2018 January 9; 18(1).

73 *See* Emerton, 2017, *loc. cit.* A virtual MG in Brooklyn, New York, enabling prosumers to buy and sell energy produced locally between neighbours without exiting the local distribution infrastructure is one of the most advanced projects is run by LO3ENERGY and Consensus Systems, two US start-ups. A LO3ENERGY blockchain-based trading platform is combined with a Siemens MG management solution (https://lo3energy.com/innovations/, accessed 27 April 2018).

74 Furthermore, as blockchains would allow the formation of smart contracts between all involved parties with a transparent documentation of transactions open to scrutiny, the certification of green energy products is possible proving that electricity is from renewable or regional sources.

guarantee independence and trustworthiness. The required synchronicity of a transmission within a certain time frame to a large number of nodes in the Internet imposes limits of the possible number of transactions in a given interval depending on the bandwidth of the communication channels used.[75] For example IOTA, a blockchain designed for the Internet of Things, can handle above 100 transactions per second on a small network of less than 250 nodes.[76] In comparison, VISA had an average of 1,667 transactions per second in 2016.[77] These latency issues put the blockchain technology in competition with mature alternative technologies like for example mobile payments for electricity offers in Africa.[78]

Furthermore, the security and privacy of consumption and trading data pose challenges requiring encrypted messaging streams and multi-signatures to guarantee anonymity.[79] Finally, the "proof-of-work" consensus mechanism underlying early blockchains, such as Bitcoin,[80] is in its current form unsustainable as it requires computationally very hard problems for mining a block; with computational power increasing exponentially according to Moore's Law the complexity for mining new blocks must also increase over time requiring an ever greater amount of electricity. Nonetheless, research is in progress to replace "proof-of-work" by "proof-of-stake" approaches that make time-consuming and electricity intensive "mining" unnecessary. If feasible, the "proof-of-stake" alternative would avoid "computational puzzles" required for both mining and authentication by choosing each creator of the subsequent block in the chain via various combinations of random selection and wealth or age (that is, the stake).

d) Micro Grids – RECs as owners and managers of distribution networks

As it can be expected that energy communities will have an important role in particular in remote rural areas or on islands which are less attractive for DSOs the possibility foreseen in Art. 16 para 2 (b) IEMD for Member States to grant them the right to own, establish, purchase or lease distribution networks and to autonomously manage them is of particular importance. In the case, that a REC acts as a network operator it becomes an addressee of the regulation framework and in particular of the conditions set out in Art. 16 para 3 IEMD. However, as recital (47) states the IEMD allows the Members States to grant such networks the same privileges as for closed distribution networks in the meaning of Art. 38 IEMD, in particular exemptions from procurement and approval requirements. This is an exception for energy communities since Art. 38 IEMD as a rule excludes the qualification as closed distribution networks if household customers are supplied. A MG, that is, a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that act as a single controllable entity with respect to the grid according to the U.S. Department of Energy[81] can operate in both modes, grid-connected or off-grid. Such MGs are an integral part of smart grids and can: (i) Facilitate combined heat and power (CHP) generation; (ii) help to mitigate system instability resulting from intermittent RE production; (iii) enhance reliability with intentional islanding ; and (iv) increase local reliability especially during energy outages. While most MGs are still military or research installations, they are increasingly employed in commercial, island or remote community settings. When interconnected to the grid, a MG allows the import and export with the macro grid while deferring capacity investments, reducing system losses and improving local reliability. When disconnected from the grid, a MG can operate autarkic, requiring the coordinated dispatch of distributed energy resources to ensure voltage and frequency regulation, typically providing service to remote off-grid locations.[82] As MGs are a disruptive, new technology system, barriers include a lack of standards especially for

75 D. Guinard, *"The Ledger of Every Thing: What Blockchain Technology Can (and Cannot) Do for the IoT."* Foreword by Don Tapscott, Blockchain Research Institute, 2017.

76 D. Schiener. *"A Primer on IOTA"*. IOTA Blog, 21 May 2017. https://blog.iota.org/a-primer-on-iota-with-presentation-e0a6eb2cc621, accessed 2 August 2018.

77 J. Vermeulen, *"Bitcoin and Ethereum vs Visa and PayPal – Transactions per second"*, 22 April 2017, https://mybroadband.co.za/news/banking/206742-bitcoin-and-ethereum-vs-visa-and-paypal-transactions-per-second.html, Accessed 2 August 2018.

78 *See* Emerton, 2017, *loc. cit.*

79 N. Z. Aitzhan, D. Svetinovic, "Security and Privacy in Decentralized Energy Trading through Multi-signatures, Blockchain and Anonymous Messaging Streams", in: IEEE Transactions on Dependable and Secure Computing, 2016, doi: 10.1109/TDSC.2016.2616861.

80 S. Nakamoto, *"Bitcoin: A peer-to-peer electronic cashsystem"*, 2008, https://bitcoin.org/en/bitcoin-paper, accessed 2 June 2018.

81 D. T. Ton, M. A. Smith, "The U.S. Department of Energy's Microgrid Initiative", The Electricity Journal 2012, http://dx.doi.org/10.1016/j.tej.2012.09.013.

82 S. Bahramirad, J. Svachula, A. Khodaei, J. R. Aguero, "Community Microgrids: A New Paradigm for Electricity Delivery". Electric Light & Power, December 15, 2014.

interconnection procedures as well as of financing models, as the majority of MG projects, so far, have been end-user financed with limited access to third-party capital.[83] However, with MGs being highly customized with no or few scalable prototypes, involving long-term large-scale investments and implying cyber-security concerns when connected to the macro grid, their field of application may remain narrow.

VI. Consumer Stock Ownership Plans as an answer to the quest for RECs

To meet the described challenges both of governance and scalability of the financing and ownership model on the one hand and those of acceptance of technological innovation and change of consumer behaviour on the other hand an innovative and flexible business model is needed. This is the Consumer Stock Ownership Plan or CSOP. A CSOP[84] can buy into an existing or invest in a new RE plant. Designed to facilitate scalable investments it is open to co-investments by municipalities, energy suppliers, plant engineers or other strategic partners. Moreover, as a low-threshold method of finance it enables individuals without savings or access to capital credit to invest in RE projects.[85] The CSOP as an alternative financing source for sustainable investments is of particular importance for municipalities that are charged with fulfilling EE and climate policy goals with these responsibilities straining their limited budgets often lack the funding to make the investment themselves. Aim of this contractual model is above all to facilitate bankability employing one bank loan instead of many micro loans thus reducing transaction costs. At the same time, individual liability of consumers is avoided while participating consumers acquire capital ownership, providing them with an additional source of income. Other important issues are easy tradability of the shares, deferral of taxation of profits for the consumer-shareholders and pooling of voting rights.[86]

In particular, low-income households who as a rule do not dispose of savings necessary for conventional investment schemes are enabled to repay their share of the acquisition loan from the future earnings of the investment: A fiduciary trust set up, *e.g.*, by the local community, managed by independent trustees is authorized to borrow funds for the acquisition of shares in the RE plant on behalf of the energy consumers. The shares are allocated among the consumer-beneficiaries in proportion to their respective energy purchases. Revenues from (i) the sale of the energy produced and (ii) monies saved from increased EE are used to repay the acquisition loan assumed by the CSOP. Once this debt is amortized this revenue is distributed to the consumer-beneficiaries.

1. Legal structure

In the continental European CSOP model, the legal form of the intermediary entity, which administers the CSOP shares until their earnings have repaid the initial loan, is derived from the Anglo-American Common Law trust.[87] In the absence of genuine trust legislation this leads to a two-tier structure, that is, a fiduciary closely held limited liability corporation (Trusteeship) setting up an operating closely held limited liability corporation (Operating-Company). Such under continental law, the financing structure employing two limited liability corporations pools individual investments while benefiting from the borrowing power of the corporate vehicle. Indirect share ownership using an intermediary entity that manages the shares held in trust for the consumer-beneficiaries and pools the voting rights executed by the trustee, implies a due professionalization of management: Participation in decision-making is channelled via the trustee while individual consumer-shareholders may execute control rights on a supervisory board or advisory council. Municipalities (or external investors) can buy into the project acquiring shares in the CSOP while being guaranteed corresponding voting rights.[88]

83 M. Soshinskaya, W.H.J. Crijns-Graus, J.M. Guerrero, J.C. Vasquez, "Microgrids: Experiences, barriers and success factors", Renewable and Sustainable Energy Reviews, 2014, (40): 659 672.

84 The CSOP was applied for the first time in 1958 with spectacular success in the U.S. by its innovator, Louis O. Kelso, a business and financial lawyer. It is related to Kelso s best-known financial innovation, the ESOP, which has enabled millions of American workers to become owners of their employer corporations, repaying the acquisition loan not from their wages but from the future earnings of their shares in the company. Today the ESOP is an integral part of American corporate finance. At the end of 2016 there were 6,717 ESOP and 2,898 ESOP-like plans in the USA, with about 14 million employees participating, that is, 13 per cent of private sector employees holding around USD 1.3 trillion in assets (NCEO, n.d.).

85 *See* J. Lowitzsch, F. Hanke, "Consumer (Co-)ownership in RE, EE & the fight against energy poverty A dilemma of energy transitions", RELP 2019, 9, 5 22.

86 *See* J. Lowitzsch, The CSOP financing technique Origins, legal concept and implementation , in: Energy Transition, 2019, *op. cit.*.

87 *See* J. Lowitzsch, S. Kudert and T. Neusel, Legal opinion on the German trust model , Viadrina working paper 2012.

88 *See* also for other infrastructure projects J. Lowitzsch, *"Community*

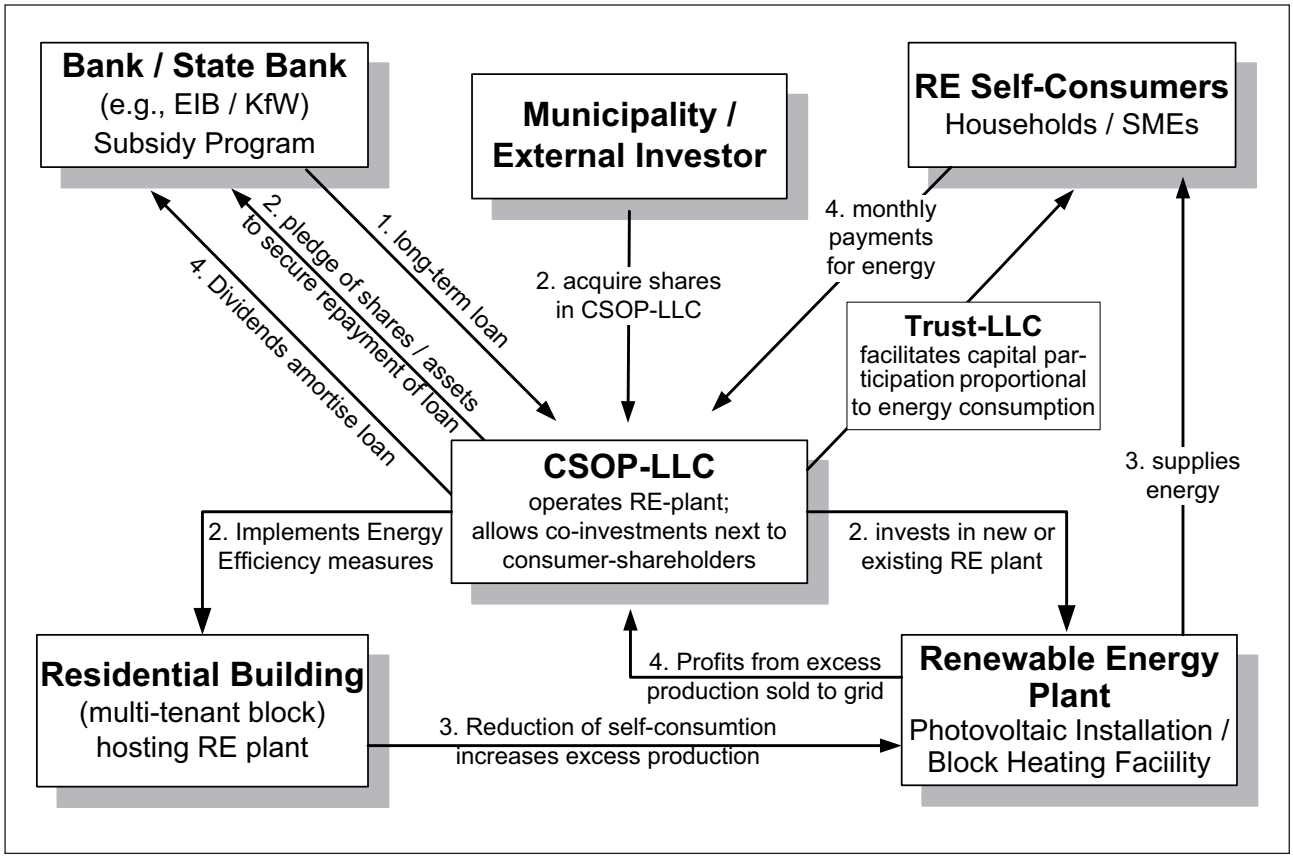

Figure 4. Financing of a RE plant and EE measures through a CSOP. Source: Own elaboration.

Pooling consumers "ownership rights in the CSOP also reduces transaction cost with regard to changes of participating individuals, *e.g.,* when consumer-beneficiaries move away from the region and transfer their share to new residents. To ensure easy tradability of the shares, the consumer (co-)ownership is facilitated through a trust entity. Thus, consumer shareholding in the Operating-Company is brokered by the Trusteeship; a trust agreement between the consumers and the Trusteeship is sufficient to render consumer shares fungible: It is the Trusteeship, which entering into a trust agreement with the consumer-trustors now holds the shares of the Operating-Company on behalf of the consumers (*see* Figure 4).

In the event of a change of the consumer-shareholder, the buyer or heir simply steps into the trust agreement in lieu of the former trustor. Unlike in the case of direct shareholding in the Operating-Company, changes of shareholders need not be registered, and the amount of participation held by the trustee is flexible, can fluctuate and is easily administrated. The basic mechanism is a trusteeship contract as proven in other investment settings.

2. The challenge: including heterogeneous co-investors in RECs via CSOPs

Complying with the above described prerequisites of RECs the CSOP aims at involving citizens and municipalities in local RE projects with the option to include SMEs and commercial investors. This approach facilitates the involvement of municipalities[89] as a pacemaker of the energy transition. Other than bringing together the interests of local citizens and their municipalities this is an important prerequisite for preferential conditions under the enabling framework for RECs as defined in Art. 22 RED II. The (optional) inclusion of minority stakes of commercial investors in itself is nothing new, e.g., citizen s energy projects in the wind sector in the legal form of limited partnerships often collaborate

participation and sustainable investment in city projects: The Berlin Water Consumer Stock Ownership Plan", Journal of Urban Regeneration & Renewal, 2017, Vol.10, Nr.2 pp. 138-151.

89 In particular municipal law typically stipulates four main prerequisites for participation of municipalities in RE projects, i.e., public purpose, capacities for the investment, subsidiarity, appropriate representation.

with professional partners. Depending on the type of project and the underlying technology, it may be very useful to include professional operators, as operation and maintenance of infrastructure can be very complex; this concerns for example wind energy and bioenergy but also energy cluster projects aiming at sector coupling that may involve electricity sharing, storage, e-mobility, cogeneration, and the like.

Conventional business models for consumer ownership may not always allow for the combination of different types of co-investors. With regard to cooperatives for example the one-member one vote principle is inclined to be an obstacle to partner with SMEs and commercial investors since they will prefer voting rights proportional to their shareholding. Furthermore, the necessity of representation on management and supervisory bodies has been reported an obstacle to municipal investments as cooperative law does not acknowledge a right of delegation familiar to legislation on joint stock companies. This is where cooperative projects often set up special purpose vehicles. The CSOP involves such a standard special purpose vehicle but with a defined governance structure allowing for the direct involvement of municipalities and strategic partners while safeguarding the interests of the local partners. Thus, it avoids obstacles related to the principle of self-governance[90] and to the question of representation of municipalities on the board.

At the same time members of an energy cooperative can participate in a CSOP when expanding an existing facility together with strategic partners. As a rule, consumers will hold between 33 and 51% of the shares in the Operating-Company running the RE-facility and together with the municipality will have a majority interest. Regarding the exercise of consumer s voting rights, the CSOP offers flexibility: The articles of association stipulate which matters are to be deliberated either by the trustee (e.g., day-to-day business) or voted by CSOP-members (*e.g.*, strategic decisions). It is thus the consumers themselves that determinate the extent of their involvement facilitating a process of apprenticeship. Finally, as the CSOP business model uses the borrowing power of a corporation it enables the participation of vulnerable consumers that are underrepresented so far.

In practice CSOP financing is based on a modular approach extending a base model depending on the type of different co-investors involved, their investment horizons, needs and aims:[91]

- The base model is simply composed of the Trusteeship[92] and the Operating-Company (*see* also Figure 4). This structure responds to a setting where a strategic co-investor has a local long-term interest (*e.g.*, acceptance of a wind park project) and does not mind burdening the Operating Company with the capital acquisition loan for consumers; all shareholders are proportionally liable for the debt of the Operating Company.

- A more complex structure results when the strategic Investor for example has a short-term interest and will not engage in the project if his shareholding would be burdened with the acquisition loan that facilitates the consumer shareholding; in this setting the Operating Company stands next to a Holding Company with only the latter being liable for the acquisition loan.[93]

When upscaling and pooling more than one CSOP investment the structure is yet more complex: The Operating Company runs X number of RE-CSOP projects while separate Asset Companies own the RE-plants of various CSOPs. Strategic investors with differing short- or long-term interest like management, capital investment, electricity storage, aggregation and demand response or a distribution system operator of a micro grid can invest at the different levels accordingly (*see* Figure 5).

To sum up, together with the potential of scalability being compatible with conventional investments gives the CSOP the advantage to avoid concerns of market fragmentation (*see* above Section III.1). Sub-scale investments can be eschewed, local projects pooled and partnerships with municipalities set up thus advancing to economies of scale while retaining the benefits of individual consumer participation.

90 Cooperative members take all management and board positions; representation by third parties it not permitted.

91 For details *see* J. Lowitzsch, "Consumer Stock Ownership Plans (CSOPs) The Prototype Business Model for Renewable Energy Communities", Energies 2020, 13, 118; doi:10.3390/en13010118.

92 The trusteed entity could, of course, also be a RE-cooperative that is already in place which, however, would have implications for the taxation of individual consumer (co-)owners.

93 National tax law permitting as for example in Poland, the Operating Company and the Holding Company may form a "Capital Tax Group" with the financing cost of the loan lowering profits of RE-Plant resulting in a repayment of the loan with pre-tax money.

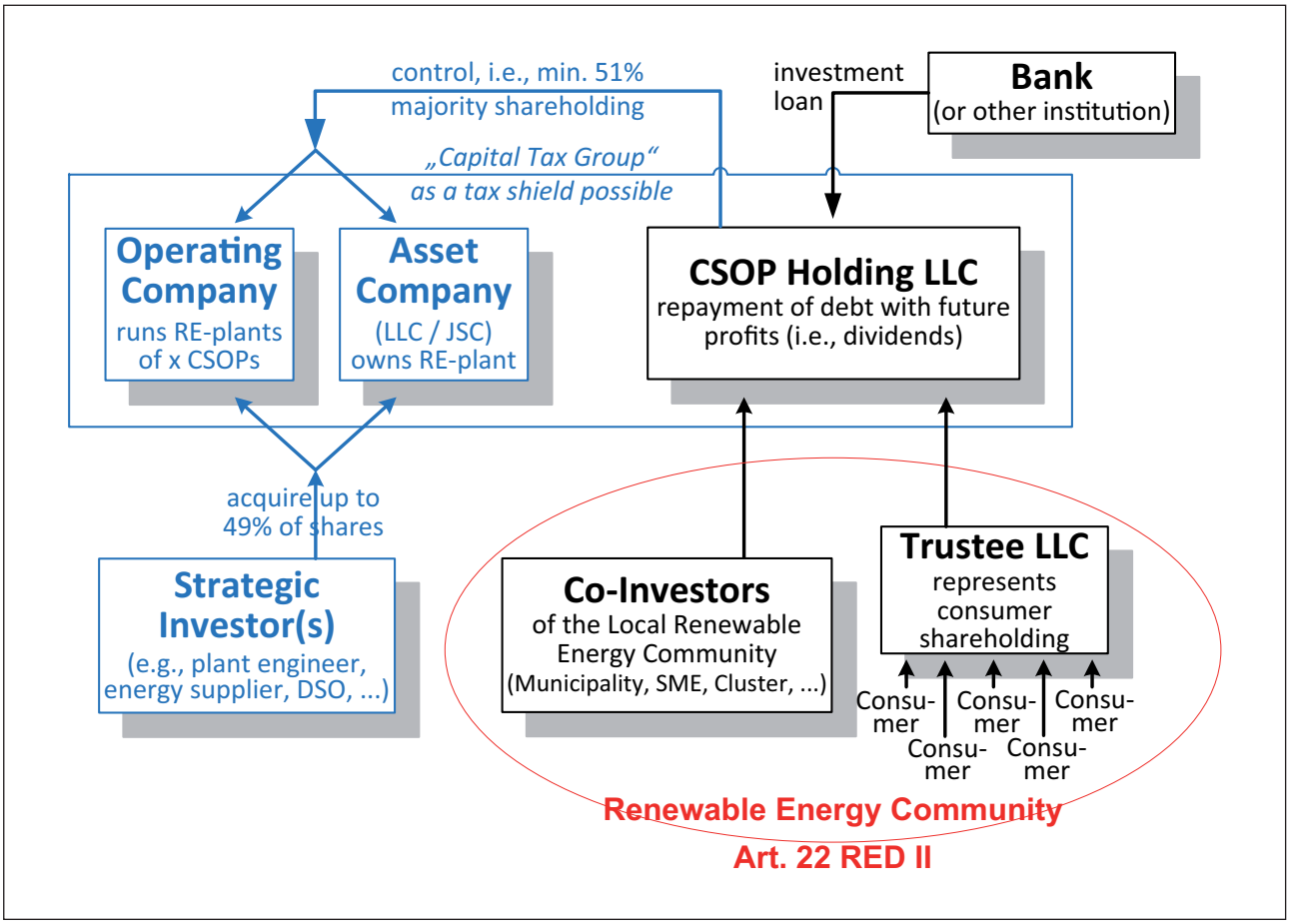

Figure 5. Including heterogeneous co-investors in RECs in a CSOP. Source: Own elaboration.

VII. Conclusion: Renewable Energy Communities, a prerequisite for the Energy Transition

During the past 25 years, communities, small businesses and particularly consumers as individuals and households have invested heavily in energy from wind, solar and biomass. Decentralized energy production has proved to be an efficient means for fostering both the *Energy Transition* and a low-emission-economy. Essential measures such as planning designation or grid extensions are more likely to gain acceptance when civil society is involved.[94] RECs can educate citizens in responsible energy use. In addition to economic impetus, community involvement offers other advantages. Local social capital[95] is not limited to projects of self-organisation but can be a resource for future endeavours. Moreover, by reducing its carbon footprint and improving its sustainability profile, communities make themselves more attractive.

The broadened RE ownership structure innovated in countries like Germany, the Netherlands, Denmark or Great Britain primarily depends upon the particular form of Energy Transition those countries have chosen and the type of FITs at the core of those reforms.[96] Guaranteed FITs have proved to be the most effective means of repaying RE installation loans, providing at the same time investment security and a more accurate assessment of project risk, while widening the investor circle, particularly citizens as individuals. By stimulating innovation, this model has enabled renewables to achieve grid parity, that is, reducing production costs to a level competitive with fossil

94 T. Schomerus *et al.*, *"EEG-2014: Das Ende der Bürgerenergie?"*, Energierecht Zeitschrift für die gesamte Energierechtspraxis, 2014, 3 (4), pp. 147-154.

95 Social capital is sociological term, which describes the rate of social cohesion (the 'social climate' so to speak), willingness for cooperation and the potential for mobilisation.

96 The 2000 model law EEG is one of the legal act most often copied in other countries around the world; it has been adopted and transferred worldwide: 71 countries and 28 states/ provinces enacted some form of feed-in policies as of early 2013, led by developing countries with regard to number of FITs in place (REN21 2013).

energy.[97] The success of this concept in promoting RES is exemplified by Germany, where the share of RE rose to 25.8 per cent already in September 2014, edging out brown coal as the country s primary energy source.[98] However, the consumer ownership model although already a proven success is slowed in its adaptation by two factors: Firstly, potential is sacrificed by inadequate potential for the scaling of investments; fewer medium and large size projects with citizen participation are being realised.[99]

Secondly, FITs are being replaced by auctions, resulting in worsening refinancing prospects for RE plants. This trend particularly disadvantages small producers who cannot compete with the large ones. This policy change will eventually impact the ownership structure as is already is the case in Germany where the ownership share of individual citizens and farmers decreased from about 50 to a little above 40 per cent between 2012 and 2016.[100] Large concerns are now investing in the RE business. The question is whether the resulting market consolidation and ownership concentration is compatible with the decentralised ownership structure essential to the Energy Transition as argued above. If the Energy Transition is to continue to progress, and if the share of RE is to reach 50 per cent of total energy consumption, structural changes need to be made. Financing systems must be redesigned so as to include more and eventually all groups of society in particular through RECs. However, as shown above conventional business models do not correspond to their requirements and organisational innovation is much needed to harness the potential of energy communities.

Against this background CSOPs can be an important bridge technology in financing citizen energy projects extending the advantages of RE-cooperatives where projects involve very different co-investors or where the cooperative model is not feasible for other reasons. This is especially the case in Eastern Europe where citizen energy projects are still rare and where the cooperative model is associated with the socialist past. Furthermore, the flexible governance structure of CSOPs offers the advantage to combine RE projects with active citizen participation, both financial and in decision-making while allowing for the participation of commercial investors. Especially in RE clusters[101] that target sector coupling and may involve electricity sharing, storage, e-mobility, cogeneration, etc. including professional operators will become increasingly important as operation and maintenance of infrastructure can quickly become very complex. Here the CSOP provides a standard governance model that safeguards the interests of local partners vis-à-vis their co-investors.

As a low-threshold financing concept CSOPs retain the benefits of individual consumer participation when advancing to economies of scale, while simultaneously being able to include low-income households. Inclusiveness is of particular importance with regard to gaining acceptance when rolling out smart meters and applying new ICT technologies important elements of energy/electricity sharing. With regard to the potential of the energy/electricity sharing within RECs it would be desirable that Member States grant RECs other than the right to electricity and energy sharing also that to own and manage of distribution networks (*see* Section V.2. d) above).

On a broader scale, transforming consumers into owners of RE installations strongly motivates them to more efficiently use energy. It also makes consumers more aware of energy use and triggers a learning process. This is a consumer educational process which in turn contributes to:

– Facilitating the use of ICT solutions, like smart meters and fostering closer alignment of consumption with volatile RE supply by increasing demand side flexibility (economic).

– Encouraging the public to accept the Energy Transition, particularly grid extension and installation of new RE production facilities, *e.g.*, wind turbines; also to provide practical information to civic and public agencies including public procurers in this field (social).

97 P. McKenna, *"Solar power will soon be as cheap as coal"*, 18 April 2015, http://www.realclearenergy.org.

98 Agora Energiewende, *"The Energiewende in the Power Sector: State of Affairs 2014"*, AGORA, 2015.

99 There are a few large and medium scale projects in Germany that are financed via closed-end funds but other business models suffer from high intra-organizational costs and high transaction costs.

100 *Cf.* trend:research, "Eigentümerstruktur: Erneuerbare Energien Entwicklung der Akteursvielfalt, Rolle der Energieversorger, Ausblick bis 2020", trend:research, Bremen, 2016; trend:research / Leuphana Universität Lüneburg, "Definition und Marktanalyse von Bürgerenergie in Deutschland", Study commissioned by the initiative Die Wende - Energie in Bürgerhand and the Agency for Renewable Energy, Bremen & Lüneburg, 2013.

101 *See* J. Lowitzsch, C. Hoicka, F. van Tulder, Renewable Energy Communities under the 2019 European Clean Energy Package Governance Model for the Energy Clusters of the Future? , RSER 2019 https://doi.org/10.1016/j.rser.2019.109489.

– Accelerating the Energy Transition by reducing emissions and the impact of energy production on climate and current externalities as well as contributing to sustainability goals (ecologic).